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Evaluating Growth in Broadband Using the Commission's Targets



In January 2018, at its Special Session at the Annual General Meeting of the World Economic Forum, the Broadband Commission extended and updated its existing five broadband targets to a total of seven targets. This report considers progress across all seven targets. Policy analysis and targets can play a significant role in informing, shaping and influencing policy priorities at the national and regional levels – for example, Viewpoint 11 describes how policy analysis has helped concretize policy thinking and priorities, from the perspective of the Government of Rwanda.

Viewpoint 11: The Importance of Policy Analysis for Shaping Policy Priorities in Africa – Government of Rwanda

Rwanda has made significant progress towards affordable broadband for all. In 2008, the Government of Rwanda (GoR) embarked on a nationwide roll-out of fibre optic as a backbone infrastructure for broadband. This optic fibre connected different parts of the country and provided high-capacity cross-border links with onward connectivity to submarine cables. In 2013, GoR published a new broadband policy aimed at restructuring the broadband market under an infrastructure-sharing regime, by putting in place a 4G LTE wholesale open-access network, as a means to accelerate roll-out of

broadband network services, and reduce overall infrastructure investment costs. The network is currently over 90% population coverage.

Policy analysis has helped guide the Government's planning and decision-making process, right from the start of the ICT4D journey in 2000. The GoR has developed the National 5-year ICT Plans since 2001, revised every five years. The fourth 5-year rolling plan, the *Smart Rwanda Masterplan*, was adopted in 2015 and includes, among others, a target for gender digital equality by 2020. The Broadband Commission targets and policy analysis were key inputs to the formulation of this and other targets for the *Smart Rwanda Masterplan*.

The Government's vision, policy and plans recognize broadband and ICTs in general, as a driver of economic growth, access to information and social cohesion, productivity and innovation across all sectors of the economy. Steps have been taken to promote innovation and entrepreneurship, reduce the cost of end-user devices, stimulate the development and uptake of relevant content and diffusion of technologies into various sectors of the economy. Broadband connectivity provides access to information and enables economic activities that create jobs,



reduce the cost of communications and improve government service delivery.

At the continental level, the leadership by H.E. President Paul Kagame and the work of the Broadband Commission have been a factor in numerous developments, including the *Smart Africa Initiative*. In October 2013, the first *Transform Africa Summit* was co-hosted by the GoR and ITU, and culminated in the *Smart Africa Manifesto* as a continental agenda to leverage ICTs for Africa's transformation. This manifesto was adopted at the African Union Summit in January 2014, effectively endorsing Smart Africa as a continental agenda.

The overall objective of Smart Africa is to foster integration across the continent, towards a single African digital market, spurring innovation, economic growth and job creation. Great progress has been made, with 25 Heads of State and Government across Africa committing to and embracing the Smart Africa Agenda, which includes the following pillars:

- Establishing an enabling policy environment;
- Promoting and expanding broadband access;

- Enabling efficient Government service delivery through e-Government;
- Putting the private sector first; and
- Sustainable Development.

In conclusion, policy analysis by the UN Broadband Commission has been a useful input for ICT policy formulation in Rwanda and, more generally, in Africa.

Source: Patrick Nyirishema, Director-General of RURA (Rwanda Utilities Regulatory Authority).

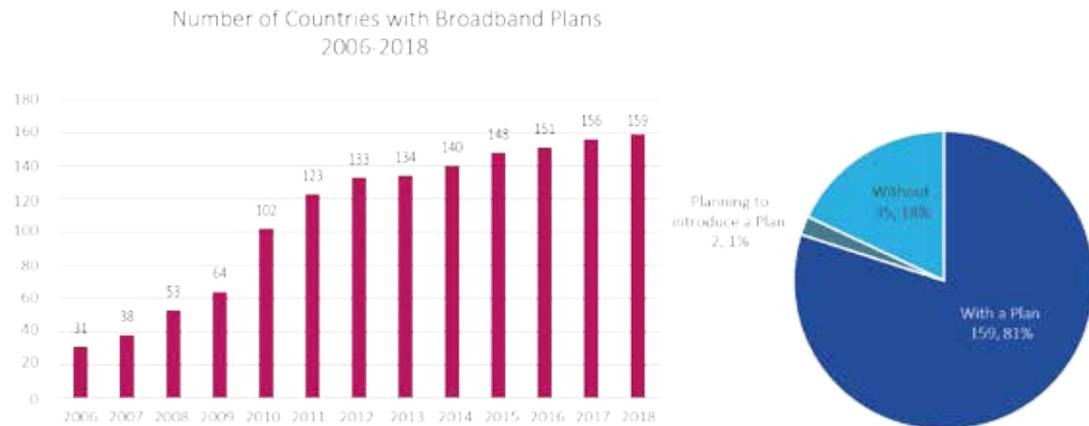
3.1 Advocacy Target 1: Making broadband policy universal

By 2025, all countries should have a National Broadband Plan or strategy or include broadband in their UAS definitions

Growth in the number of countries with NBPs has shown good progress, but has effectively stabilized over recent years (Figure 10, left). According to ITU data, 81% of all countries now have a NBP, at 159 countries in 2018, up from 156 in 2016 and 151 in 2015. 35 countries do not have a Plan (Appendix 1). For example, in Lebanon, the state-owned fixed-line telco, Ogero, has developed a network and Internet strategy. This plan for a national

Figure 10: Policy Leadership in National Broadband Plans, 2008-2018

Number of countries that have adopted a Plan or Strategy, planning to adopt or without (left chart); Growth in National Broadband Plans, 2006-2018 (right chart).



Source: ITU. Note: Charts based on data for 196 countries. National Broadband Plan or strategy includes: a plan, strategy or policy specific to broadband; digital plan, agenda, strategy or policy; ICT plan, strategy, or policy; or a communication plan, strategy, or policy.

fibre-optic upgrade aims for 85% of Lebanon’s population to access the Internet at speeds over 50 Mbps (ten times faster than many current connections) by end 2020. Investments of USD 99 million are planned in the fibre project investment in 2018. Ogero’s fixed voice network equipment upgrade is scheduled for the end of 2018, and wireless Internet coverage for rural areas for mid-2018, with the public Wi-Fi programme due to end in 2018¹.

Viewpoint 12 from the OECD discusses how national broadband availability targets are evolving. One obvious way in which NBPs are evolving is to include new technologies, such as IoT. For example, China has a national strategy for IoT. Following efforts by government and industries, China has built a huge narrow-band cellular IoT network, with over 700,000 active sites. In 2018, applications will exceed one million connections (including smart fire, smart gas, smart water and smart home), and a large number of innovative applications are emerging (including connected cattle and electric vehicle monitoring).

Another way in which NBPs should evolve is to take into account AI and data. According to Tim Dutton (2018), at least 15 countries have concrete national strategies for AI,

while another six countries are working to develop their strategy. In its “Data-Driven Development” report, the World Bank (2018) notes that “there is growing recognition within many governments that, in the digital economy, data is on par as an infrastructure asset with more traditional infrastructure like transport and public utilities. There is now interest in crafting policy that recognizes data as an infrastructure asset². Policies that discuss data infrastructure in the government typically focus on management of data assets (collection, access, reuse, sharing, preservation, security) and data governance (ownership, funding)”³. This implies data is an asset, similar to other infrastructure assets.

Viewpoint 12: Evolving National Broadband Availability Targets

In order to close broadband divides, it is necessary to measure the different availability and adoption gaps. Given the capabilities within each broadband speed threshold, a technology-neutral approach or a speed-based approach disaggregated to the smallest regional level possible is desirable, as it allows measuring

the accessibility gaps in terms of QoS for each area and type of user.

Baseline definitions of broadband remain important for measurement of high-speed network availability. When the 256 kbps threshold was established in 2001, it served the purpose of excluding ISDN and was, at that time, the lowest commonly offered commercially offered speed in OECD countries. Periodically, it has been suggested that the threshold speed for data collection be raised, but without consensus on a new baseline, it was instead decided to introduce speed tiers for reporting broadband subscriptions (e.g. 256 Kbps to 1.5/2 Mbps; 1.5/2 Mbps to 10 Mbps and so forth with increasing tiers of service to above 1 Gbps). While speed tiers are useful for comparisons, the current 256 kbps definition for broadband seems increasingly removed from the expectations of all stakeholders, including those in rural areas.

All OECD countries (apart from Japan⁴) have specific national goals for broadband availability. In the majority of countries, goals for broadband deployment are set in terms of speed of service offered and percentage of coverage, penetration and specific groups. Luxembourg has the highest access target with a goal of offering 1 Gbps to 100% of households by 2020, followed by Sweden with the goal of connecting 98% of both households and businesses with 1 Gbps broadband. Korea has the goal of connecting 90% of urban areas with 1 Gbps by 2017. Belgium aims for 50% of its households to have 1 Gbps by 2020 and Sweden 98% by 2025. Australia, Israel and several European countries have set national goals in the range from 25-30 Mbps, while Chile has a target of 10 Mbps (see Figure below).

Box Figure: Matrix of OECD national broadband targets per coverage and quality



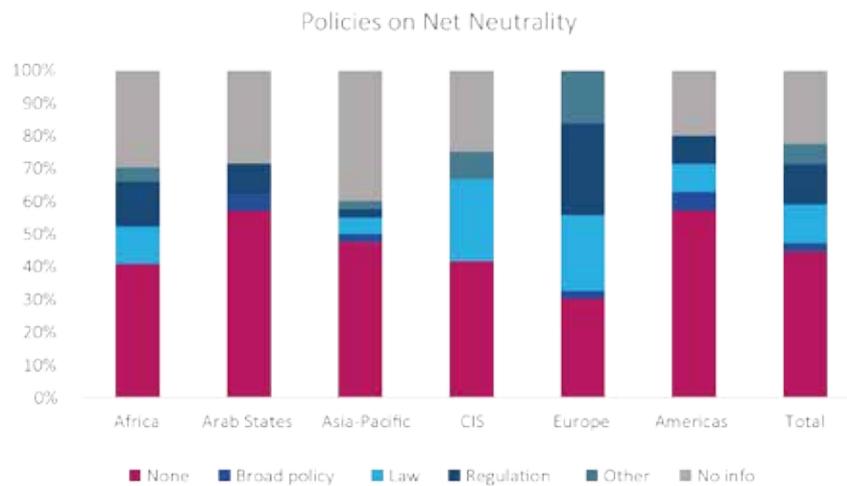
Source: OECD.

While broadband plans understandably focus on business and residences or aim at extending mobile broadband coverage in areas with little or no coverage, the mention of railways, highways and roads in Canada, the UK and EU goals is significant. Many

people in rural areas live close to highways and roads, even if their businesses and residences are distant to towns or cellular towers.

Policy frameworks that promote the maximum expansion of telecom and

Figure 11: Policies on Net Neutrality, 2017



Source: ITU World Telecommunication Regulatory Survey 2017. * Total 193 ITU Member States.

cable networks are desirable – partly because they reduce the area that needs to be addressed by other means, but also because they are likely to be a key ingredient in providing those alternatives. Connectivity targets for digitalizing rural areas needs residents to be treated as both consumers, as well as producers, of content. Helping rural areas be included in global value chains means identifying targets not only for higher download speeds, but also higher upload speeds, so they can share and create content online and benefit from developments such as cloud computing and big data.

Source: OECD (2018), “Bridging the Rural Digital Divide”, OECD Publishing, Paris.

Of course, while important, national broadband strategies are just one part of the regulatory and policy framework in place to govern the development of broadband in a country. Countries also have broad sets of telecom and broadband regulatory requirements in place – for example, relating to the mandate of the regulator, as well as net neutrality. Of ITU’s 193 Member States, 45% of countries have no clear policy statement on net neutrality in place, with the highest proportions in the Arab States (80%) and the Americas (71.4%). Europe is the region with the highest proportion

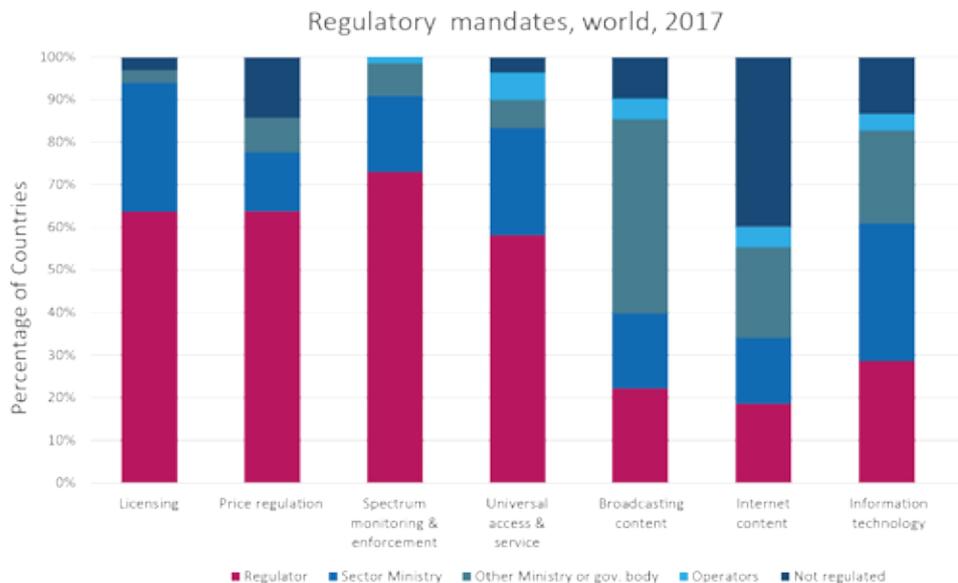
of countries with a statement or policy on net neutrality in place (70%) – Figure 11.

According to ITU’s *Global Regulatory Outlook Report 2017*, a growing number of countries have adopted or are in the process of adopting more flexible regulatory frameworks over the past decade, with a small, but growing, number of ICT regulators including the regulation of Internet content in their remit (Figure 12). Most regulators still focus on ‘traditional’ areas for ICT regulators, such as licensing and spectrum monitoring and enforcement (Figure 12).

Analysis of countries’ regulatory frameworks shows that a growing number of countries have adopted general or class licensing. ITU holds an annual Global Symposium for Regulators to debate the latest issues, review international best practices. ITU publishes its *Global Regulatory Outlook Report* annually to track regulatory developments around the world. Some countries have been moving to merge regulators – the most recent is Zimbabwe, which merged its telecom and broadcasting regulators, on the basis that telecoms show convergence with broadcasting⁵.

For example, in Singapore, the converged telecommunications and media regulator, IMDA, has adopted a regulatory sandbox

Figure 12: Who Regulates What in ICT?



Source: World Telecommunication Regulatory Survey 2018. * Total 193 ITU Member States.

approach to enable the industry to test innovative technologies. For instance, to facilitate trials of TV white spaces and 5G technologies, IMDA has waived certain licensing requirements and frequency fees. To encourage trials in Heterogeneous Network (HetNet) technologies as the next step in Singapore’s infrastructure, IMDA has offered grants to firms to roll out HetNet solutions at specific locations and facilitated access to buildings.

3.2 Advocacy Target 2: Making broadband affordable

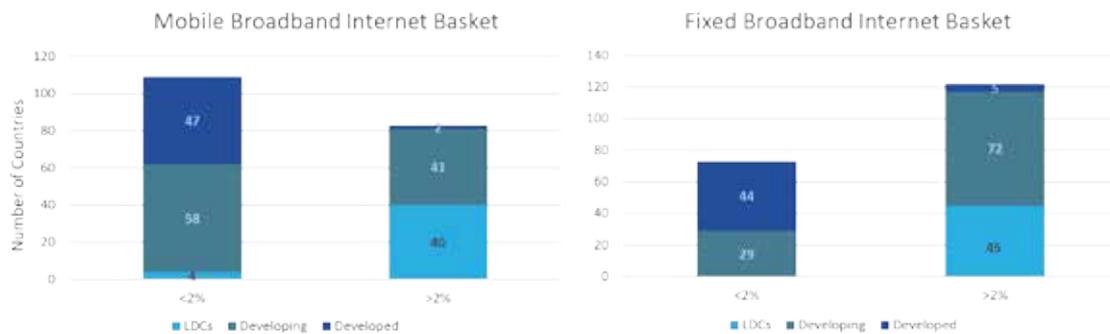
By 2025, entry-level broadband services should be made affordable in developing countries at less than 2% of monthly GNI per capita

Mobile broadband is more affordable than fixed-broadband services in most developing countries. For example, in LDCs, on average, an entry-level fixed-broadband subscription is 2.6 times more expensive than an entry-level mobile-broadband subscription. Mobile-broadband prices as a percentage of GNI per capita halved between 2013 and 2016 worldwide. The steepest decrease occurred

in LDCs, where prices fell from 32.4 to 14.1% of GNI. However, mobile broadband prices are still significantly more than 2% of GNI per capita in most LDCs and unaffordable for the large majority of the population.

In January 2017, the Broadband Commission lowered the de-facto standard for Internet affordability to 2% of average income, from the previous <5%⁶. For the fixed broadband sub-basket, 73 of ITU’s 193 Member States benefitted from an Internet package costing <2% of GNI per capita. 122 countries have not achieved the target (Figure 13). No single LDC has achieved this 2% target, while only five developed countries have not yet achieved the target, all in South-Eastern Europe (Albania, TFYR Macedonia, Moldova, Montenegro and Serbia). For the handset-based mobile broadband sub-basket, 109 of 192 countries enjoyed an Internet package costing <2% of GNI per capita, leaving 86 countries which have not achieved the target. Here, four LDCs have achieved the target (Bhutan, Cambodia, Lao PDR and Sudan), but nearly all developed countries have already met this target, with only two developed countries yet to achieve it (Bulgaria and Montenegro). Viewpoint 13 describes Singapore’s initiative to help realize more affordable connectivity for all walks of life.

Figure 13: Affordability & Broadband Prices, 2016



Source: ITU.

Viewpoint 13: Helping realize affordable connectivity for people from all walks of life in Singapore

Cognisant of the need to make connectivity as inclusive as possible, in Singapore, IMDA has enhanced the *Digital Inclusion Programme* aimed at building a digitally inclusive society that brings infocomm to people from all walks of life. The Digital Inclusion programme consists of four key areas – the Silver Infocomm Initiative, NEU PC Plus Programme, Home Access Programme and Enable IT Programme. These programmes target four key groups of citizens: senior citizens, low-income students, low-income households and people with disabilities (PWDs), respectively.

- The *Silver Infocomm Initiative* aims to bridge the digital divide among seniors aged 50+ by addressing differences in educational background, language and IT competencies. Launched in 2007, the Silver Infocomm Initiative adopts a multi-pronged strategy to drive IT awareness and literacy among seniors so that they can be digitally ready and be actively engaged in the digital age. To date, over 200,000 seniors have benefitted from activities such as the *Silver IT Fest, Mass IT Training, Silver Infocomm Junctions, Intergen IT Bootcamps* and *Digital Clinics*.
- The *NEU PC Plus Programme* aims to provide affordable access students

from low-income households by defraying costs of computer ownership and Internet access. Since launching in 2006, over 34,000 low-income households with school-going children have benefited from: the *PC-Bundle Scheme* providing students from low-income households with new computers and 3 years of free broadband access at affordable prices; and the *INSPIRE Fund*, which helps students to earn their PC-Bundle by doing community service. To date, over 3,000 students have benefited.

- The *Home Access Programme* was established in 2014 and aims to make Internet connectivity more accessible and affordable to low-income groups. Under *Home Access 2.0*, eligible households without school-children are provided with 2 years subsidized Internet access, with an option for basic equipment. Over 9,000 low-income households have benefited so far.
- The *Enable IT Programme* aims to enable and enhance the abilities of PWDs in their daily activities and employment through IT and assistive technology. Initiatives include educating PWDs, helping them make informed decisions on the appropriate IT to adopt, providing hands-on experience & training and using IT to improve employability. The Programme

is implemented through collaboration with IMDA, disability organizations and private firms.

Source: Infocomm Media Development Authority of Singapore (IMDA).

3.3 Advocacy Target 3: Getting People Online

By 2025, broadband-Internet user penetration should reach: 75% worldwide, 65% in developing countries, and 35% in LDCs

Three years is an eternity in telecom, so targets for 2025 are clearly optimistic at best. Estimates of Internet usage are based on a number of assumptions, each of which can be challenged. For example, it uses median population projections from the UN (extrapolated between 1 July estimates for each year), subject to various caveats (e.g. no major epidemics, conflicts, famines, and constant fertility rates).

Internet user growth rates are gradually reducing, at around 5.5% Internet user growth for 2018, as easy-to-reach areas get connected. Having said this, there are significant **Internet mass connectivity projects** underway in some regions, and mass area coverage by next-generation satellite. The total number of Internet users can in fact go down, as well as up – for example, as Governments and regulators revise their figures for inactive SIM cards or the latest consumer surveys. Each national figure is an estimate, based on operator subscriber data and/or consumer surveys, which may be more or less representative of each market, and the quality of the estimate depends on the quality of surveys.

Arguably, it is not just access and how many people use the Internet which is of interest; it is **how the Internet is used and the quality of usage that matter**. For example, in 2017, an estimated 1.66 billion people (under half the global population online) purchased goods online. Even in developed countries, large gaps persisted across OECD countries for some Internet uses as recently as 2016, with less than half of all online Internet

consumers using the Internet for telephony, content creation, travel, software download, cloud services, online job searches and sales⁷. Viewpoint 14 explores the case of broadband in four developing countries – Cambodia, Rwanda, Senegal and Vanuatu.

Viewpoint 14: Broadband for Development in four LDCs: Cambodia, Rwanda, Senegal and Vanuatu

So many of us take using our cell-phones and tablets for granted – instantly, we can be connected. Connectedness means participation, it means inclusion, and it means opportunities. Connection bridges space, connection is access to knowledge and innovation. However, connectivity is not an opportunity afforded to all, and many are still left behind. The group of LDCs – some 47 countries – experience severe structural obstacles to their sustainable and inclusive development. The LDCs truly risk being left most behind in the world's economic and social development scorecard.

On some fronts, remarkable progress has taken place over recent years, but these countries still display some of the lowest Internet access rates in the world. By end 2017, only 172 million people of the nearly 1 billion people living in LDCs used the Internet, equivalent to a usage rate of 17.5%. At slightly over 20 per 100 inhabitants in LDCs, the mobile broadband subscription rates remain equally low. This is almost four times less than in developed countries.

Being connected means enhancing development potential. Thus, greater access to and enhanced literacy in and use of broadband services are critically important to the sustainable development of the LDCs and their full participation in achieving the goals of Agenda 2030. There is no time to waste. For this reason, a Working Group on Vulnerable Countries (LDCs, LLDCs and SIDS) was established under the auspices of the Broadband Commission

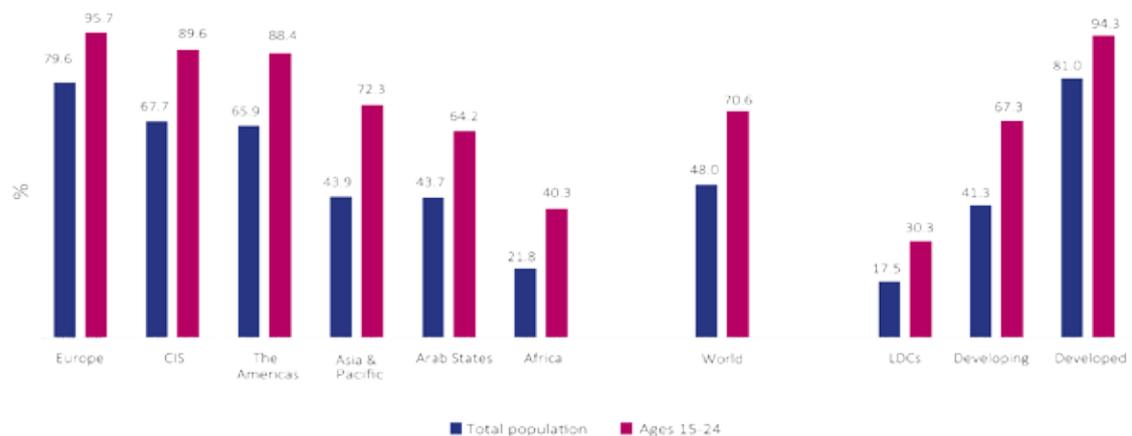
to fill the knowledge gap on how LDCs are leveraging investments in broadband for national development.

The synthesized report on ‘Broadband for National Development in four LDCs: Cambodia, Rwanda, Senegal and Vanuatu’ aims to contribute to filling that gap. This report is based on extensive case studies conducted in four LDCs in three regions: Asian LDC (Cambodia), African LDC (Senegal) with access to the sea, a landlocked LDC in Africa (Rwanda), and a small island developing state in the South Pacific (Vanuatu). It is very impressive and highly encouraging to note that, in just a few years, all the four countries

were able to significantly increase broadband coverage and affordability. Rwanda is close to achieving universal coverage of mobile broadband – in 2016, over 90% of the Rwandan population could access a 3G signal.

The market conditions leading to these remarkable achievements differed considerably, and ranged from a mix of local access competition and wholesale PPP interventions in Rwanda, to an unregulated and fiercely competitive market in Cambodia, a regulated market dominated by the incumbent operator in Senegal and the mobile “duopoly” in Vanuatu.

Figure 14: Internet User Penetration, 2017*



Internet Users relative to Global Population



Source: ITU.

* Figure is based on the ITU 2017 data and doesn't reflect the ITU 2018 Global and Regional ICT estimates and the ITU's "Measuring the Information Society Report 2018".

However, a gap persists between deploying the necessary infrastructure and then the utilization rates of the infrastructure to enhance development. The report reveals that, while broadband impacts have so far had modest measurable impact, anecdotal evidence suggests that narrowband services and text messages have achieved traction in sectors such as health, agricultural and finance (m-money). The report makes various insightful recommendations for leveraging broadband more rapidly in LDCs.

I sincerely hope this report and its recommendations will contribute to furthering the ongoing conversation on how we can best support LDCs to connect to the emerging, and ever more rapidly evolving, digital world and to reap its developmental benefits.

Source: Ms. Fekitamoeloa Katoa 'Utoikamanu, Under-Secretary-General and High Representative for the Least Developed Countries, Landlocked Developing Countries and Small Island Developing States (UN-OHRLS).

3.4 Advocacy Target 4: Digital Skills & Literacy

New Employment Dynamics & Skills of the Future: By 2025, 60% of youth and adults should have achieved at least a minimum level of proficiency in sustainable digital skills

Demand is vitally important in creating a sustainable Internet ecosystem. It is necessary to address consumers' ability to use the Internet, as well as fostering innovation. ICT infrastructure may often remain under-utilized, due to factors such as lack of affordability, interest or knowledge, which are obstacles to the productive use of ICTs and Internet. When challenges around affordability, awareness and ability are addressed, the value of ICT and broadband can be realized and people can benefit greatly⁸.

A recent UNESCO/UNICEF report notes that ICTs have immense potential to facilitate

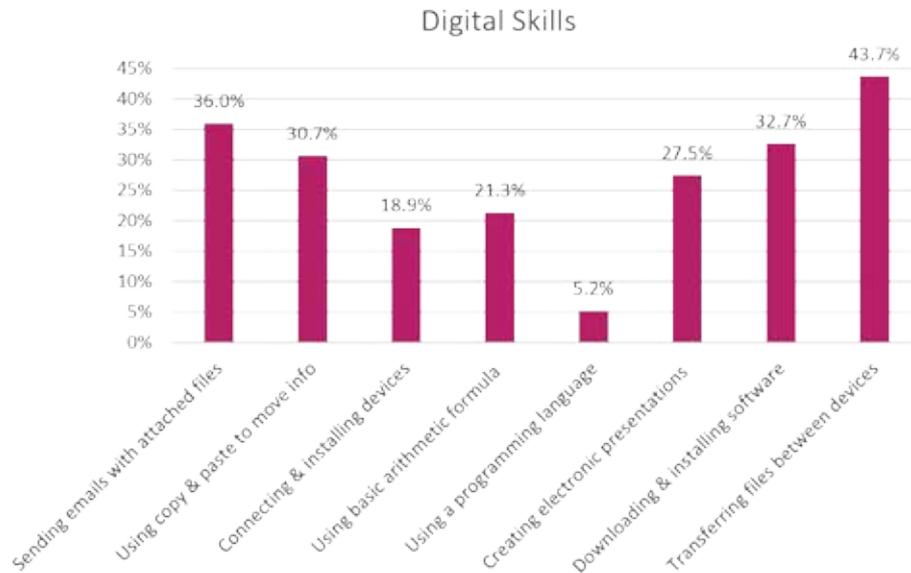
dramatic changes in learning and education systems, while placing new demands on the knowledge and skills that people need to acquire throughout their lives. There are, however, significant challenges in ensuring that everyone can benefit from this potential, and can use these technologies effectively in their lives. It is vital to ensure that the poorest, most marginalized and vulnerable people are not left behind and that tech investments contribute to improved learning and skills⁹.

Effective education systems are essential for meeting future challenges and delivering on the SDGs. Although rapid technological change has taken place over the last thirty years, education systems in many countries have remained largely unchanged over the last century. Education is about much more than merely providing people with the skills and knowledge to work, and must create a framework through which people can lead diverse and fulfilling lives. People of all ages should have opportunities to learn about their own cultures, in their own languages.

There is broad agreement that education needs to ensure that people gain four main skills: creativity, communication, collaboration, and critical thinking. Alongside skills such as literacy and numeracy, people should now also gain basic digital skills. They need to have a comprehensive understanding of the rapidly changing world in which they live, as well as their roles and responsibilities within it. ITU's Global ICT Development Index (IDI) includes a measure of digital skills and capabilities.

There is considerable debate as to what proficiency in digital skills and an 'adequate' level really mean. Digital skills have been broken down into three categories: (1) the basic digital literacy needed for all workers, consumers and citizens in a digital society; (2) the advanced ICT skills (coding, computer science and engineering) which are needed to develop innovative ICT products and services; and (3) e-business skills or the specific know-how needed for digital entrepreneurship¹⁰. Figure 15 shows how global averages for digital skills vary from 5.2% (using a programming language) to 43.7% (transferring files).

Figure 15: Digital Skills Worldwide, 2017



Source: UNESCO. Note: Based on average skills available for the different numbers of countries available * = 50 countries.

It is likely that only some of these necessary digital skills can be taught in schools. Many of the digital skills needed in the new economy may be self-acquired – or at least self-perfected – through personal curiosity and interest. Viewpoint 15 describes how KT is working with the Cambodian Government and Cambodia Telecom to promote digital skills through a digital schools programme and public WiFi in parks near the capital, Phnom Penh.

Viewpoint 15: The Cambodia Public Wi-Fi & Digital Schools Project

To help bridge the digital divide in Cambodia, Korea Telecom has worked in close partnership with the Ministry of Post and Telecommunications in Cambodia and Telecom Cambodia on a public Wi-Fi and digital schools project providing free Wi-Fi in public places. It has also launched a distance learning programme for underprivileged schools under the e-Education objective of the Cambodian ICT Masterplan 2020.

In the “Samdach Hunsen” and “Royal Palace” national parks near Phnom Penh, visitors can take advantage of public Wi-Fi. KT delivered ‘Giga Wi-Fi’ technology connected to Telecom Cambodia’s

national backbone network, enabling Internet connectivity of up to 600 Mbps. From the Independence Monument in Hunsen Park, 24 Wi-Fi access points have been installed to cover the entire park. Along the Tonle Sap River in the Royal Palace Park, local residents and many tourists benefit from free Wi-Fi.

Public Wi-Fi in Hunsen Park, Phnom



Distance Learning Class in Tuol Kpos School



Cambodia's mobile penetration rate has risen rapidly over the last decade, but low-income families and unemployed still suffer under expensive data plans and Wi-Fi services offered by private network operators. To address information gaps between ordinary citizens and the underprivileged, national network infrastructure is in high demand for the digitally deprived.

Cambodia's rural schools 200-300 km away from Phnom Penh have been transformed into digital schools through remote education opportunities. KT has developed a smart education application, 'K-box', whereby teachers implement distance classes online and communicate with over 2,000 students via video-conferencing. For enrichment of e-learning services, multimedia classrooms were established and Telecom Cambodia operates wireless networks to remote schools in cooperation with KT.

The Government of Cambodia has defined an objective for enhancing public education using ICTs to improve educational infrastructure in schools. As a pilot, the project aims to improve digital literacy, develop video content and foster e-learning programmes. On 9 May 2018, the public Wi-Fi at Samdach Hunsen Park opened, attended by 1,000 citizens of Phnom Penh. KT and MPT Cambodia showed how PPPs can help address and resolve social issues by promoting ICTs. This project addresses the SDGs, including SDG 4

(Quality Education) and SDG 9 (Industry, Innovation and Infrastructure).

Source: KT Corp.

In Singapore, IMDA works in partnership with the industry, community and other government agencies in the Media Literacy Council (MLC) to champion and develop public education and awareness on media literacy and cyber-wellness issues. The MLC's outreach initiative, the Better Internet Campaign, encourages safe and responsible online behaviour. The campaign messaging – "Be Safe, Be Smart, Be Kind online" – addresses issues such as cyber-safety and security, critical thinking and discernment of online falsehoods, online civility and cyber-bullying. The MLC has also launched programmes with schools and tertiary institutions to develop curated resources in collaboration with private sector and people-based organizations such as Google, Facebook, DQ Institute, TOUCH Cyber Wellness and the Centre for Fathering to provide the community with tools and tips to navigate the online space. Viewpoint 16 explores how new employment dynamics will impact future skills.

Viewpoint 16: New Employment Dynamics & Skills of the Future

The combination of 5G and AI will change our world in ways we have only just begun to imagine. Improvements in healthcare, transport, energy distribution, education and other areas will benefit the lives of billions of people. At their best, the technologies behind the Fourth Industrial Revolution (4IR) will help us to create a safer, smarter and more efficient world for everyone.

The extent to which 4IR will impact the socio-economic structures underpinning our societies is still uncertain, however. How will the nature of work change? Which sectors will see increased or decreased employment? And how should we educate or re-train people in the face of these changes? We still don't know the answers to all these questions, but we can prepare for different eventualities, so our societies are ready for the changes, as and when they happen.

Technological progress has broadly two competing effects on employment¹¹. On one hand, there is an ‘attrition’ effect as automation substitutes for labor. On the other hand, capitalization describes how an increase in demand for new goods and services leads to the creation of new occupations. Some types of jobs are more at risk of attrition than others – repetitive manual labor tasks have mostly already been automated, but now, higher-level routine or predictable jobs are also at risk. The radiology profession serves as a good example, as new technology allows medical images to be interpreted more accurately and faster than previously possible.

Sophisticated algorithms may also make knowledge-based jobs – such as those in finance or law – more prone to replacement. Jobs that are less prone to substitution may include jobs requiring entrepreneurial approaches and creativity; jobs where people need to collaborate with machines; and jobs needing trust, empathy, compassion and human interaction (such as childcare or nursing). There is an urgent need to develop new skills and approaches to address the disruption created by the 4IR:

- **The importance of education:** There needs to be focus on entrepreneurial and social skills, as well as on the development of educational models for learning to work alongside intelligent machines. Education systems need to incentivize the use of AI-powered tools in traditional fields of activity, so future workers can learn to use new tools such as AR, VR and social learning.
- **New employer-employee relationships:** It is important to develop new types of employment contracts to fit the evolving nature of work. Traditional employer-employee relationships are becoming a series of transactions between employer and employee. Transitions between jobs should

also be facilitated, through measures such as portable health insurance.

- **Investments in ICT infrastructure:** In addition to investing in people, we can embrace the future by accelerating investments in ICT infrastructure and by ensuring adoption of new technologies by societies. The availability of appropriate ICT infrastructure is a pre-condition for enabling the 4IR. Accelerated investments in 5G infrastructure and ensuring 5G-ready policy frameworks are critical priorities, if we are to reap the benefits of digitalization.

Governments, regulators, industry players, NGOs, academics and decision-making bodies have a critical role to play in shaping our response to the effects of the 4IR. Policy-makers need to develop an environment for using 4IR technologies that fuels the positive outcomes and mitigates the concerns.

Source: Nokia.

3.5 Advocacy Target 5: Digital Financial Services

By 2025, 40% of the world’s adult population should be using digital financial services (DFS)

Digital finance provides an effective way to swiftly connect large populations in many countries, especially where traditional infrastructure is lacking. With DFS technologies, it will be possible to connect the unconnected and bring the excluded into the global financial system. The World Bank has identified various benefits to enhancing DFS around the world¹², including:

- Enhanced access to formal financial services;
- Lower costs of digital transaction platforms, as well as cash transactions;
- Additional financial services tailored to individual customer financial needs;

- Potentially reduced risk of loss, theft, or financial crimes;
- Promotion of economic empowerment by enabling asset accumulation, including for women.

According to the World Bank, financial inclusion is growing, but the gains have been uneven. The World Bank suggests that 3.8 billion people now have an account at a bank or mobile money provider, and 1.2 billion people have a mobile money account¹³, this last equivalent to 15.8% of global population and around 21.4% of the adult population (Figure 16). However, globally, 1.7 billion adults still remain unbanked and gender-based divides persist, with the divide between male and female in developing economies unchanged since 2011 at 9% (Figure 16).

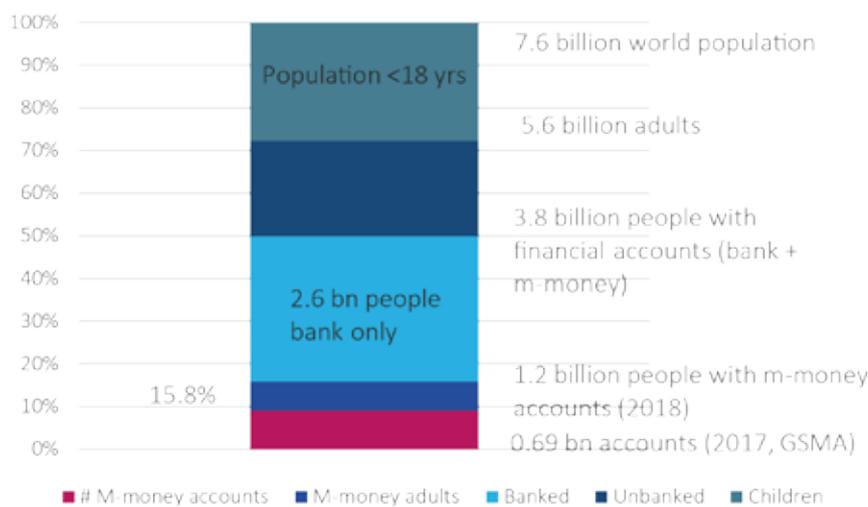
The GSMA found that 136 million mobile money accounts were added during 2017, resulting in 690 million mobile money accounts worldwide in 2017, a 25% increase on 2016 (and up from 136 million mobile money accounts in 2012). Mobile money is now available in 90 countries (including three-quarters of low- and lower-middle-income countries) and has become a leading payment platform for a digital economy in emerging

markets. In 2017, Western Africa accounted for an estimated 338 million accounts, with Sub-Saharan Africa accounting for nearly half or 49.1% of total global market share in 2017, with the strongest growth in South Asia¹⁴.

In geographically dispersed countries (such as the Maldives), citizens in rural areas may face difficulties in accessing traditional banking services. Digital financial services (such as the M-Faisaa mobile wallet, part of Ooredoo Mobile Money) are playing an important role in accelerating financial inclusion, focusing on convenience and affordability. M-Faisaa allows customers to deposit, withdraw, pay and send money in Maldives instantly through their phones. It has a growing user-base of 12,000 customers and 250 channel partners (including STELCO, the State Electric Company, Medianet, the cable TV service, and various online and offline merchants) and also digitizes bill payments.

In Myanmar, Ooredoo's 'M-Pitesan' mobile money service allows users to store electronic money and make transfers via their mobile phones. M-Pitesan supports over-the-counter cash transfers between mobile money agents. Given that 70% of Myanmar's rural population remains unbanked even today, mobile money services such as M-Pitesan

Figure 16: Digital Financial Services, 2018



Source: Based on World Bank (2018) and GSMA (2017).

Note: This graph assumes that one m-money account is allocated per adult individual, and that all bank accounts belong to adults.

provide an alternative channel for the unbanked to access financial services. To date, M-Pitisan has 300,000 registered customers country-wide with 30,000 using the solution actively to transfer money, buy airtime, pay bills and purchase tickets.

Digitalization may be applied beyond digital financing. Invoicing is an example of a business-to-business (B2B) transaction that cuts across businesses and sectors. E-invoicing can help businesses speed up business transactions, minimize disputes and reduce errors and operating costs. E-invoicing is the automated creation, exchange and processing of request for payments between suppliers and buyers. Singapore plans to implement a nationwide e-invoicing framework in 2018 with end-to-end digital transactions enabling businesses to exchange e-invoices with buyers and suppliers.

3.6 Advocacy Target 6: Getting businesses online

By 2025, overcome unconnectedness of Micro-, Small- and Medium-sized Enterprises (MSMEs) by 50%, by sector

This target prepares MSMEs for a future where online presence is needed. There is a body of evidence that SMEs are instrumental in eradicating poverty, creating economic growth, and empowering citizens to become productive. Connectivity, connectedness and the adoption of digital technologies by SMEs can offer the opportunity for tech SMEs to play a major role in a country's economy, as well as the adoption of broadband connectivity and technology in SMEs in non-tech sectors.

Research differs as to whether SMEs are more or less likely to adopt ICTs, or lag in the adoption of certain digital technologies. There is evidence to suggest that SMEs are just as likely to use broadband as larger firms; however, gaps in adopting more sophisticated digital tools exist. Figure 17 shows that technology intensity and business use of Internet vary by sector in developing countries, according to their degree of technological sophistication, with primary extractive industries showing lower tech take-up. Viewpoint 17 describes the work of the Commission's Working Group on Digital Entrepreneurship, while Viewpoint 18 explains the importance of connectivity for SMEs, while Viewpoint 19 describes how Singapore's SMEs are going digital.

Figure 17: Business use of Internet and level of technology intensity in developing countries, by industry



Source: UNCTAD World Investment Report 2017.

Viewpoint 17: The Importance of Thriving Digital Entrepreneurship

Digital development is not just about technology; it is also about overturning and recreating business models. Start-ups are known for accelerating creative disruption, breaking new ground with new approaches and products. But digitization has given traditional SMEs new ways of doing business – at a distance, with more customers, as well as with lower barriers to entry and lower costs in many sectors.

A thriving landscape of digital entrepreneurship is essential for meeting the 2025 Connectivity Targets:

- Connectivity: new business models and services are needed to drive demand for faster connections, including 5G.
- On skills and gender equality, digital technology allows female entrepreneurs to manage and own a higher proportion of online-only businesses in developing countries.
- MSMEs that use e-commerce and digital tools for their business will help to achieve the connectivity targets, expanding the market for business services aimed at MSMEs.
- Start-ups and MSMEs are among the major users of digital financial services, which encourages their customers towards higher rates of take-up.

Digital entrepreneurship is also needed for making progress on the SDGs. The success of mobile payments in Africa has contributed to financial inclusion across the continent, while the delivery of medicines by drones, pioneered in Africa, makes urgent medical care available to isolated and rural communities. Digital entrepreneurship can stimulate regional integration, with many start-ups looking to grow by developing markets in

neighbouring countries and drawing from international talent pools.

For developing countries in particular, it is essential – and urgent – to promote digital entrepreneurship, to build and scale new businesses based on the technologies of 4IR. To achieve this, however, is a formidable challenge. Despite progress elsewhere, the most active innovation ecosystems and investments are concentrated in Silicon Valley and a few developed countries in East Asia and Europe.

In addition, automatization threatens to remove several rungs of development that would otherwise support the transition to middle- and high-income economies. Automated and additive manufacturing are reducing labour costs and driving some manufacturing tasks back to developed countries. AI may make many outsourced business services obsolete, including call centres and medical services.

The issues of infrastructure and business environment relate to digital entrepreneurship as well. Along with the various obstacles mentioned, digital entrepreneurship faces particular difficulties in developing countries, where:

- investment and access to financing remain low, compared with developed countries;
- small domestic consumer markets limit the growth potential of start-ups and SMEs;
- innovation ecosystems remain underdeveloped, with poor infrastructure and insufficient cooperation between new companies, academia and existing enterprises;
- the talent base remains small. As well as the lack of skilled engineers, entrepreneurs also

lack the business skills to succeed at building digital companies.

In view of these factors, I initiated a Working Group on Digital Entrepreneurship at the UN Broadband Commission. It has produced policy recommendations for all parties involved – governments, businesses, civil society and donor organisations – for digital entrepreneurship to be a priority for developing countries, in the Digital4Entrepreneurship Report with recommendations in 4 main areas:

- 1) Digital economy success factors (connectivity, skills, regulatory openness, women, ICT);
- 2) Digital entrepreneurship policy support (e-government, funding, innovation ecosystems);
- 3) Strengthening e-commerce (online payments, regulatory measures, cross-border parcel delivery);
- 4) Governance of regional and global digital markets (including development aid assistance).

Source: Andrus Ansip, EC Commissioner and Chair of the Working Group on Digital Entrepreneurship.

Viewpoint 18: The Importance of Connectivity for SMEs

Connectivity to the Internet is a prerequisite for enterprises to conduct e-commerce, but given the penetration of mobile broadband coverage in many urban areas, small enterprises in developing countries often face other priorities to successfully develop their business online. Two key concerns are the suitability of e-commerce as a sales channel and the level of understanding and relevant skills needed for e-commerce. The majority of enterprises in developing countries do not have products which can be sold easily through e-commerce; their products are adapted to the low price of the local market and cannot support additional channel and distribution costs.

Enterprises in developed countries engaged in e-commerce and online competition are principally concerned with generating sufficient online visibility; SMEs in developing countries have more basic concerns relating to setting up operations (such as warehousing and delivery services).

Small enterprises in developing countries raise concerns about cross-border e-commerce, including complying with export requirements, consumer protection regulations, accessing and paying for e-payment solutions and the availability of cost-effective transport options. Four common misconceptions persist among SMEs in developing countries: e-commerce is only for goods, not services; e-commerce is for consumer products (B2C) and not professional or industrial goods (B2B); e-commerce requires mass production; and there are more counterfeits online.

Connectivity alone cannot overcome the hurdles that SMEs in developing countries face. Increased attention needs to be paid to building the capacities of local business managers and policies that promote a vibrant and competitive local service ecosystem.

Source: "New Pathways to E-Commerce: A Global MSME Competitiveness Survey", ITC, Geneva, 2017.

Viewpoint 19: Singapore's SMEs Go Digital

SMEs are an important foundation of the economy as they make up 99% of all businesses and 70% of the workforce in Singapore. In helping Singapore's SMEs thrive in the digital economy, the **SMEs Go Digital programme**, launched in April 2017, was designed to make going digital simple for SMEs. This programme includes the **Industry Digital Plans for SMEs (IDPs)**, which SMEs can refer to for guidance on the use of digital technologies at different stages of their growth. IDPs will be developed for six sectors – food services, logistics, retail, wholesale trade, environmental services and security.

Box Figure: Use of Digital Technologies by SMEs



Source: IMDA.

Through the IDPs, SMEs can:

- Use a **digital roadmap** to understand the digital readiness of their business and the trainings required to raise their employees' digital skills.
- Identify pre-approved **digital solutions** relevant to their business. Examples of solutions include digital ordering and payment, fleet management and supply chain optimization.
- Reach out to **SME Centres** for basic advisory services with regard to the digital roadmap, or be referred to the **SME Digital Tech Hub** for more specialized advice.
- Participate in **digital sector projects** led by their industry leaders to pilot emerging solutions with the potential to scale and uplift whole sectors.
- Engage **digital project management services** to help implement digital solutions to yield maximum sustainable outcomes through business processes re-engineering and job redesign.

Source: Infocomm Media Development Authority of Singapore (IMDA).

3.7 Advocacy Target 7: Achieving gender equality in access to broadband by 2025

Historically, the digital gender divide was originally evaluated at 11% between men and women (ITU, 2013), which then actually increased to 11.6% in 2017 (ITU, 2017¹⁵ and Figure 18). Despite this adverse trend, it is hoped that gender equality in Internet access can be achieved by 2025. The proportion of men using the Internet is higher than the proportion of women using the Internet in around two-thirds of countries worldwide.

According to GSMA, over 1.2 billion women in LMICs do not use mobile Internet. Women are, on average, 26% less likely to use mobile Internet than men. Even among mobile owners, women are 18% less likely than men to use mobile Internet. Beyond cost, barriers to mobile ownership may relate to the local context, including low digital literacy and literacy, and safety and security concerns in Latin America, all of which tend to affect women disproportionately. Women may be generally less aware of mobile Internet compared

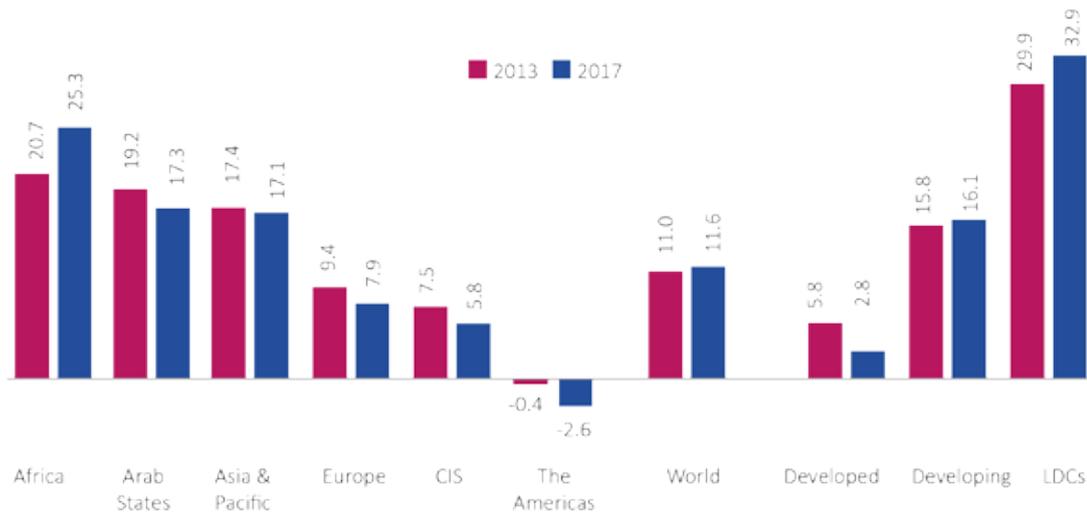
with men, which can significantly limit their uptake, particularly in Africa and Asia.

A strong link is observed between gender parity in the enrolment ratio in tertiary education and gender parity in Internet use, as the digital gender divide reflects broader social inequalities¹⁶. The only region where a higher percentage of women than men are using the Internet is the Americas, where countries also score highly on gender parity in tertiary education. While the gender gap has narrowed in most regions since 2013, it has widened in Africa. In Africa, the proportion of women using the Internet is 25% lower than the proportion of men using the Internet¹⁷. In LDCs, only one

out of seven women is using the Internet compared with one out of five men.

In conjunction with a number of other partners, ITU has launched the EQUALS partnership, a growing global network to bring women and girls to tech, and to bring tech to women and girls (<https://www.equals.org>). Viewpoint 20 describes how mobile can help close the digital and financial inclusion gender gap, while Viewpoint 21 describes the Jazz-Unilever partnership addresses the lack of access by women to DFS in Pakistan by building on Unilever’s network of female retail entrepreneurs, which enables women to act as mobile money agents.

Figure 18: Measuring the Gender Gap in Internet Usage



Source: ITU.

Viewpoint 20: Closing the digital and financial inclusion gender gap

Mobile has the power to transform lives. In my role as Director General of the GSMA, I have seen this first-hand. I have seen how mobile can empower women by making them feel safer, more connected, and more able to access information and take advantage of life’s opportunities. During my recent visit to a health centre in Tanzania, I spoke with expectant mothers, who told me how a mobile service called Wazazi Nipendeni gave them vital health information during their pregnancies. I also met

new mothers, who were registering the birth of their newborn babies using a mobile service from Tigo, giving their children an identity and a future.

It is a disappointment to me that while mobile connectivity is spreading rapidly, it is not spreading equally. Mobile is now the primary way to access the Internet across the developing world. A recent GSMA study revealed the extent of the gender gap in mobile Internet use across low- and middle-income countries (LMICs) and highlighted the persistent gender gap in mobile

ownership. Over 1.2 billion women in these countries do not use mobile Internet, while women are, on average, 10% less likely than men to own mobile phones and 26% less likely to use mobile Internet. According to the latest findings from the World Bank's Global Findex database, women in these markets are also, on average, 33% less likely to use a mobile money service. This is important because services such as mobile money can increase women's financial independence and strengthen their role as financial decision-makers. With 276 live deployments in 90 countries, mobile money can help households to lift themselves out of poverty and drives economic growth.

The mobile gender gap is driven by social, economic and cultural factors, which result in women experiencing barriers to mobile ownership and use. To close the mobile gender gap, we need to address these issues and focus on accessibility, affordability, usability and skills, safety and security, and relevance. In India, Telenor aimed to address many of these barriers with a 'combo-SIM' product in an area where 76% of men but only 29% of women used a mobile phone. Telenor launched two paired-SIMs sold together, one to be used by a woman and the other by her husband, and recruited trusted female community members to explain the benefits to women and their families. This product challenged the social norms preventing women from using mobile phones in Uttar Pradesh, showed men the value of women having a SIM of their own, and helped promote digital literacy among women.

It is my vision that the mobile industry should do even more to drive digital and financial inclusion for women. I am a champion of the GSMA Connected Women programme, designed to help the mobile industry reduce the gender gap, and unlock significant commercial and socio-economic opportunities. Through the Connected Women Commitment Initiative, 36

mobile operators have made 51 formal commitments to reduce gender gaps in their mobile money and/or mobile Internet customer base across Africa, Asia and Latin America. To date, the Connected Women programme and its mobile operator partners have delivered life-enhancing services to over 22 million women.

As mobile and digital technologies proliferate, it is important that the mobile industry, policy-makers and development community continue to take action to address the gender gap through targeted interventions. I see being part of the digital economy as a human right. Addressing the mobile gender gap will ensure we do not leave anyone behind, while contributing to achieving SDG 5, Gender Equality.

Source: Mats Granryd, Director-General of the GSMA.

Viewpoint 21: Collaborating to Achieve Digital Financial Inclusion – An Example from Pakistan

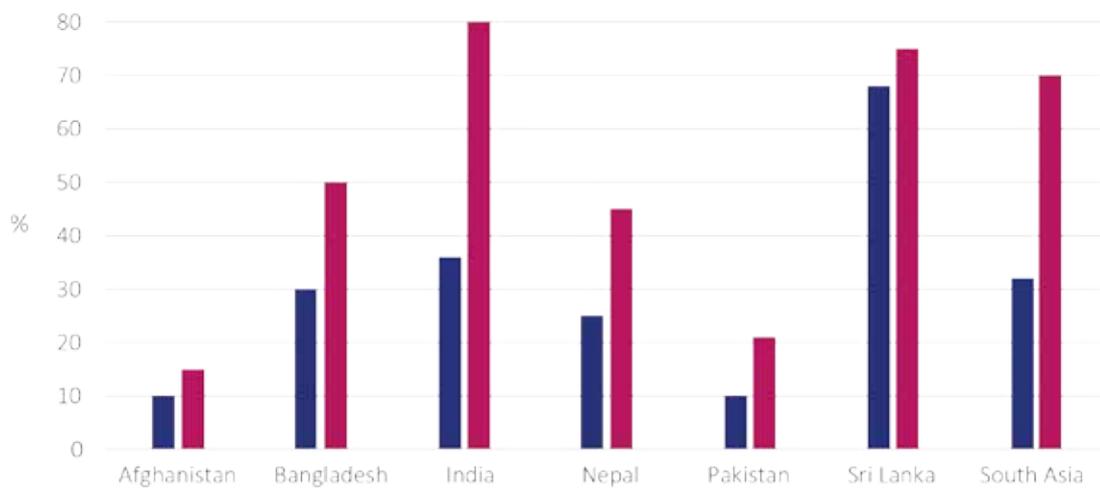
To empower women with low incomes and those living in rural areas, VEON's subsidiary in Pakistan, Jazz, announced its collaboration with Unilever Pakistan, the non-profit Women's World Banking, and Karandaaz, a development finance company, to improve the availability and access to financial services. Achieving universal financial access remains a challenge. By going it alone, traditional banks may not cater to the needs of lower income groups or the residents of remote areas, despite the spread of smartphones. According to the World Bank, some 1.7 billion people are still financially excluded, with 30% of adults lacking access in South Asia. In Pakistan, financial exclusion is higher and only 21% of adults have access to financial services.

Operators can build out infrastructure and distribution networks and capabilities (handling high-volume, low-value cash-to-airtime transactions) to provide low-cost access to digital financial services. Innovative fintech

companies are focusing on specific use cases that address specific user needs in various ways – for example, identification solutions to open an account. Pakistan is leading the way in DFS in South Asia, with almost 7% of people having mobile bank accounts, compared to 4% in South Asia. In 2017, Jazz processed 300 million transactions, executed by a total user base of over 14 million (an increase of 8 million users on 2016) and a network of

75,000 agents across Pakistan. Despite this rapid growth, only 7% of women stated that they utilized financial services in Pakistan, compared to an average of 64% in South Asia (World Bank, 2018). Women face a number of barriers with regards to access to DFS, including limited financial autonomy, the lack of phone shops run by females, and the fear of the ‘negative side’ of the Internet that might damage family reputation.

Box Figure: Adults with access to financial services across South Asia
(% over 15+)



Source: World Bank.

The Jazz-Unilever partnership aims to address the lack of access for women by building on Unilever’s network of ‘Guddi Baajis’ or female retail entrepreneurs, who sell Unilever products in rural and low-income communities across Pakistan. These women can now act as mobile money agents and make deposits/withdrawals, so all partners benefit: Unilever benefits from increased supply chain digitization and access to credit; women gain access to additional revenue streams and new services; and Jazz increases its footprint in rural areas. The pilot started in Kasur and Sialkot in

2017 and trained 32 female m-banking agents, and ended in June 2018, with training for 500 women per year in the retail agent network. This project aims to help Pakistan make progress in the Commission’s targets 5 and 7 – increased use of DFS and gender equality. By developing a shared vision between Governments, partners and stakeholders, and building on each other’s strengths while respecting each other’s limitations, we can work to ensure a sustainable and prosperous digital future for everyone.

Source: VEON.

Endnotes

- ¹ https://www.telegeography.com/products/commsupdate/articles/2018/02/08/ogero-updates-internet-strategy-targets/?utm_source=CommsUpdate&utm_campaign=e3766b06cd-CommsUpdate+08+February+2018&utm_medium=email&utm_term=0_0688983330-e3766b06cd-11619241
- ² <https://theodi.org/what-is-data-infrastructure>
- ³ “Data-Driven Development”, ICT4 Development Report 2018, World Bank (forthcoming).
- ⁴ In Japan, 50% of households already have 100 Mbps and the other remaining 50% at least 30 Mbps, has chosen not to set additional connectivity goals. Instead, in their broadband strategy, they target the establishment of commercial 5G by 2020.
- ⁵ https://www.telegeography.com/products/commsupdate/articles/2018/04/30/zimbabwe-to-merge-regulators/?utm_source=CommsUpdate&utm_campaign=5b088ee7f1-CommsUpdate+30+April+2018&utm_medium=email&utm_term=0_0688983330-5b088ee7f1-11619241
- ⁶ <https://internethealthreport.org/2018/the-internet-is-more-affordable-but-not-enough/>
- ⁷ Graph, “large gaps remain across countries for some Internet usages”; % of Internet users performing selected online activities” (2016), at: www.oecd.org/sti/oecd-digital-economy-outlook-2017-9789264276284-en.htm
- ⁸ “Enabling the Use of ICTs and Broadband: Understanding What Works to Stimulate ICT Adoption”, Working Group on Demand at: www.broadbandcommission.org/Documents/publications/WorkingGrouponDemand-2016.pdf
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- ¹⁴ GSMA Industry Report on Mobile Money 2017, available from <https://www.gsma.com/mobilefordevelopment/sotir/>
- ¹⁵ ICT Facts and Figures 2017, available at: <https://www.itu.int/en/ITU-D/Statistics/Documents/facts/ICTFactsFigures2017.pdf>
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- ¹⁷ ICT Facts and Figures 2017, <https://www.itu.int/en/ITU-D/Statistics/Documents/facts/ICTFactsFigures2017.pdf>