CONNECTING THE UNCONNECTED

Working together to achieve Connect 2020 Agenda Targets

A background paper to the special session of the Broadband Commission and the World Economic Forum at Davos Annual Meeting 2017

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INTRODUCTION AND BACKGROUND

The Internet has the potential to positively impact and transform people's lives and bring benefits in a great number of areas, including health, education, financial services, transport, energy, agriculture, and more. However, to-date 53% of the world's population is still offline, with the majority located in Africa and Asia-Pacific. The reasons for being offline or for limited Internet use are manifold: many do not have access because they live in remote or difficult-to-reach areas and do not have access to digital or other basic infrastructure such as electricity or transport. Some do not see the benefits of being connected, often because of limited awareness, cultural impediments or limited relevant digital content. Still others are illiterate, and many are too poor to afford even the most basic of Internet packages and devices. Existing inequalities in terms of income and education, particularly prominent among women, and other factors exacerbate the problem. To tackle the large offline populations, ITU within its Connect 2020 Agenda[1] has made it a goal to bring 60% of the world's population online by 2020. The key challenges in meeting Connect 2020 Agenda Targets are finding replicable solutions that can be scaled to connecting the large rural offline populations at minimal costs, and finding effective strategies for narrowing the usage gaps (including the gender gap) across all regions. While a significant amount of initiatives have been implemented, targeting both the rural/urban divide and the usage gaps largely at the local, community or national level, it is unlikely that large-scale rural 'almost free' solutions will be deployed within the next three years. Therefore, by default, most people to come online by 2020 are likely to come from more urban areas or areas that are already covered by infrastructure.

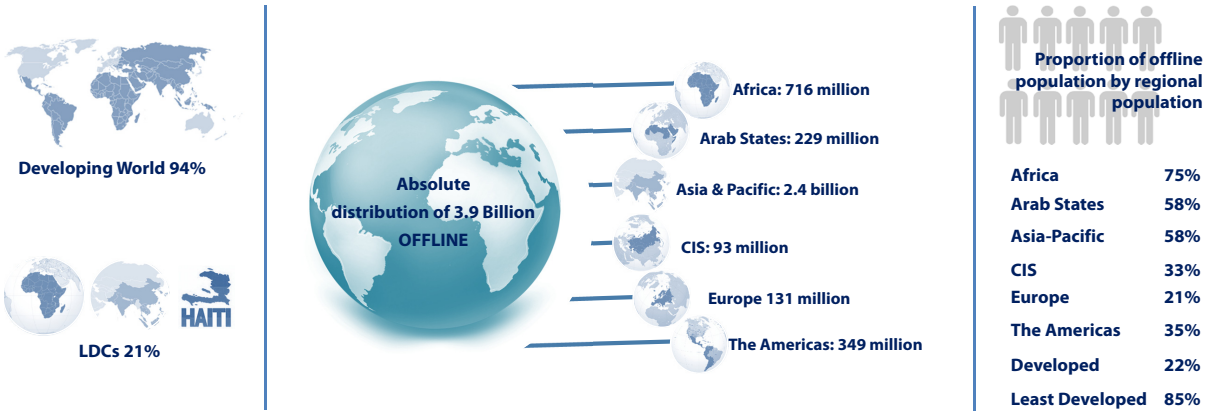
The UN Broadband Commission and the World Economic Forum are co-hosting a Joint Program in Davos on 17 January 2017 to highlight the increasing importance of Internet access and adoption as an enabler to achieving the UN Sustainable Development Goals, and to enable all economies and societies to participate and benefit from the 4th Industrial Revolution. The Special Session will bring together leaders from government, business, civil society, and academia with the objectives of (1) assessing existing efforts and progress towards connecting the 3.9 billion people not on the Internet and (2) discussing innovative approaches and solutions and how these efforts can be scaled and replicated.
Last year's Special Session of the Broadband Commission in Davos focused on facilitating alignment and collaboration among established initiatives and foster joint investments and promote partnership, as well as help to contribute to maximizing synergies among various efforts to extend the benefits of connectivity worldwide.
To kick-start the discussion, a Discussion Paper was prepared that provided three key statements (1) highlighting the largely positive economic impact of the Internet on economic growth[2] (2) estimating high-level infrastructure investment requirements of US$450 billion to connect the next 1.5 billion and (3) providing evidence of a generally positive link between a progressive

enabling and regulatory environment and broadband penetration. The key outcome was a joint call to action in relation to aligning efforts on infrastructure investment.[3] A number of global initiatives with the aim of connecting the unconnected have since been called into life. To examine where connectivity efforts should be focused or increased within the next three years, this year's Background Paper is of a contextual nature and examines in greater detail who and where the unconnected are today, what the key challenges are to meet the Connect 2020 Agenda Targets, specifically 1.2, 2.2.A, 2.2.B and 2.5.A, and what possible measures can accelerate the connection of the unconnected to achieve the Connect 2020 Agenda Targets.

WHO AND WHERE ARE THE UNCONNECTED TODAY AND WHY?

To-date, 53% of the world's population is still not using the Internet[4]. Research undertaken by ITU into the online and offline population shows that four-fifths of the offline population are located in Asia-Pacific and in Africa. While absolute numbers of offline individuals at a regional level show that Asia-Pacific bears the lion's share, it is Africa that exhibits the greatest connectivity shortfall when examining the proportion of population that is not online. When grouping countries by their level of development[5], the greatest connectivity shortfall is exhibited in Least Developed Countries ("LDCs"), where 85% of the population is still offline set against only 22% in Developed Countries.

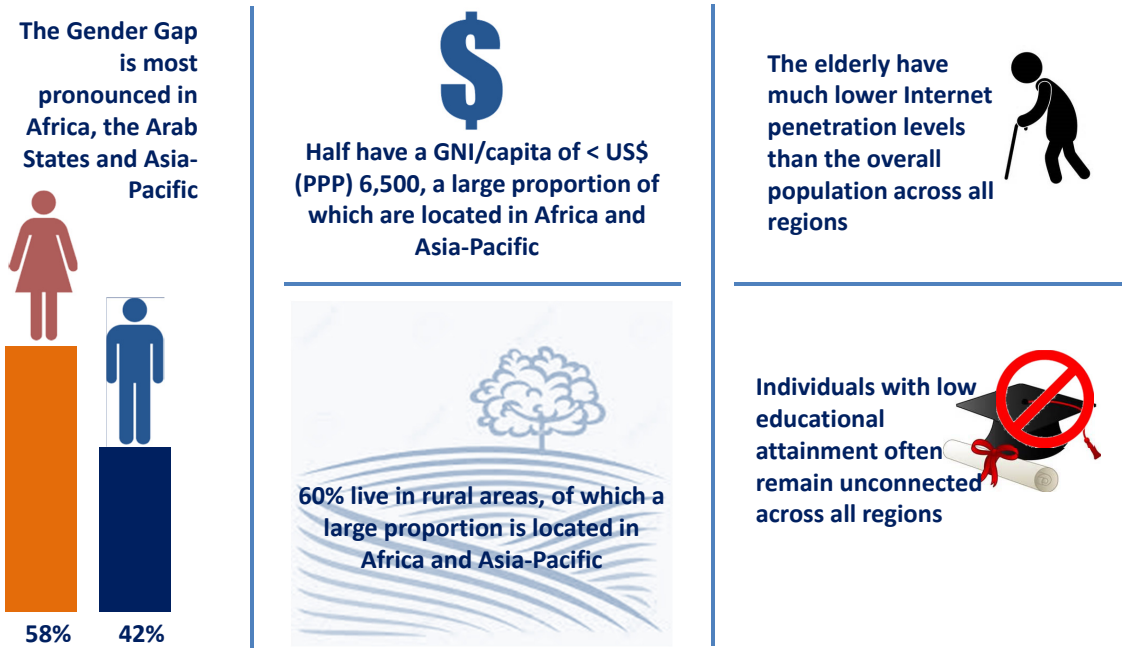
Figure 1: Distribution of the offline population 2016 by region and development level



Source: Author

The offline population is disproportionately female, rural, poor, illiterate and elderly.[6] As shown in Figure 2, of the 3.9 billion people that are still unconnected, 58% are female[7], roughly 60% are rural[8] and at least half come from countries with a GNI/capita of less than US$ (PPP) 6,500[9]. In addition, many spend far in excess of 5% on ICT access and services as a proportion of GNI/capita, the affordability threshold set by the UN Broadband Commission for Sustainable Development[10]. Moreover, the elderly and individuals with low educational attainment are groups that are largely excluded from Internet use. While Internet penetration for people over the age of 75 remains well below 10 percent, individuals with low educational attainment often remain unconnected.[11]

Figure 2: Key characteristics of the world offline population



Source: Author

There are a multitude of factors that influence if and how many people are on- or offline within a particular country. These include first and foremost the status and degree of infrastructure roll-out, the state of national development, the regulatory and enabling environment and corresponding policies[12], and demographic and socio-economic status.[13] In this regard, ITU's MIS16 report highlights a strong link between Internet uptake, education and income across

both the developed and developing world.[14] Moreover, the geographic location is also a significant determinant of Internet uptake. A large proportion of the rural population, especially in the developing world, remains unconnected.[15] In this regard, lower levels of income and lower levels of education that are often prevalent in rural areas exacerbate the problem. Data on rural and urban Internet use is patchy.[16] Still for most countries it holds true that rural Internet use is almost always lower than urban Internet use.[17] To this effect, the McKinsey Report "Offline and falling behind: Barriers to Internet Adoption" (2014) finds that urbanization is a key driver of Internet penetration.[18]

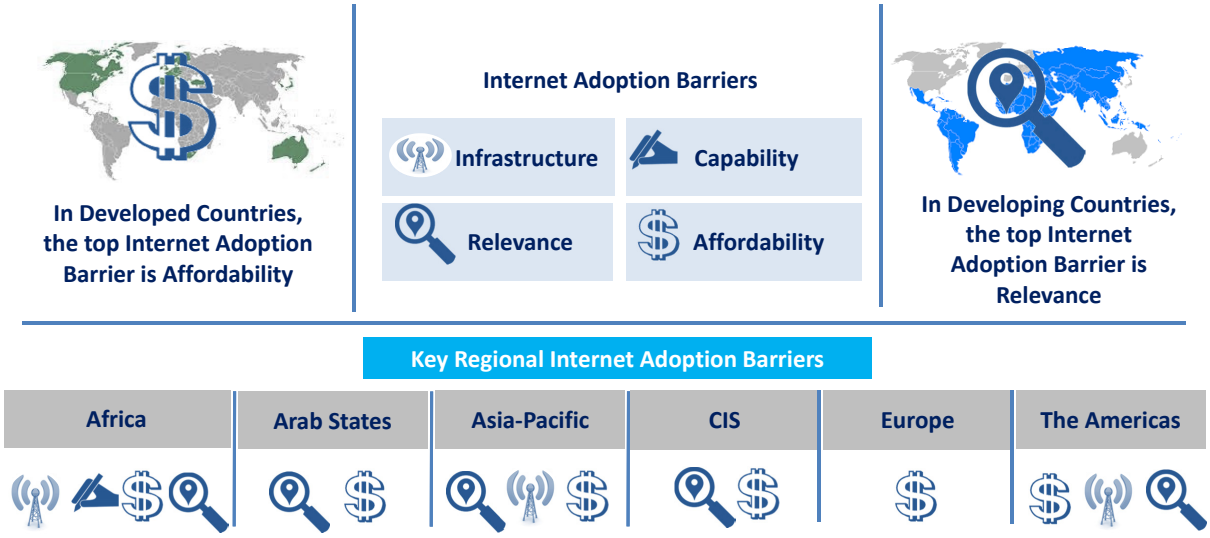
Understanding why people are offline has been the subject of numerous studies[19] that have examined the offline population, their key socio-economic and demographic characteristics, and the most significant Internet adoption barriers that they face. Most studies conclude that while infrastructure gaps are still a key reason for being offline, including supporting infrastructure such as power[20], it is the demand-side barriers including the lack of capability (ICT skills and know-how and basic literacy), relevance (content, services and apps, cultural awareness or barriers such as gender, inclusion) and affordability (service and device costs as well as costs of electricity for e.g. recharging and taxes) that should be given increased attention. ITU data shows that while 84% of world population live within coverage of 3G and 53% live within coverage of 4G networks[21], and while 66% of world population live within a 100 Km reach of fibre transmission networks[22], only 39% of total population have 3G or 4G connections[23] and only 11% have fixed broadband subscriptions[24]. Consequently, there is not only an infrastructure or access gap, but also an Internet usage gap.

As regards affordability, 57%[25] of world population currently cannot afford the Internet, because the costs of end-user devices, services, access and ancillary costs (including usage and device taxes) are still too high for many[26]. In addition, the A4AI Affordability Report 2015/2016 highlights patent fees as one key driver of high smartphone costs.[27] Moreover, income levels are too low for a large proportion of the offline population as highlighted above. This is particularly prominent in rural areas, where 80% of the worldwide poor are located[28]. In relation to relevance, there is a significant number of individuals that do not connect because they do not perceive a benefit from, trust or have an interest in being online. Others are prevented from going online for lack of relevant content, services or apps, or for cultural reasons or lack of skills. Currently 50% do not have access to relevant online content in their primary language[29], one of the major barriers cited for the developing world (and for women)[30], and the availability of services such as eCommerce, eBanking or eGovernment is limited. Regarding capability, currently, only 44% of global population have attended secondary education[31], a key determinant of Internet use as highlighted above.

The reasons why people are offline differ across countries and regions. Research for the years

2013-2015 on the top barriers to household Internet access at home shows that while the top barrier in the developed world appears to be affordability, in the developing world it is first and foremost relevance.[32]

Figure 3: Key Internet adoption barriers



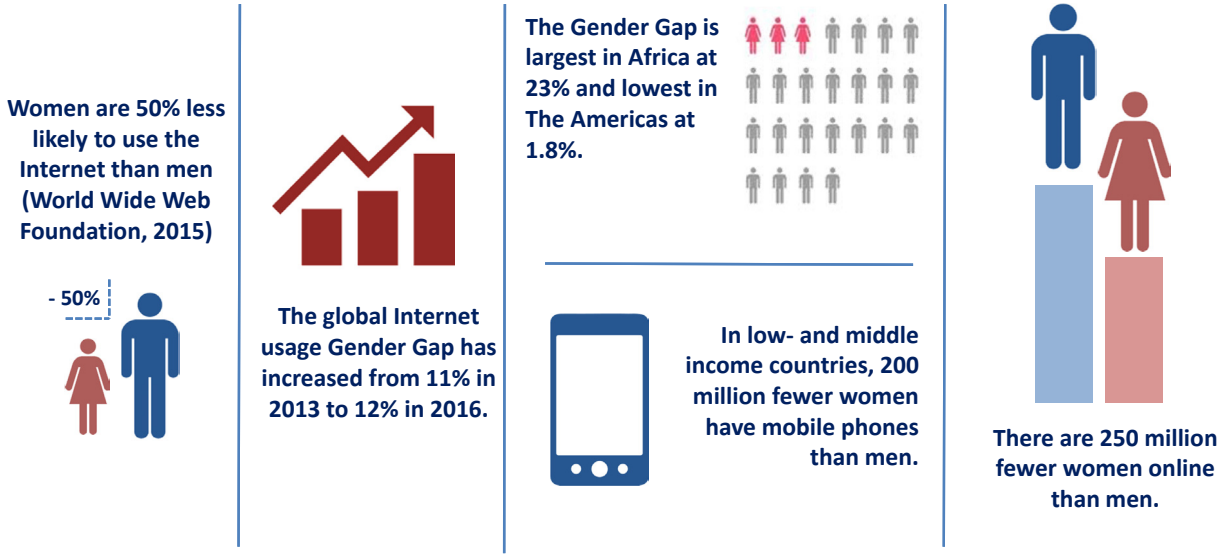
Source: Author

The regions that are still faced with most significant challenges in overcoming Internet adoption barriers are Africa and Asia-Pacific. Africa still faces challenges in relation to all Internet adoption barriers, including affordability and relevance, capability and infrastructure. Africa is the region with the highest rural population at 62%[33]. It also shows the lowest levels of income and education[34] as well as the highest Internet usage gender gap[35]. Asia-Pacific also still faces significant Internet adoption barriers[36]. The key barriers are relevance[37], infrastructure (particularly in rural areas and island nations) and affordability/ low income[38]. Moreover, Asia-Pacific has a relatively large gender gap.[39]

While at the country level there is very high variability in the data for a range of ICT indicators, women fare poorly across almost all regions and development levels: the GSMA estimates that 1.7 billion women in low- and middle income countries do not own mobile phones and women are on average 14% less likely than men to own a mobile phone.[40] In terms of access, women are 50% less likely than men in the same age group and at similar education and income levels to

be connected to the Internet than men. The key socio-economic drivers of Internet access for women are education and age.[41] In terms of use, women are half as likely to speak out online and a third less likely to look for work than men.[42] In this regard, the A4AI Affordability Report highlights lack of know-how and technical literacy, as well as the high costs to connect as the key reasons for not being online for women who live in urban areas.[43] The MIS 2016 Report highlights a persistent gender gap[44] in relation to Internet use, which is largest and has widened between 2013 and 2016 in Africa (from 20.7% to 23%) and the Arab States (from 19.2% to 20%).[45]

Figure 4: Focus Group Women

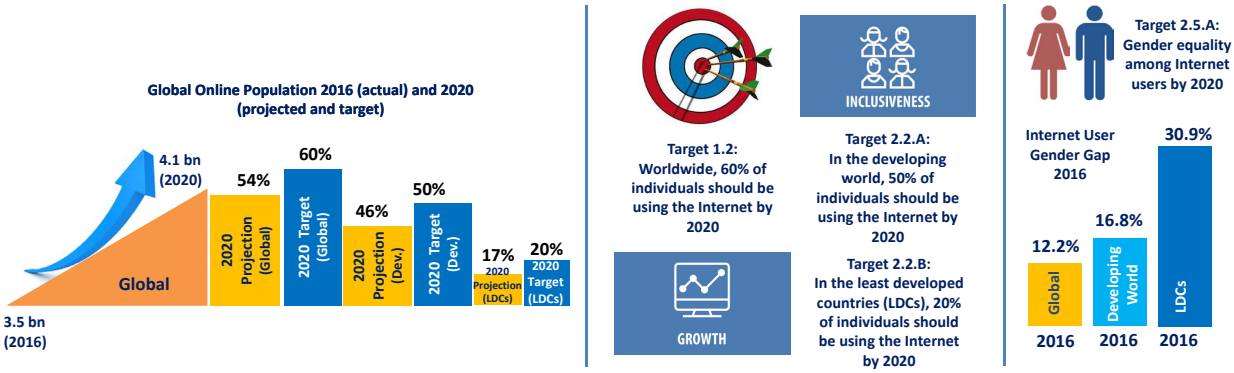


Source: author, adapted from ITU.

ACHIEVING THE CONNECT 2020 AGENDA TARGETS

ITU has set forth four overarching goals of growth, inclusiveness, sustainability and innovation & partnership as part of its Connect 2020 Agenda[46]. The targets that are considered in this paper include Internet usage targets 1.2, 2.2.A, and 2.2.B which stipulate that 60% of worldwide individuals, 50% of developing world individuals, and 20% of LDCs individuals should be using the Internet by 2020, and target 2.5.A, which sets forth that gender equality among Internet users should be reached by 2020.[47] Figure 5 shows online population forecast[48] and Connect 2020 Agenda Goals and Targets.

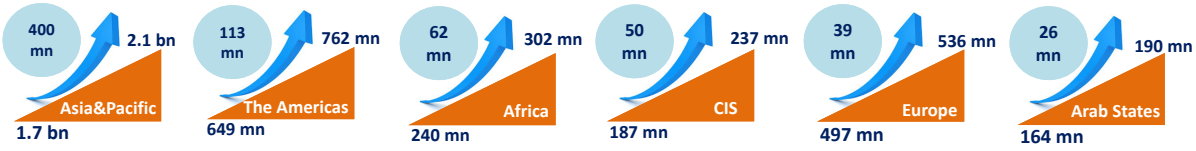
Figure 5: Online Population forecast and Connect 2020 Agenda Goals and Targets



Source: Author

54% of total global population is projected to be online by 2020, as shown in Figure 5. This falls 6% short of ITU's Connect 2020 Agenda Target 1.2. At the Developing World and LDC levels, the percentage shortfalls are 4% and 3%, respectively. Overall, a total of 1.1 billion individuals between now (47%) and the end of 2020 (60%) will still need to be connected[49]. In addition, a gender gap persists at global and at regional levels. Therefore, significant efforts have to be made to push Internet use closer to the 2020 projections and targets. Looking at the regional level, most people that are projected to come online within the next three years are located in Asia-Pacific and The Americas.

Figure 6: Regional online population 2016 and 2020 projections



Source: Author

Contrasting the Internet use and gender targets with projections of the online population and current online and offline profiles to-date shows the significant challenges that will have to be overcome within the next three years. Given the key Internet adoption barriers as discussed above the following two key challenges to achieve Connect 2020 Targets can be summarized:

- **Challenge 1**: Finding solutions to connect the large rural offline populations at minimal costs, and
- **Challenge 2**: Finding strategies for narrowing the usage ga ps across all regions.

While Challenge 1 can be largely seen as a supply-side issue given the lack of infrastructure coverage in rural or hard-to-reach areas, Challenge 2 is predominantly a demand-side issue, which relates to the lack of relevance, affordability/low levels of income and capability as well as the sizable proportion of women that are offline.

Challenge 1: Finding solutions that connect the large rural offline populations at minimal costs

Finding solutions that connect the rural offline population at minimal cost is a pan-regional issue, but a most prominent one for Africa and Asia-Pacific. Roughly two-thirds of the African and roughly three-fifths of the Asian-Pacific offline population are rural.[50] While not all of the rural offline population live outside infrastructure coverage, it is still a large proportion: ITU estimates that globally more than two-thirds of people living in rural areas were not covered by mobile broadband networks in 2015.[51]

To target rural or underserved areas, solutions need to be low-cost, given that lower incomes often coincide with rural areas. Moreover, solutions also need to be scalable and replicable to maximize the number of people to be brought online. To this effect, a number of pilot projects are at the testing stage. For example, Alphabet's Loon Balloons in Sri Lanka, Indonesia and other countries[52] are meant to provide Internet to rural and hard-to-reach areas at low cost or for free,

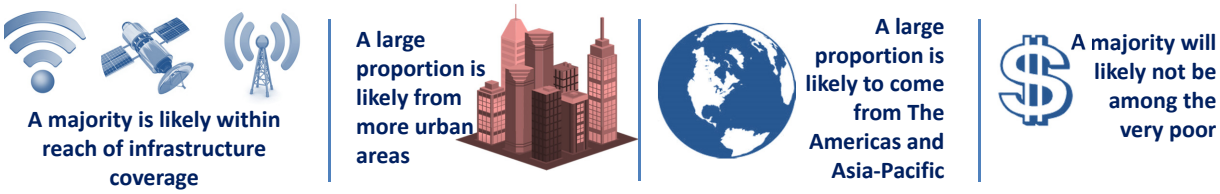
and Facebook's Connectivity Lab is developing new methods to deliver Internet, including lasers, drones, and new artificial intelligence–enhanced software.[53] Also, new, more enhanced[54] and more cost effective satellite systems[55] which are being developed using high-throughput satellites (HTS) and non-geostationary satellite orbit (NGSO) systems in low-Earth or mid-Earth orbit with embarked digital technology[56] are particularly suitable to address the rural/urban divide at a large scale.[57] In this context, a number of governments already include satellite technology for rural, remote and low population density regions in their National Broadband Plans (NBPs), including the United States, Kenya, Brazil, Malaysia, the European Union and Australia.[58] Moreover, a number of satellite initiatives and agreements are being implemented and concluded across the globe, addressing multiple Internet adoption barriers.[59] In addition, a number of governments are targeting rural and hard-to-reach areas by using Universal Service Obligations (USOs) and Universal Service Funds (USF) or setting connectivity targets, by constructing anchor facilities, by imposing licensing conditions, providing subsidies or tax rebates, introducing NBPs[60] and digital economy policies and programs, or optimizing new business models, and using PPPs to address the rural/urban divide.[61]

Given the large rural offline populations across Africa and Asia-Pacific, many initiatives in Africa and Asia-Pacific focus on rolling out infrastructure or providing public access in underserved areas using fixed, mobile or satellite technology. For example, Nigeria's Rural Broadband Initiative "RUBI" is piloting mobile hotspots that are constructed across the country[62], American Tower Corporation is launching partnerships with governments and other stakeholders in Nigeria and India to create "Digital Town Squares" as primary points of connectivity[63], and South Korea has introduced 'The Information Network Village' that aims at enabling rural communities to become self-sustainable through the provision of high-speed Internet access[64]. Pakistan has committed to connecting all of the country's unserved populations to the Internet by 2020, which will be financed through its USF and include building 200 telecentres in rural areas.[65] In India the "Digital India" program sets ambitious targets to digitally connect 250,000 of India's villages and Gram Panchayats[66] by broadband Internet and provide universal phone connectivity by 2019[67] and Vodacom has partnered with Intelsat in the Democratic Republic of Congo to extend its services using satellite broadband to over 700 rural sites.[68] Other satellite initiatives include the provision by Intelsat together with the Office des Postes et Telecommunications of French Polynesia of KU-band satellite solutions on Intelsat 18 to enable expansion of wireless infrastructure across French Polynesia[69], and in Myanmar Internet services provider Bluewave has introduced a satellite broadband services "Easy IP solution" that uses capacity on the EUTELSAT 70B satellite.[70]

Yet, the likelihood that replicable rural solutions deployed through government programs, PPPs or based on commercial solutions using satellites,

drones or balloons are going to be deployed at scale within the next three years is low. The new methods and technologies have yet to be developed and tested further for large-scale deployment and replicability, costs have to come down further and policies and programs have yet to show effect.[71] Therefore, in the likely absence of the deployment of large-scale replicable cost-effective and 'almost free' rural solutions within the next three years, most people are likely to come online in those areas where barriers in terms of access to infrastructure are lowest. In most cases this is likely to coincide with more urban areas. In more urban areas, the proportion of population that can afford access to the Internet and that have a higher level of education is also likely higher. The default profile of individuals to come online by 2020 is therefore as follows:

Figure 7: Profile of individuals to come online within the next three years



Source: Author

While each region will contribute to the share of people coming online within the next three years, the region with the highest share of urban offline population is the Americas: more than two-thirds of the offline population live in urban areas [72]. Moreover, 113 million individuals are projected to come online within the next three years. Coupled with the lowest gender gap[73] and more favourable rankings in the Affordability Development Index (ADI) with six nations of the region represented in the top 10[74], it is likely that a large proportion will come from the Americas. Moreover – and despite the fact that Asia-Pacific is largely home to a rural offline population - a large proportion is also likely to come from Asia-Pacific. Internet adoption across the region will be mainly driven by China, India and Indonesia with high urbanization prospects and rising middles classes.[75]

Given the likely absence of large-scale rural solutions and the resulting default profile of individuals to come online within the next three years, the key challenge will be to sufficiently address demand-side barriers of lack of relevance, affordability and capability that are strongly prevalent in urban areas to bring more people online.

Challenge 2: Finding strategies for narrowing the usage gaps across all regions in both, rural and urban areas

As highlighted above, there are significant usage gaps that cannot solely be explained by missing infrastructure, given that a majority of the world's population is already covered by 3G networks. Instead it is lack of relevance, affordability and capability, which are particularly prominent among women that are driving the significant usage gaps evident across almost all regions.

Finding targeted solutions that bear fruit within the short time-frame of three years to achieve Connect 2020 targets is challenging. Moreover, a detailed stocktaking and mapping exercise of ongoing initiatives that assesses impact, effectiveness and replicability of initiatives implemented for each of the Internet adoption barriers is needed to gain a better understanding of the current progress and remaining gaps. To-date, there are a number of efforts and initiatives that have been undertaken and implemented to specifically connect the unconnected largely at local, community or national level. To this effect, a number of initiatives were launched in 2016 with a combined investment value of more than US$20 billion[76]. Analysis of these initiatives shows that while most initiatives impact multiple Internet adoption barriers, a large proportion is focused on infrastructure investment, -roll-out and policy to foster the development of infrastructure such as open access frameworks or frameworks for infrastructure sharing. Most initiatives are publicly or PPP-funded and a majority of initiatives have been implemented across Africa (mainly in Nigeria and Kenya) and Asia-Pacific (first and foremost in India, Indonesia, Pakistan, and Myanmar).

There are also a number of initiatives that specifically target demand-side barriers. Internet.Org by Facebook, for example, has introduced "Free Basics" across 52 countries, a majority of which are located in Africa, The Americas and Asia-Pacific.[77] The National Institute of Information Technology of Japan has developed and tested a wireless communications technology "NerveNet"[78] in Cambodia, which enables high-speed data communication with solar power suitable for deployment across rural and remote areas, specifically addressing affordability in rural areas by reducing ancillary costs. Other demand-side initiatives include government programmes that specifically target poor households, schools and universities, libraries, hospitals and health institutions. In this regard, the UN Broadband Commission's Report "Enabling the Use of ICTs and Broadband: Understanding What Works to Stimulate ICT Adoption"[79] highlights key demand programs implemented in different countries and regions to tackle relevance, affordability and capability. The Government of Costa Rica, for example, has introduced the "Costa Rica Connected Homes Program" to address access, affordability, and capability among wider economic and socio-economic objectives[80], and the Government of Colombia has implemented a 'Subsidy Program for low-income households'[81] to tackle affordability of fixed broadband by addressing device (PCs and tablets) costs[82] and introducing a subsidy scheme for fixed Internet access to low-income households. This program

showed significant positive effects within a time-frame of only three years from implementation, evidenced by significantly increased Internet adoption rates. Moreover, Intelsat together with SkyNet de Colombia is supporting the Colombian Ministry of Information Technologies and Communications to connect schools in rural areas using satellite.[83]

While social media is still a key driver for people to go online in the developing world, more initiatives need to focus on developing different types of locally relevant content, apps and services (including eCommerce (online shopping), eBanking, and eGovernment services) to entice also those groups that are higher-income non-Internet users to go online. To address relevance in particular, the Government of India has created "Mobile-Seva", a mobile-governance platform or online gateway of public information and on-demand services[84], providing locally relevant information and services (e.g. national ID and passport services, employment, tax and pension information and services and other). The US Government through USAID has invested in Liberia's digital infrastructure, including the expansion of e-payments and e-government services to tackle relevance[85] and on the private-sector side Telenor has made it its goal to have 100 million customers using mobile financial services by 2020. In the area of capability, Kenya has established a Digital Learning Program to Drive Primary Education and Senegal has introduced ubiquitous WiFi, affordable PCs, software and an increasing portfolio of digital classes across its universities and created the first Senegal Virtual University, which has become the second largest university in the country.[86]

As highlighted above, women are a key driver of Internet use and can help push Internet user numbers closer to Connect 2020 Agenda Targets.[87] In this context, a significant number of initiatives have been implemented to address the gender gap, with objectives ranging from ensuring access and digital literacy, to working towards gender equality and participation of women in the digital world. The Government of Pakistan (in cooperation with a US Company), for example, is teaching girls to code, and the USAID Office of Senior Coordinator for Gender Equality and Women's Empowerment aims to bring 600,000 young women in Kenya online by 2020 through digital literacy training, relevant content, policy work and online social networks.[88] Moreover, ITU and UN Women have established EQUALS: the Global Partnership for Gender Equality in the Digital Age[89], a multi-stakeholder initiative which aims at creating a global movement to promote women and girls as equal participants in the digital technology revolution. In 2011, ITU also initiated "Girls in ICT", an ongoing global effort to raise awareness on empowering and encouraging girls and young women to consider studies and careers in Information and Communication Technologies. [90] Analysis by ITU of more than 200 gender initiatives implemented across the globe shows, that most initiatives in the gender area focus on training women in ICT skills, capacity building and awareness raising (see Figure 8). While for initiatives analysed for Africa, the most common was training, in Latin America it was training and community building.

Furthermore, mapping results showed that the region with the lowest number of initiatives mapped was the Arab States, and Europe showed a larger spread of initiatives, including training, awareness raising and mentoring as the leading categories, most of which were implemented in the UK and the Netherlands.[91]

Figure 8: EQUALS Gender Digital Inclusion Map

Source: Author, adapted from ITU EQUALS Gender Digital Inclusion Map.

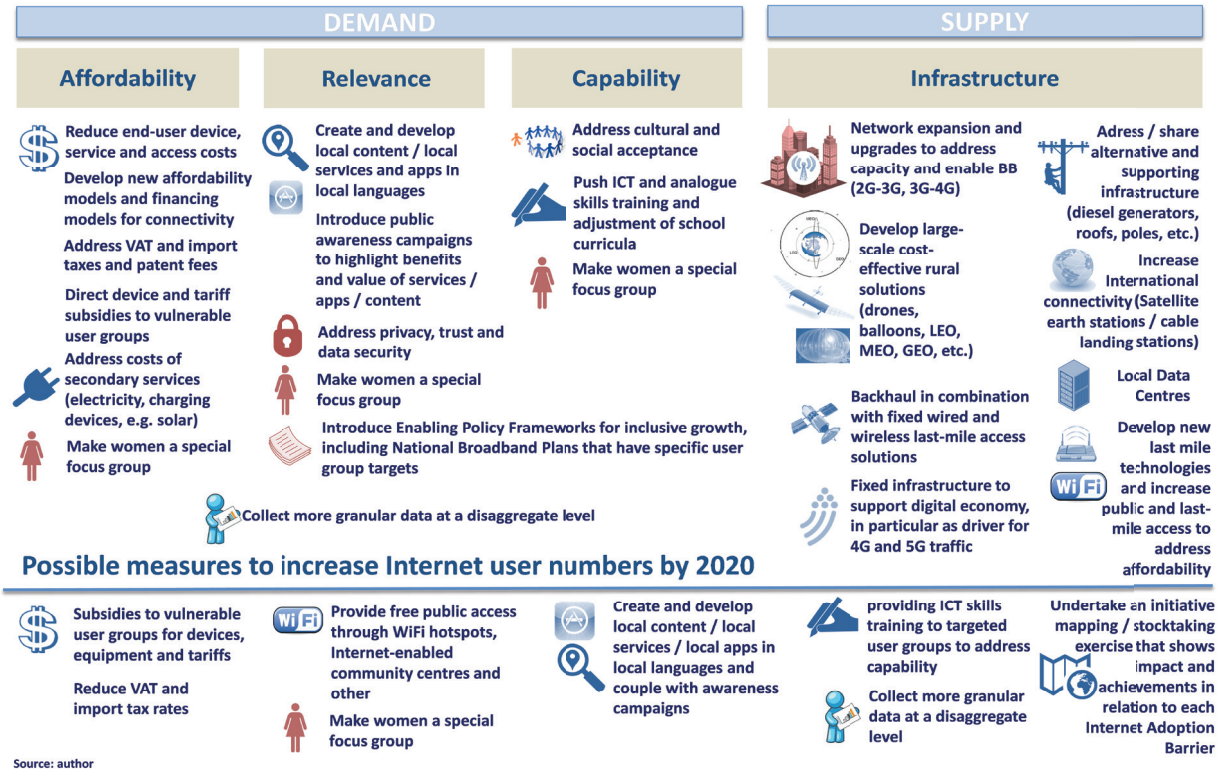
In addition to general framework conditions which facilitate broadband as a whole, as well as alongside the key policy recommendations put forward in the Broadband Commission's most recent State of Broadband Report 2016[92], a number of recommendations have been made in a number of reports[93] in relation to tackling demand-side barriers. Recommendations put forward are largely policy-related and include recommendations ranging from setting more ambitious cost targets by e.g. redefining "entry-level" broadband as a 1GB data plan[94] or by reforming and reviewing tax and patent regimes[95], to increasing competition and transparency in every layer of the connectivity market by reviewing regulatory and competition frameworks, or making better use of UAFs and USFs with concrete targets for reducing e.g. the gender gap in access and adoption.[96] Still others include promoting flexible use of low-value spectrum bands for free or very low-cost connectivity[97] as well as prioritizing public access facilities, or developing gender-responsive national broadband plans, and measuring progress and collecting, sharing, analysing and applying data (including gender data) to derive further insights into the barriers and their underlying drivers to better target policies.

As highlighted above, the key areas that need to be addressed in order to push Internet user numbers closer to Connect 2020 Agenda Targets within the next three years are first and foremost relevance, affordability and capability, while continuing to dedicate efforts to finding rural solutions. To drive relevance, more pragmatic recommendations that are effective in the short-term are needed, including public awareness campaigns on eCommerce, eBanking and mobile payments transactions, and eGovernment

services, as well as eHealth services highlighting the value of using them (e.g. time saved or that services are save to use) to entice also those people that can principally afford the Internet, but do not choose to use it. Where these services or content do not exist, the development of relevant local online content in local languages, apps and services in these areas should be pushed by both the private and public sectors as well as academic institutions, schools and medical institutions. To address affordability, direct device or tariff subsidies to vulnerable user groups as well as reductions in VAT and import device taxes can help in the short-term to overcome the affordability barrier (see the example of Colombia as cited above), as well as providing public access through WiFi hotspots or community WiFi networks, anchor facilities or telecentres, community centres or post offices that also provide free access to computers, tablets and other devices with an Internet connection[98]. To tackle capability in the short-term, providing ICT training targeted at different user groups appears to be an effective solution also in the short-term, which can be employed by the private sector and public institutions. Another recommendation includes to ensure that schools have sufficient broadband capacity and ICT equipment, and that school curricula are adjusted to include ICT skills training already in primary school.[99]

Figure 9 provides a summary overview of possible measures to increase Internet user numbers going forward in general and possible measures to increase Internet user numbers within the next three years.

Figure 9: Overview of possible measures to increase Internet user numbers



Source: author

Source: Author.

CONCLUSION

More than half of the world's population is still offline of which a majority lives in rural areas, is poor, female and illiterate. The key reasons for people not using the Internet are structural inequalities in income and education as well as the lack of infrastructure, relevant online content and services and high relative costs of access and usage. While a significant amount of initiatives have been implemented across all of the key Internet adoption barriers to tackle the key reasons for un-connectedness, a significant amount of people will remain unconnected and connectivity targets such as the ITU's Connect 2020 Agenda Targets will not be met. The key challenges to meet the Connect 2020 Agenda Targets are finding solutions to connecting in particular the large rural offline populations at minimal costs, and finding effective strategies for narrowing the usage gaps (including the gender gap) across all regions. Given that replicable rural solutions are unlikely to be deployed at scale and at low or no cost within the next three years, the default profile of people to come online by 2020 includes people from more urban areas or areas that are already within reach of infrastructure and people that are not among the very poor. Given this profile, the key barriers that need to be tackled in a pragmatic and effective way to push the online population closer to Connect 2020 Agenda Targets are relevance, affordability and capability, with a specific focus on women. Possible measures that can show an impact, some of which have proven successful in some countries in getting more people online also within a shorter time-frame include: direct device and tariff subsidies to vulnerable user groups coupled with a reduction in VAT and import duties; the provision of free public access through WiFi hotspots, Internet-enabled community centres / anchor facilities to address affordability; the creation of online content, apps and services that are relevant to people's lives coupled with public awareness campaigns to promote the use of services and highlight the benefits of using such services to tackle relevance; and providing ICT skills training to targeted user groups to address capability. Moreover, to improve and develop better targeted policies and create new partnerships going forward, more granular data has to be collected at a disaggregate level, and ongoing initiatives should be mapped and assessed as to their impact, effectiveness and possible replicability for each of the Internet adoption barriers.

ENDNOTES

1 itu.int/connect2020

2 It should be noted that a number of studies call into question the productivity gains said to have been brought on by the Internet. For example, the *World Development Report 2016* (World Bank, 20168) and *World Employment & Social Outlook 2016 (ILO, 20169)* offer more cautious viewpoints with regard to the economic impact of Internet access on job creation, with the WDR 2016 examining the 'displacement' of jobs between different sectors.

3 UN Broadband Commission for Sustainable Development, Joint Statement, *Working Together to provide Internet access to the next 1.5 billion by 2020*, 21 January 2016 http://broadbandcommission.org/Documents/publications/davos-statement-jan2016-en.pdf

4 Use of Internet means the proportion of individuals who used the Internet from any location in the last three months, see https://www.itu.int/dms_pub/itu-d/opb/ind/D-IND-ITCMEAS-2014-PDF-E.pdf , p. 54. see http://www.itu.int/en/ITU-D/Statistics/Pages/publications/manual2014.aspx

5 ITU, *ITU Regions, corresponding to the regional grouping of the ITU's Telecommunication Development Bureau*, https://www.itu.int/en/ITU-D/Statistics/Pages/definitions/regions.aspx and UN-OHRLLS, *UN Office of the High Representative for the Least Developed Countries, Landlocked Developing Countries and Small Island Developing States*, http://unohrlls.org/about-ldcs/

6 Illiteracy and age as factors that impact Internet use are further discussed in the MIS 2016 Report. However, data is patchy and evidence only exists for selected countries. Therefore, it is difficult to make aggregate statements. For further discussion of common characteristics of the offline population, also see World Development Report 2016, "Digital Dividends", World Bank 2016, available from: www.worldbank.org/en/publication/wdr2016

7 The female/male split in the offline population has been calculated at the regional level only, based on data obtained from https://www.statista.com/statistics/491387/gender-distribution-of-internet-users-region/ and Female Population 2015 (%, World Bank): http://data.worldbank.org/indicator/SP.POP.TOTL.FE.ZS

8 The rural/urban split in the offline population is based on data from ITU, McKinsey and UN Rural and Urban Population Statistics. Data on rural and urban Internet use from ITU was available for a number of selected countries including Mauritius, Senegal, Egypt, Morocco, Oman, Australia, Bangladesh, Indonesia, Iran, Japan, Korea Rep, Mongolia, New Zealand, Thailand, Azerbaijan, Belarus, Georgia, Russian Federation, Ukraine, Israel, Lithuania, Montenegro, Switzerland, Turkey, Bolivia, Canada, Chile, Colombia, Costa Rica, Cuba, Ecuador, El Salvador, Honduras, Jamaica, Nicaragua, Panama, Paraguay, Peru, and the US. The rural/urban offline split from McKinsey applies to the following 20 countries: India, China, Indonesia, Pakistan, Bangladesh, Nigeria, Brazil, Ethiopia, Mexico, Congo (Democratic Republic), Philippines, Russian Federation, Iran (IR), Myanmar, Vietnam, US, Thailand, Tanzania, Egypt, Turkey. Figures for the remaining countries have been inferred

based on country profiling, i.e. countries with similar population characteristics have been given the same rural/urban offline split.

9 It should be noted that when using average per capita income as a benchmark to assess affordability, especially for countries that have significant income inequalities, a large number will lie outside of affordability, as few very high incomes will skew the average upwards.

10 This threshold refers to the Broadband Commission's proposed affordability target of 5% of GNI per capita. Also, ITU data shows that a large majority of the subset of the offline population that comes from countries with a GNI/capita of less than US$ (PPP) 6,500 has a proportion of ICT expenditure of far in excess of even 10%. ICT expenditure in this paper reflects Mobile Broadband prices, prepaid handset-based 500 MB, 2014. It should be noted that when in-country income inequalities are taken into consideration, the number of individuals that cannot afford the Internet even though the country meets the 5% affordability threshold, will likely be significantly higher. To this effect the A4AI Affordability Report 2015/2016 shows that even in the face of falling prices, across a sample of 51 countries, not one meets the 5% target for those individuals that live in poverty. See A4AI, *A4AI Affordability Report 2015/2016*, Chapter 3, p. 25

11 See ITU, *Measuring the Information Society Report*, Chapter 6, 2016, and McKinsey, *Offline and falling behind: Barriers to Internet adoption*, 2014, p. 22, the report finds for 20 selected countries that 28% of the offline population is illiterate.

12 ITU tracks the advancement of regulatory systems with its ICT Regulatory Tracker. ITU Regulatory Tracker categorizes the regulatory environment into four main clusters, including: (1) Regulatory authority, (2) Regulatory mandate, (3) Regulatory regime, and (4) Competition framework. Each cluster comprises a set of different indicators and corresponding maximum scores that can be achieved per indicator and cluster, depending on the type of regulatory tool/measure/enabler/policy in place and associated progress. Based on these scores, countries fall into different regulatory generations, of which there are four. For example, a country that has a Tracker score of >= 85 points falls into the most advanced category of fourth-genera on. For a detailed description of the ITU Regulatory Tracker, please visit https://www.itu.int/en/ITU-D/Regulatory-Market/tracker/Pages/default.aspx

13 In this regard, the ITU Whitepaper on Broadband Regulation and Policy in Asia-Pacific highlights the key commercial and economic drivers of broadband growth, which include historical, political and institutional factors, historical and contemporary levels of GDP/Capita, aggregate levels of GDP, levels of passive communication infrastructure, historical and contemporary levels of POTS infrastructure and population distribution. See ITU, *White Paper on Broadband Regulation and Policy in Asia-Pacific Region: Facilitating faster Broadband Deployment*, November 2016, p.18, http://www-file.huawei.com/~/media/CORPORATE/PDF/event/itu-telecom-world-2016/white_paper_on_broadband_regulation_and_policy_in_asia_pacific_region_2016.pdf; Moreover, McKinsey, *Offline and falling behind: Barriers to Internet adoption*, 2014, identifies the following key drivers of Internet penetration: expansion of mobile network coverage and increasing mobile Internet adoption, urbanization, shrinking device and data plan prices, growing middle class, and increasing utility of the Internet.

[14] See ITU, *Measuring the Information Society Report*, 2016, Chapter 6 pp. 188-190: Based on data from OECD and Eurostat reflecting Internet use by distribution of different household income levels, the report shows that Internet use by individuals from high-income households is almost universal (9 out of 10 individuals use the Internet), whereas for low-income households it is significantly fewer. A similar more pronounced picture emerges for Latin American countries. Moreover, there is significant variability for the poorest quartile of income across the OECD countries analyzed. While for six countries in the lowest income bracket, less than half use the Internet, for 12 countries in the same bracket there are more than 70% of individuals that use the Internet. In addition, the level of educational attainment is seen as one of the most important indicators of Internet use is: In the developed world Internet use reaches almost 100% among those with higher (tertiary) education. Where educational attainment is low, Internet use is also low.

[15] This is mainly because rural or hard-to-reach areas are largely uneconomic for the market to serve, given the low density of population and the consequentially higher costs of network roll-out.

[16] The MIS Report 2016 has analysed 31 countries across all regions. The data shows that there is great variability among the countries examined.

[17] With the exception of Japan, Australia, Switzerland and the United States, where urban and rural Internet use are almost at parity, see ITU, *Measuring the Information Society Report*, Chapter 6, Chart 6.15, 2016; ITU research into the online and offline population 2016 shows, that a majority of countries with a share of rural population greater than 60% have Internet use of 30% or less.

[18] The report shows that urbanization in China, India, Ethiopia, Indonesia and Nigeria has and continues to contribute significantly to Internet penetration.

[19] For further information see: McKinsey, *Offline and Falling Behind: Barriers to Internet Adoption*, 2014; ITU, *Measuring the Information Society Report*, 2015 and 2016; ITU, *Facts and Figures*, 2016; ITU/ Broadband Commission for Sustainable Development, *Report on the State of Broadband*, 2016; Internet Society, *Global Internet Report 2015:Mobile Evolution and Development of the Internet*, 2015; Analysys Mason and Internet.org by Facebook, *State of Connectivity Report 2015: A Report of Global Internet Access*, 2015; UN Broadband Commission for Sustainable Development, *Enabling the Use of ICTs and Broadband: Understanding What Works to Stimulate ICT Adoption*, November 2016; Alliance for Affordable Internet, *A4AI Affordability Report 2015/16*, 2016; GSMA Mobile Economy Report 2016, https://www.gsmaintelligence.com/research/?file=97928efe09cdba2864cdc-f1ad1a2f58c&download and GSMA Mobile Economy Report Africa 2016, http://www.gsma.com/mobileeconomy/africa/ ; World Economic Forum: *Internet for All* http://www3.weforum.org/docs/WEF_Internet_for_All_Framework_Accelerating_Internet_Access_Adoption_report_2016.pdf; World Wide Web Foundation, *Women's rights online: Translating Access into Empowerment*, 2015; World Development Report 2016, "Digital Dividends", World Bank 2016, available from: www.worldbank.org/en/publication/wdr2016

[20] This is particularly prominent in rural areas across Africa and Asia-Pacific.

[21] ITU, *ICT Facts and Figures 2016: Mobile network coverage and evolving technologies*, 2016

22 ITU, *ITU Interactive Transmission Maps*, 2016, https://www.itu.int/en/ITU-D/Technology/Pages/InteractiveTransmissionMaps.aspx

23 Broadband Commission for Sustainable Development, *Enabling the Use of ICTs and Broadband: Understanding what works to stimulate ICT Adoption*, page 10, November 2016

24 ITU research and MIS Report 2016, Chart 6, Chapter 6, p. 197

25 Internet.org by Facebook, State of Connectivity Report 2015, A Report on Global Internet Access, p.18

26 To this effect, the GSMA shows that albeit prices of smartphones in developing countries have fallen since 2008 by 30% in Asia, 25% in Latin America and 20% in Africa, the cost of an average smartphone is still too high for most. GSMA, *The Mobile Economy 2015*, 2015 http://www.gsmamobileeconomy.com/GSMA_Global_Mobile_Economy_Report_2015.pdf. The GSMA recommends that devices be priced between US$25-50 in order for the majority of people in developing countries to consider them affordable, yet smartphones on average cost over two times that recommended "sweet spot". Most smartphones still sell for US$100 or more in developing countries – equivalent to approximately 9% of annual income (or about an entire month's income) for a person living in poverty (i.e., on under $3.10/day). Also see GSMA 2016 https://www.gsmaintelligence.com/research/?file=97928efe09cdba2864cdcf1ad1a2f58c&download which highlights that sub-US$100 smartphones are increasingly available, however still have to reach the mass market.

27 Up to 31% of the cost of a US$400 smartphone can be attributed to patent royalties and in some cases the costs associated with patent royalties for a smartphone represent more than the cost of the phone's physical components. See A4AI, *A4AI Affordability Report 2015-2016*, p.39

28 10.7% or 767 million people live below the poverty line of US$1.90 per day, most of which are located in Africa and Asia-Pacific. World Bank. 2016. *Poverty and Shared Prosperity 2016: Taking on Inequality*. Washington, DC: World Bank. doi:10.1596/978-1-4648-0958-3. License: Creative Commons Attribution CC BY 3.0 IGO https://openknowledge.worldbank.org/bitstream/handle/10986/25078/9781464809583.pdf

29 Internet.org by facebook, State of Connectivity Report 2015, A Report on Global Internet Access, p.26

30 ITU, *Measuring the Information Society Report 2016*, Chapter 6; see also World Wide Web Foundation, *Women's rights online: Translating Access into Empowerment*, 2015, pp.18,19

31 See UNESCO Education Statistics 2015. For further information and for more granular statistics on enrolment and educational attainment and completion by level, age and economic status, please go to http://data.uis.unesco.org/Index.aspx?DataSetCode=EDULIT_DS&popupcustomise=true&lang=en

32 ITU, *Measuring the Information Society Report*, 2016, Chapter 6 p. 197-198. The second and third barriers are affordability and capability in the developed world. See also McKinsey, *Offline and Falling Behind: Barriers to Internet Adoption*, 2014, pp. 5,6

[33] ITU research shows that 33 out of 46 African countries have a proportion of rural population of 50% or more, and 23 out of 46 African countries have a rural population in excess of 60%.

[34] A4AI, *A4AI Affordability Report 2015-2016*, p.14 & 18. The report shows that most African countries are within the lower half of the 51 countries that have been examined as part of the Affordability Development Index. A large proportion of African countries have literacy rates of less than 70% (19 out of 37 countries that data was available for).

[35] See Figure 4.

[36] The offline population totals 2.4 billion, of which 85% is located in only five countries including China, India, Indonesia, Pakistan and Bangladesh. There is great variability at a disaggregate level across Asia-Pacific. In relation to projected Internet use up to 2020, it is first and foremost China, India, and Indonesia that will drive Internet uptake across Asia-Pacific in terms of numbers.

[37] This is highlighted as an issue particularly for China, see McKinsey, *Offline and Falling Behind: Barriers to Internet Adoption*, 2014 , p. 64

[38] Nine Asian-Pacific countries are ranked in the bottom half of the ADI index, which include China, Vietnam, Pakistan, Myanmar, the Philippines, Indonesia, India, Bangladesh and Nepal. The ADI index is the Affordability Drivers Index which is created by the Alliance for Affordable Internet (A4AI) and which ranks countries across a range of variables within two sub-index areas of infrastructure and access and which subsequently ranks countries among themselves. See www.a4ai.org, p.12 for a brief description of the ADI.

[39] More than half of the offline population are female in India, China, Indonesia, Pakistan, Bangladesh, the Philippines and Vietnam. See McKinsey, *Offline and Falling Behind: Barriers to Internet Adoption*, 2014. See also the MIS Report 2016.

[40] GSMA 2016, http://www.gsma.com/newsroom/press-release/results-of-new-mobile-phone-gender-gap-survey/

[41] Alliance for Affordable Internet, *A4AI Affordability Report 2015/2016*, Chapter 4, p. 32

[42] World Wide Web Foundation, Womens' rights online: Translating Access into Empowerment, 2015, http://webfoundation.org/docs/2015/10/womens-rights-online21102015.pdf

[43] A4AI, *A4AI Affordability Report 2015-2016*, p.32. Also, Women earn on average 30%-50% less than their male counterparts, see http://www.researchictafrica.net/publications/Evidence_for_ICT_Policy_Action/Policy_Paper_13_-_Lifting_the_veil_on_ICT_gender_indicators_in_Africa.pdf

[44] Gender gap is defined as the difference between the Internet user penetration rate for males and females in relation to the Internet user penetration rate for males, expressed as a percentage.

[45] At the Global level it has also widened from 11% to 12.2%, at the Developing level from 15.8% to 16.8% and LDC level from 29.9% to 30.9%. The Gender gap has slightly narrowed in Europe (9.4% to 6.9%) and CIS (7.5% to 5.1%) and at the Developed Country level (5.8% to 2.8%). The Americas has the lowest Gender gap at 1.8%. It is the only region where more women were online than men in 2013. See ITU, Measuring the Information Society Report, Chapter 6, 2016

[46] See http://www.itu.int/en/connect2020/Pages/default.aspx

[47] While all targets within goals 1 and 2 are relevant in relation to connecting the unconnected, this paper focuses on examining targets 1.2, 2.2.A and 2.2.B. Goals 3 and 4 deal with managing challenges resulting from ICT / telecommunication development and leading, improving and adapting to a changing ICT/telecommunication environment.

[48] The online population projections are based on average annual increase in Internet use for the period 2010-2015 based on ITU data. For selected countries adjustments have been made using the average annual projected increase of Mobile Internet Unique Mobile Subscribers from GSMAi for the period 2016-2020.

[49] In terms of additional global population to be connected, the 6% gap between the projected online population and target 1.2 translates, in absolute terms, into 475 million individuals. These will have to be connected in addition to those that are projected to come online by 2020 at current connectivity rates.

[50] ITU research shows that the rural offline population in the Arab States is roughly 47%, in the CIS Region 53%, in the Europe Region 32% and in the Americas Region 26%.

[51] See MIS Report 2015, Chart 1.20, p. 20 – This figure is likely lower to-date, i.e. a larger proportion of rural population is likely covered by 3G networks than in 2015.

[52] First tests were undertaken in New Zealand and Brazil in 2013 and 2014, respectively. https://x.company/loon/ and https://www.technologyreview.com/s/542956/alphabets-stratospheric-loon-balloons-to-start-serving-internet-to-indonesia/

[53] For further information see https://info.internet.org . In addition, Facebook provides Express Wifi, a partnership with carriers, internet service providers, and local entrepreneurs to expand connectivity to underserved locations around the world. Express WiFi is available in India to-date. For further information see: https://info.internet.org/en/story/expresswifi/

[54] in terms of speed, capacity and latency.

[55] On the one hand, it is increased competition from e.g. new entrants such as SpaceX that reduce barriers to entry and thereby costs in the area of satellite launch. On the other hand it is technological improvements and innovations such as the development of worldwide fleets of high-throughput satellites (HTS) and non-geostationary satellite orbit (NGSO) systems in low-Earth or mid-Earth orbit with embarked digital technology that make satellites a strong alternative to fixed or mobile Internet provision, especially in rural or hard-to-reach areas.

[56] For example in-orbit reprogrammable features.

[57] For further information on the use of satellite for ICT, please see ITSO/EUTELSAT IGO, *Satellites for Sustainable Development, A contribution to the Broadband Commission for Sustainable Development,* 2016 and ITSO, Inmarsat and EUTELSAT igo, *Satellite as an effective and compelling solution to overcome the digital divide*, a Contribution to the Broadband Commission, 2016. See also UN Broadband Commission's State of Broadband Report 2014 and 2016, pp. 28,29

58 For further information see *Satellite as an effective and compelling solution to overcome the digital divide*, a Contribution to the Broadband Commission, 2016, p. 14,15

59 For an overview of satellite deployments that target vulnerable user groups in rural and hard-to-reach areas alongside applications of satellite to support the achievement of the Sustainable Development Goals, see ITSO/EUTELSAT IGO, *Satellites for Sustainable Development, A contribution to the Broadband Commission for Sustainable Development,* 2016

60 While some evidence links NBPs to increased fixed and mobile broadband penetration, five key policy measures were found to particularly drive broadband adoption, including (1) public investment in backbone and aggregation, (2) public investment in access networks, (3) regulatory framework for infrastructure sharing, (4) inclusive social offers and (5) regulatory frameworks facilitating FTTx-roll-out (See Nokia/Diffraction Analysis, *Government Broadband Plans: Five key policy measures that proved to make a difference, Strategic White Paper*, May 2016, see http://resources.alcatel-lucent.com/asset/193176). NBPs have been introduced by 151 countries to-date, seven countries are planning to introduce plans and 38 countries do not have a plan. At the regional level, more than two-thirds of countries in Africa, Asia-Pacific, CIS, Europe and the Americas have introduced NBPs. The only region with less than two-thirds of countries with an NBP are the Arab States with 14 out of 22 countries. Joint research by ITU, the Broadband Commission and Cisco in 2013 has found that the introduction or adoption of a broadband plan is associated with 2.5% higher fixed broadband penetration, and 7.4% higher mobile broadband penetration on average. The positive relationship between the uptake of ICTs and a progressive regulatory environment has been highlighted in a number of studies and papers, see ITU, UN Broadband Commission for Sustainable Development, *"Working together to connect the world by 2020: Reinforcing Connectivity Initiatives for universal and affordable access – A discussion paper to partners working to connect the world",* 2016, pp. 8,9,

61 See ITU UN Broadband Commission for Sustainable Development, *State of Broadband 2016 Report*, 2016, pp. 36,37, http://www.broadbandcommission.org/Documents/reports/bb-annualreport2016.pdf , which highlights that „USFs still seem the most popular mechanism with 33% of ITU Member States" making use of them, "followed by license conditions or USOs (18%) and subsidies or inclusive offers (16%)."

62 See http://www.uspf.gov.ng/index.php?option=com_content&view=article&id=11:rubi-rural-broadband-initiative&catid=13&Itemid=129 - Through the RUBI project, the USPF provides subsidies to operators for the deployment of network to support the establishment of core delivery mechanisms for broadband services in the rural/semi-urban areas of Nigeria. The pilot wireless mobile broadband hotspots have been completed. This project is providing both wired and wireless internet at high speed in the rural areas at wholesale, and at the same time serving as catalyst for the uptake of other broadband-dependent projects in those locations such as e-library, e-health, e-government, etc.

63 American Tower Corporation is providing critical access to the Internet in underserved areas by building education kiosks with Internet access and uninterrupted power supply and a broadband link. This is piloted in Nigeria and India. In India, American Tower is building Villages of the Future where they have 30 operational sites, with plans for another 30 by year end. The digital

square concept is like a village well, especially in rural India, where students can use Hole-In-The-Wall learning stations because many of American Tower's sites have electricity, security and internet backhaul. American Tower has also set up e-learning kiosks at schools and solar projects where it has installed fans, bore wells and installed water pumps in order to provide clean drinking water. See http://wirelessestimator.com/articles/2016/for-atc-india-its-56000-towers-and-corporate-responsibility-projects/ , see also American Tower Corporation Annual Report 2015To tackle relevance, intiatives need to be focused on different types of locally relevant contentbase i that target demand-side p. 21 To tackle relevance, intiatives need to be focused on different types of locally relevant contentbase i that target demand-side

64 see: Jung, Man-Chul, Park, Sora, Young Lee, Jee: *Information network villages: a community-focused digital divide reduction policy in rural Korea*, 2014, Australian Journal of Telecommunications and the Digital Economy, 2 (1), pp. 1-17 - This study examines South Korea's Information Network Village (INVIL) project as an exemplary policy of building sustainable communities through a digital divide policy implemented in small rural areas. INVIL project has three objectives: to close the digital gap between urban and rural areas, to create new sources of revenues from existing industries, and to build sustainable local communities.

65 See Global Connect „Global Actions".

66 https://www.quora.com/What-is-a-gram-panchayat

67 "Digital India" is the Indian's Government's plan to digitally connect all of India's villages and gram panchayats by broadband internet, promote e-governance and transform India into a connected knowledge economy. By the year 2019, the 'Digital India' program envisages that 250,000 Indian villages will enjoy broadband connectivity, and universal phone connectivity. See http://telecom.economictimes.indiatimes.com/tele-talk/digital-india-making-villages-smart/719

68 http://www.intelsat.com/wp-content/uploads/2016/03/Delivering-rural-cellular-services-in-DRC-Vodacom-7251-CS.pdf

69 http://www.intelsat.com/intelsat-news/opt-french-polynesia-expands-relationship-withintelsat-to-meet-growing-broadband-demands-across-region/

70 http://www.mmbiztoday.com/articles/frenchfirm-grabs-myanmar-satellite-solutions-deal

71 There are also setbacks: Internet.org's first Satellite AMOS-6, which was part of the payload of SpaceX's Falcon 9 rocket and set to deliver connectivity to large portions of Sub-Saharan Africa, exploded on the launch pad on 1 September 2016. See https://info.internet.org and http://www.theverge.com/2016/9/1/12750872/spacex-explosion-facebook-satellite-internet-org-zuckerberg

72 Based on ITU research on estimations of rural and urban Internet use across The Americas, the majority of the offline population lives in urban areas (e.g. Brazil 76%, Mexico 75% and the United States 52%). Also, the region with the highest urban population is The Americas at 81% to-date, which is projected to increase to 82% by 2020.There is high variability across all countries in The Americas, given the significant differences in countries' geographies, including the Caribbean islands and mountainous and rain forest terrain in South America, where infrastructure challeng-

es are still prevalent. However, the percentage of population that lives in rural or difficult-to-reach areas is relatively small: at the regional level, only 19% live in rural areas. For South American countries, the proportion is only 16.5%. While a large majority of countries in The Americas has an urban population of more than 50%, it is 10 countries that have an urban population of less than 50%. These include seven for the Caribbean (Antigua & Barbuda, Aruba, Barbados, Grenada, St. Kitts & Nevis, St Lucia, and Trinidad & Tobago), one Central American country (Belize) and one South American country (Guyana). Source: ITU Research 2016 into the online and offline population and McKinsey, *Offline and falling behind: Barriers to Internet Adoption*, 2014, Exhibit 9, p.27

73 The Americas has the lowest Gender gap of only 1.8%, which is likely to have a positive bearing in bringing a larger proportion of women online (for example in Mexico, 54.6% of women use the Internet and in Venezuela, 50.6% use the Internet).

74 A4AI, *A4AI Affordability Report 2015-2016*, p.15. - Latin American countries lead the Affordability Development Index (ADI) rankings, with six nations of the region represented in the top 10.

75 See McKinsey, Offline and falling behind: Barriers to Internet adoption, 2014, pp. 60-98. Also, ITU research indicates that China has a projected increase in Internet use from 760 million to 882 million (absolute increment of 123 million), India has a projected increase from 383 million to 541 million (an increment of 157 million), and Indonesia has a projected increase from 72 million to 106 million (34 million increase). See also World Bank. 2016. Poverty and Shared Prosperity 2016: Taking on Inequality. Washington, DC: World Bank.doi:10.1596/978-1-4648-0958-3. License: Creative Commons Attribution CC BY 3.0 IGO, p.48 https://openknowledge.worldbank.org/bitstream/handle/10986/25078/9781464809583.pdf

76 A number of initiatives were launched that are highlighted under the Global Connect Initiative, see: https://share.america.gov/globalconnect/ , for Global Connect Actions, see https://share.america.gov/wp-content/uploads/2016/04/GCI-Global-Actions-FINAL.pdf; Estimating the impact in terms of the number of additionally connected as a result of these initiatives is difficult. However, a rough addition of some connectivity targets included in the initiatives shows that at least 250 million additional individuals are envisaged to use the Internet through Global Connect initiatives.

77 Facebook estimates that Free Basics has brought 25 million of additional Internet users online, which has been launched in 24 countries in Africa, 16 in the Americas, 11 in Asia-Pacific and 1 in the Arab States. Free Basics addresses affordability as well as relevance by providing access to services and websites for free without data charges. Content includes links to news, employment, health, education and local information. For further information, see: https://info.internet.org/en/story/free-basics-from-internet-org/. There have been concerns regarding Free Basics in relation to net neutrality principles. India's regulatory authority TRAI has therefore banned the service in India. See, for example, http://trai.gov.in/WriteReadData/PressRealease/Document/Press_Release_No_13%20.pdf or https://techcrunch.com/2016/02/08/india-blocks-facebook-freebasics-net-neutrality/

78 https://www.nict.go.jp/en/asean_ivo/4otfsk000029wocm-att/Rapid_Sun.pdf

79 See http://broadbandcommission.org/workinggroups/Pages/demand.aspx

80 http://1worldconnected.org/wp-content/uploads/2016/10/ConnectedHomes.pdf - The Connected Homes Program is a public-private partnership in Costa Rica that seeks to subsidize Internet access and computer equipment for 14,000 vulnerable households by 2018. Initiated by the Presidential Social Council of Costa Rica in 2015, the program aims to reduce poverty and inequality for 15% of Costa Rica's overall population and promote economic growth through creation of new jobs over the course of the next six years. The program uses USF funding to subsidize wireless connections for the poor and to distribute one laptop each to 140,000 poor homes, 5,000 schools, 1,100 hospitals and most of Cost Rica's public libraries to tackle access, affordability, and capability among wider economic and socio-economic objectives.

81 as part of its Plan Vive Digital 2010-2014, see http://www.mintic.gov.co/portal/vivedigital/612/articles-1510_recurso_1.pdf

82 By introducing zero VAT and zero import tariff for personal computers and by promoting better access to financing and longer broadband contracts for subsidized devices, 20% of total ownership costs could be eliminated.

83 For further information see http://www.intelsat.com/intelsat-news/intelsat-and-skynet-de-colombia-bring-high-speedbroadband-connectivity-to-remote-areas-of-colombia/

84 https://mgov.gov.in

85 See Global Connect Initiatives.

86 See http://broadbandcommission.org/workinggroups/Pages/demand.aspx

87 This is clearly evidenced by countries and regions that have a smaller Gender gap, for example in The Americas.

88 See Global Connect „Global Actions".

89 http://equals.org

90 See http://girlsinict.org/ - The initiative is committed to celebrate and commemorate the International Girls in ICT Day on the fourth Thursday of every April as established by the ITU membership. The Girls in ICT Portal is a tool for girls and young women to get an insight into the ICT sector as well as for partners to understand the importance of the International Girls in ICT Day, developed by the Digital Inclusion program of ITU Telecommunication Development Bureau.

91 Further information about the project and methodology of the mapping is available at http://equals.org

92 The key policy recommendations include: Review and update regulatory frameworks for broadband, Improve Policy Frameworks for the IoT and Smart Cities, Encourage Investment by Both the Public & Private Sectors, Make Full Use of USOs, Consider infrastructure-sharing , Consider measures to make broadband more affordable, Reduce taxes and import duties on telecom/ICT equipment and services, Promote training and measures to stimulate demand, Encourage Local Innovation through Strategic Local Hosting, Promote Free Flows of Information, Promote Advanced Market Commitments for Rural Broadband Access, Benchmark and Monitor Developments in Telecom and ICT, see pp. 76-83 for further detail of ITU/UN Broadband Commission for Sustainable Development, *Report on the State of Broadband* 2016, http://www.broadbandcommission.org/Pages/default.aspx

[93] See: McKinsey, *Offline and Falling Behind: Barriers to Internet Adoption*, 2014; ITU, *Measuring the Information Society Report*, 2015 and 2016; ITU, *Facts and Figures*, 2016; ITU/UN Broadband Commission for Sustainable Development, *Report on the State of Broadband*, 2016; Internet Society, *Global Internet Report 2015:Mobile Evolution and Development of the Internet*, 2015; Analysys Mason and Internet.org by Facebook, *State of Connectivity Report 2015: A Report of Global Internet Access*, 2015; Broadband Commission for Sustainable Development, *Enabling the Use of ICTs and Broadband: Understanding What Works to Stimulate ICT Adoption*, November 2016; Alliance for Affordable Internet, *A4AI Affordability Report 2015/16*, 2016; GSMA Mobile Economy Report 2016, https://www.gsmaintelligence.com/research/?file=97928efe09cdba2864cdcf1ad1a2f58c&download and GSMA Mobile Economy Report Africa 2016, http://www.gsma.com/mobileeconomy/africa/; World Wide Web Foundation, *Women's rights online: Translating Access into Empowerment*, 2015, pp. 43-47;

[94] For example, 1 GB of data priced at 2% or less of average monthly income.

[95] For example, royalty stacking or reducing import or luxury taxes on handsets or SIM cards and other equipment and devices.

[96] For example, community access options targeting women and girls.

[97] (e.g. community WiFi)

[98] See p.39 A4AI

[99] For further information see UN Broadband Commission for Sustainable Development, *Enabling the Use of ICTs and Broadband: Understanding What Works to Stimulate ICT Adoption*, November 2016