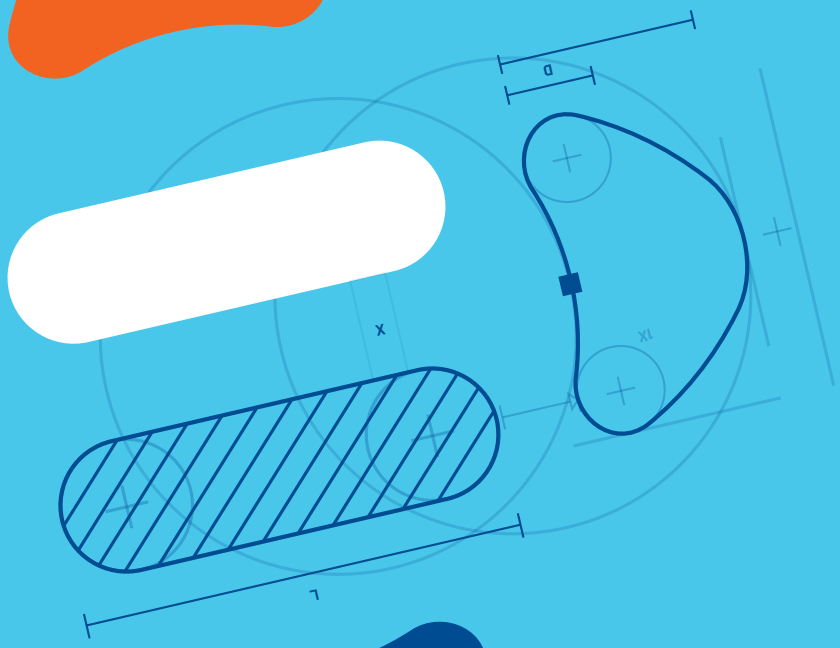
Reducing Inequality in FEALAC Member Countries



Inequality in Access to Information and Communication Technologies (ICTs)

STRENGTHENING THE EVIDENCE BASE TO LEAVE NO ONE BEHIND

UNITED NATIONS
ECLAC

Forum for East Asia-Latin America Cooperation

UNITED NATIONS
ESCAP
Economic and Social Commission for Asia and the Pacific

ST/ESCAP/2941

Social Development Division
Economic and Social Commission for Asia and the Pacific
United Nations Building
Rajadamnern Nok Avenue
Bangkok 10200, Thailand
Email: escap-sdd@un.org
Website: www.unescap.org

Reducing Inequality in FEALAC Member Countries

Inequality in Access to Information and Communication Technologies (ICTs)

STRENGTHENING THE EVIDENCE BASE TO LEAVE NO ONE BEHIND

UNITED NATIONS ESCAP
Economic and Social Commission for Asia and the Pacific

UNITED NATIONS
ECLAC

Forum for East Asia-Latin America Cooperation

Table of contents

List of figures

List of tables

1 Introduction

Information and Communication Technologies (ICTs) have transformed the way we live, work, learn and communicate. These ICT transformations have enabled delivery of information and services at unprecedented speed and scale, boosted productivity, and spurred innovations that address pressing development challenges. While advancements in ICTs can bring about many benefits, they also risk perpetuating existing divides and creating new layers of inequalities.

About half the world's population do not have access to the Internet and are unable to reap its benefits (ITU and UNESCO, 2020). COVID-19 has exposed the depths of this gap. Whilst enabling work, education, health, commerce, and cultural and social services to move online, the digital divide – the uneven access to and use of ICTs between demographics and regions – has never been more pronounced. Technologically robust infrastructure has enabled advanced digital economies with high-speed broadband connectivity to create innovative applications and services using 5G, artificial intelligence (AI), big data, blockchain, the Internet of Things and robotics – often referred to as frontier technologies. These frontier technologies are being used to tackle the pandemic, facilitate physical distancing, accelerate recovery and promote growth, while those who lack access to ICTs risk being left further behind.

The 2030 Agenda for Sustainable Development (2030 Agenda) firmly positions ICTs as an enabler to achieving the Sustainable Development Goals (SDGs) (UN, 2015). In reality, ICT innovations can create both opportunities and disruptions, and their outcomes will depend on national and local conditions and the actions we take today. The development and adoption of technological solutions are conditioned by different structural factors: production structure, a labour market (for instance, highly informal and precarious), population digital skills, digital infrastructure and socioeconomic conditions on access and connectivity (ECLAC, 2020b). To ensure that we leave no one behind, it is important to identify and understand the characteristics of the population groups that are left behind in their access to and use of ICTs. This can inform inclusive policies and priorities that enable disadvantaged groups to fully leverage the potential of ICTs for socioeconomic progress.

This report is developed as part of a project on "Reducing Inequality in the Forum for East Asia-Latin America Cooperation (FEALAC) Member Countries" that aims to strengthen public and private capacities to design and implement policies and initiatives that effectively reduce inequalities.[1] The report examines inequalities in the access to and use of ICTs in FEALAC member countries. It uses the Classification and Regression Tree Analysis to explore the ICT gaps between population groups, and determine the characteristics and circumstances of individuals most likely to be left behind.

The report begins by setting the context of ICTs as an enabler for achieving the SDGs, and highlights trends in ICT access and use in FEALAC member countries. The next section examines why inequality in ICTs matters, particularly in four closely interrelated areas – poverty, gender, education and work – and in this new reality brought about by COVID-19. This is followed by a summary of findings from the Classification and Regression Tree Analysis that identifies key characteristics of the population groups that are left behind due to their lack of access to and use of ICTs. The fourth section considers future ICT-related challenges that may increase inequalities, and presents some lessons learned and good practices to address these challenges. The report concludes with policy recommendations on ways to leverage ICTs to reduce inequalities and ensure they become essential tools for inclusive sustainable development, rather than forces that widen inequality gaps.

1 ESCAP. *Reducing Multiple Dimensions of Inequality*. Available at https://www.socialprotection-toolbox.org/inequality.

1.1

ICTs in the 2030 Agenda for Sustainable Development

Although there is no SDG dedicated to ICTs, these technologies are emphasized throughout the 2030 Agenda for their role in enabling the achievement of the SDGs. There are seven ICT-related indicators, appearing as six targets within four of the goals – quality education (SDG 4), gender equality (SDG 5), industry, innovation and infrastructure (SDG 9) and partnerships (SDG 17) (Table 1).

Furthermore, various SDGs targets refer to the development of technologies, which include ICTs, to reduce and prevent poverty (Target 1.4), enhance agricultural productive capacity (Target 2.A), supply modern and sustainable energy services (Target 7.B), achieve higher levels of economic productivity (Target 8.2), and move towards more sustainable patterns of consumption and production (Target 12.A).

ICTs are widely recognized as essential tools for accelerating SDG progress (ITU, 2019b). ICTs have contributed to reduced inequalities by extending healthcare to remote areas, creating

TABLE 1

SDG targets and indicators related to ICTs

GOAL	TARGET	INDICATOR	EXAMPLE
4	**4.4:** Substantially increase the number of youth and adults who have relevant skills, including technical and vocational skills, for employment, decent jobs and entrepreneurship **4.A:** Build and upgrade education facilities that are child, disability and gender sensitive and provide safe, non-violent, inclusive and effective learning environments for all	**4.4.1:** Proportion of youth and adults with ICT skills, by type of skill **4.A.1b:** Proportion of schools with access to the Internet for pedagogical purposes **4.A.1c:** Proportion of schools with access to computers for pedagogical purposes	· Provision of ICT hardware and software to academic and training institutions · Development of educational software and content for teaching and self-learning · Teacher training and professional development programmes on effective ICT use · ICT tools for educational administration and governance
5	**5.B:** Enhance the use of enabling technology, in particular ICTs, to promote the empowerment of women	**5b.1:** Proportion of individuals who own a mobile telephone, by sex	· Online and mobile learning for women · Women's engagement in e-commerce · Organization of advocacy campaigns for women's rights · Women's participation in online forums to voice views and concerns
9	**9.C:** Significantly increase access to ICTs and strive to provide universal and affordable access to the Internet in least developed countries by 2020	**9c.1:** Proportion of population covered by a mobile network, by technology	· Fibre-optic cable co-deployment along infrastructure such as major roads, railways, power transmission lines and pipelines · Promotion of public access solutions and community networks for last-mile connectivity
17	**17.6:** Enhance North-South, South-South and triangular regional and international cooperation on and access to science, technology and innovation and enhance knowledge sharing on mutually agreed terms, including through improved coordination among existing mechanisms, in particular at the United Nations level, and through a global technology facilitation mechanism **17.8:** Fully operationalize the technology bank and science, technology and innovation capacity-building mechanism for least developed countries by 2017 and enhance the use of enabling technology, in particular ICTs	**17.6.2:** Fixed Internet broadband subscriptions per 100 inhabitants, by speed **17.8.1:** Proportion of individuals using the Internet	· Establishment of platform for sharing ideas, developing consensus and raising awareness about partnerships. · Use of collaborative software for more effective partnerships and decision-making

Sources: ITU. 2030 Agenda for Sustainable Development. Available at: https://www.itu.int/en/ITU-D/Statistics/Pages/intlcoop/sdgs/default.aspx
UNDESA. Sustainable Development. Available at: https://sdgs.un.org/goals

learning opportunities for women and various marginalized groups, and providing channels for more open and transparent dialogue and the co-creation of policies. ICTs have also helped to build disadvantaged communities' resilience to the effects of climate change through various local innovations and applications that improve agricultural productivity, logistics systems and market access, offer financial services like mobile money, and provide early disaster warning services. They can also enhance our capability to measure progress towards the SDGs – from data collection to analysis, visualization and communication.

More recently, ICTs are playing a vital role in supporting COVID-19 pandemic response and recovery. ICTs are keeping people informed and curbing the spread of the virus, allowing remote working and learning during lockdowns, sustaining social services and payments, and accelerating research in treatments and vaccines. However, as work, education and social services move online, those without access to the Internet – that is, almost half of the world's population – risk being "left behind". They are disproportionately women, and people on low incomes and in rural areas – groups already likely to be most affected by the impacts of the pandemic (Woodhouse, 2020).

In June 2020, the United Nations Secretary-General presented a Roadmap for Digital Cooperation[2] that is the result of a multi-year, multi-stakeholder global effort to address a range of issues related to ICTs. The roadmap calls for cooperation in the following areas:

- Achieving universal connectivity by 2030 – Everyone should have safe and affordable access to the Internet;
- Promoting digital public goods to unlock a more equitable world – The Internet's open source, public origins should be embraced and supported;
- Ensuring digital inclusion for all, including the most vulnerable – Underserved groups need equal access to digital tools to accelerate development;
- Strengthening digital capacity building – Skills development and training are needed around the world;
- Ensuring the protection of human rights in the digital era – Human rights apply both online and offline;
- Supporting global cooperation on AI that is trustworthy, human-rights based, safe and sustainable and promotes peace;
- Promoting digital trust and security – Calling for a global dialogue to advance the SDGs; and
- Building a more effective architecture for digital cooperation – Make digital governance a priority and focus the United Nation's approach.

1.2 ICT trends in FEALAC member countries

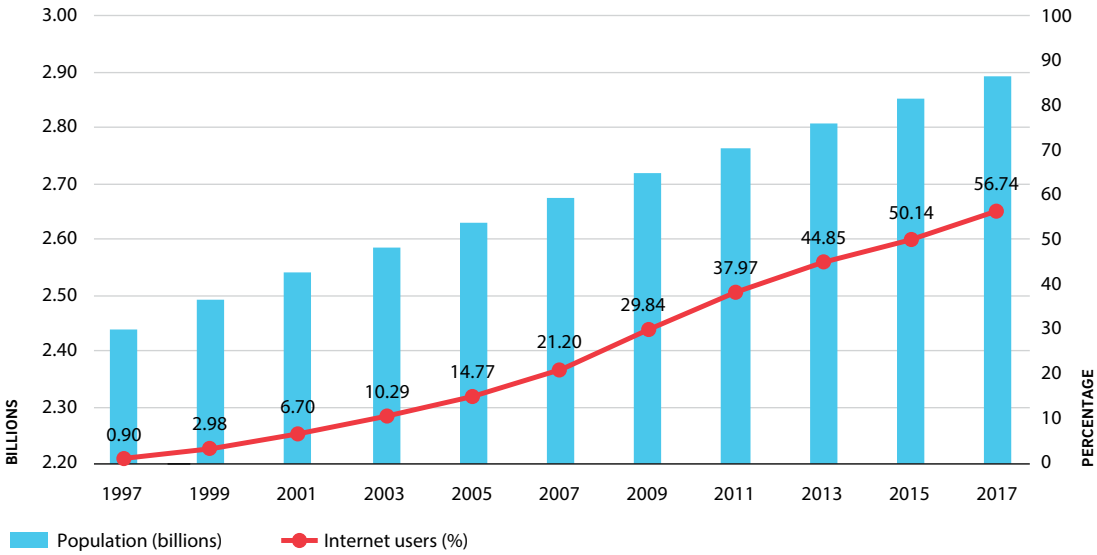
In the past two decades, the ICT sector has successfully laid an extensive network infrastructure, produced more affordable devices and offered a wide range of innovative services, and as a result, has experienced growth in access and use in absolute numbers. In FEALAC member countries, the share of Internet users has grown from 0.9 per cent in 1997 to 56.74 per cent in 2017 (Figure 1). An upward trend is also visible in other ICT indicators such as mobile-cellular telephone subscriptions, active mobile-broadband subscriptions and fixed-broadband subscriptions, with the increased affordability of services being the main reason behind these trends (ITU 2018b).

However, progress has been uneven between and within countries, with lower-income and geographically remote areas remaining the most disconnected and benefiting the least from dynamic growth in the ICT sector (ECOSOC, 2020b). Estimates suggest that there are 1.1 billion people that remain unconnected and unable to harness the potential of ICTs in FEALAC member countries.

2 UN. *Secretary-General's High-level Panel on Digital Cooperation*. Available at https://www.un.org/en/digital-cooperation-panel/.

FIGURE 1

Number and percentage of Internet users in 36 FEALAC member countries, 1997 to 2017[a]



Source: United Nations Economic and Social Commission for Asia and the Pacific (ESCAP) elaboration based on ITU data.

Notes: Estimations of the number of Internet users correspond to the proportion of individuals using the Internet from the scope population.

a East Asia: Australia, Brunei Darussalam, Cambodia, China, Indonesia, Japan, Republic of Korea, Lao People's Democratic Republic, Malaysia, Mongolia, Myanmar, New Zealand, Philippines, Singapore, Thailand and Viet Nam.
Latin America: Argentina, Bolivia, Brazil, Chile, Colombia, Costa Rica, Cuba, Dominican Republic, Ecuador, El Salvador, Guatemala, Honduras, Mexico, Nicaragua, Panama, Paraguay, Peru, Suriname, Uruguay and Venezuela.

In Asia and the Pacific, more than 80 per cent of the population in Australia, Brunei Darussalam, Japan, Malaysia, the Republic of Korea and New Zealand use the Internet; compared with less than 25 per cent of the population in Lao People's Democratic Republic and Mongolia. In Mongolia, spatial isolation and a low population density are thought to be the main reasons behind most people remaining offline, with Internet networks being expensive and hard to develop (USDOS, 2012). However, mobile-broadband subscriptions are high with most of the population relying on mobile services to communicate (ITU, 2018b). In Lao People's Democratic Republic, the high cost of fixed broadband and low quality of existing services constrain Internet use, although recent government efforts aim to ensure universal coverage for people across the country (WB, 2018).

Similar trends are found in Latin America and the Caribbean. In 2019, 66.7 per cent of the region's inhabitants had an Internet connection (ECLAC, 2020b). In particular, the mobile phone has made it possible to expand Internet access to people and groups of the population that previously did not have it. While in Argentina, Chile, Costa Rica and Venezuela, over 70 per cent of the population use the Internet; in El Salvador, Honduras and Nicaragua, only 35 per cent do. In Honduras, the restrictive cost of services is the main reason behind low Internet use. For the bottom 40 per cent of income earners, a basic mobile-broadband connection represents 42 per cent of their income, while a basic fixed-broadband connection represents 85 per cent (Prats Cabrera and Puig Gabarró, 2017). Thus, in countries such as Brazil and Chile, more than 60 per cent of households in income quintile I have an Internet connection, while in Paraguay, Peru and the Plurinational State of Bolivia, only 3 per cent do (ECLAC, 2020b). Similarly, in Nicaragua, high costs and weak legal frameworks have discouraged widespread Internet development and adoption (Prats Cabrera and Puig Gabarró, 2017). Furthermore, the majority of Internet users are concentrated in urban areas; even in wealthier countries only

about half of rural households are connected, creating a wide urban-rural disparity in terms of ICT investments (ITU, 2018b). In terms of age groups, young people and older persons are the least connected to the Internet: 42 per cent of those younger than 25 years and 54 per cent of those older than 66 years (ECLAC, 2020b). Likewise, the afro-descendant population that has Internet access at home is significantly lower than the non-afro descendant population, the gaps range from 11.5 percentage points in Ecuador to 21 percentage points in Brazil (ECLAC, 2020a).

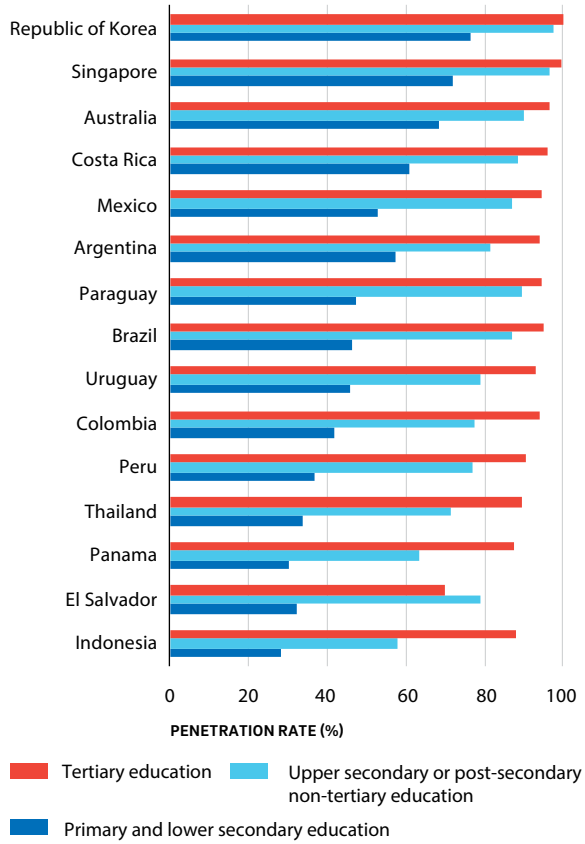
Latest data from Global System Mobile Association (GSMA) shows that the rural-urban and gender gaps in mobile Internet use remain substantial in low- and middle-income countries, where those living in rural areas are 37 per cent less likely to use mobile Internet than those in urban areas, and women are 20 per cent less likely to use mobile Internet than men (GSMA, 2020c). In least developed countries, women are 52 per cent less likely to be online than men (Iglesias, 2020).

Data also shows that those with lower educational attainment are less likely to use the Internet (Figure 2). In Thailand, for example, only 33.7 per cent of those with primary and lower secondary education use the Internet, when compared to 71.5 per cent of those with upper secondary education and 89.7 per cent of those with tertiary education. The same pattern is consistent across FEALAC member countries with available data, with Internet use increasing with higher educational attainment.

In order to fully reap the potential of frontier technologies, countries need high-speed broadband connectivity. Figure 3 shows that big gaps persist between FEALAC member countries in their readiness to absorb, disseminate and apply frontier technologies. Most lower-income countries and some middle-income countries such as Cuba, Guatemala and Paraguay are not prepared for the uptake of frontier technologies with less than 5 broadband subscriptions per 100 inhabitants.

FIGURE 2

Internet penetration rate by educational attainment in 15 FEALAC member countries



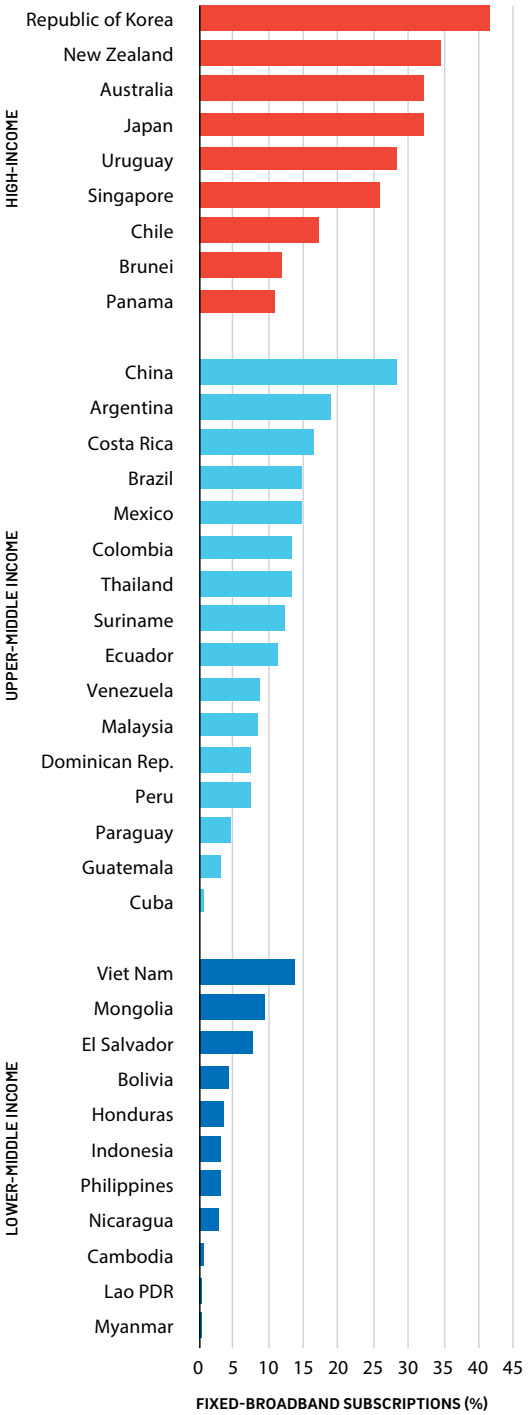
Source: ESCAP elaboration based on ITU data.
Notes: Countries for which data is available are shown. Data is based on the latest year available. Penetration rates refer to the number of men/women that uses the Internet as a percentage of the respective male/female population.

Marginalized groups are often excluded not only because of inadequate infrastructure, but also because of the lack of affordability of devices and data plans, and the lack of incentives and skills to use ICTs (ESCAP, 2018).

Although the cost of devices and data plans have fallen in recent years, they remain too high for many – nearly 2.5 billion people live in countries where the cost of the cheapest available smartphone is a quarter or more of the average monthly income (Woodhouse, 2020). The COVID-19 crisis could make devices and data plans even less affordable with the disrupted

FIGURE 3

Fixed-broadband subscriptions per 100 inhabitants by countries' income classification in FEALAC member countries, 2018



Source: ESCAP elaboration based on ITU data.

supply chains and increased poverty. Moreover, those in lower-income countries tend to have lower capacities and support in developing relevant local content. A global survey found that least developed countries only accounted for the creation of 0.2 per cent of all active mobile apps in 2017. This in turn results in a significant lack of content in local languages in the least developed countries and among minorities in many other countries (GSMA, 2018). Largely due to these reasons, approximately 3.4 billion people who live in areas covered by a mobile broadband network do not use mobile Internet (GSMA, 2020c). This usage gap is six times larger than the coverage gap.

As access to and use of ICTs open doors to other opportunities, such as employment, knowledge, networks, market information and public services, this lack of access and use has ripple effects on inequality of opportunities to improve people's socioeconomic outcomes. ICT policies and programmes should holistically address these multiple barriers – lack of infrastructure, low incomes and affordability, limited ICT skills, and lack of incentives to use ICTs due to sociocultural norms, low awareness and understanding of ICTs, and insufficient relevant local content. Addressing inequality in ICTs while focusing on the needs of the poorest and most vulnerable groups is paramount to ensuring that everyone can take full advantage of our increasingly digital society.

2 Why does inequality in ICTs matter?

"The Internet ceases to be a luxury, and becomes a foundation – a foundation of our education systems, a foundation of our health systems, a foundation of our economies. And what that means for those who are not connected are that they are left further behind, and the digital divide has a massive exacerbating effect on all other inequalities."

~ Fabrizio Hochschild Drummond, Special Adviser of the Secretary-General on the United Nations 75th Anniversary[3]

Long-standing inequalities in income, gender, race, age, ability and other divides contribute to the persistent digital divide as ICTs are mainly accessible to people with resources and skills. The COVID-19 crisis has clearly exposed these multiple dimensions of inequalities and the complex interplay of the different types of inequalities throughout society that exacerbate each other. For example, children in households without access to computers and the Internet are more likely to be missing out on education during lockdowns. Yet, these households are often without ICT access because of the long-standing inequalities mentioned above. Furthermore, the discontinuity of education could impact upon these children's future opportunities to acquire skills and jobs, and improve their livelihood.

In this new reality brought about by the COVID-19 pandemic with greater digitalization of the economy and society, access to ICTs and ICT skills will be essential to overcoming the challenges ahead, and creating a more equitable, inclusive and resilient society that are prepared against future shocks. Therefore, it is important to integrate ICT inclusion in national policies, and concurrently, be mindful of those likely to remain unconnected and ensure that ICT interventions do not exacerbate inequality. For example, in education, some countries have tackled remote learning during COVID-19 using a combination of media including television, radio, telephone calls, text messaging and print materials, ensuring that content is in relevant languages and accessible by persons with disabilities (UNICEF, 2020b; WB, 2020).

These issues are elaborated in more details below. Four closely interrelated areas – poverty, gender, education and work – are discussed to illustrate why inequality in access to and use of ICTs matters.

2.1 ICTs as a step out of poverty

ICTs have contributed to poverty alleviation by making the needs of the vulnerable visible with the use of real-time data and analytics. They have enabled vulnerable groups to co-create solutions and collaborate with diverse stakeholders. E-governance, e-commerce and digital finance innovations have enhanced their access to information and services with greater efficiency and effectiveness (ITU, 2017; UNDESA, 2020b).

In China, for example, e-governance reduced the rural-urban divide in access to health and education, while ICTs allowed for the diversification of non-agricultural, income-generating activities among rural-dwellers (Leng *et al.*, 2020). Digital payments through social networks and e-commerce platforms brought financial services to millions, helping poor and marginalized populations to invest, save and build credit scores (Better Than Cash Alliance, 2017). In Brazil and Colombia, correspondent banking arrangements provided banking coverage to remote areas with non-existent ICT infrastructure, while in

3 Access Now (2020). *Rights Con Online 2020 Outcomes Report*. Available at: https://www.rightscon.org/cms/assets/uploads/2020/10/RightsCon-Online-2020-outcomes-report-1.pdf.

Guatemala, mobiles phones and the Internet played a key role in reaching patients in poor communities through the online training of health personnel (BBVA, 2020).

However, poor individuals living in rural areas are disproportionally without access to ICTs and unable to take advantage of these benefits.[4] In FEALAC member countries, low incomes have affected the uptake of ICT services due to the lack of affordable devices and data plans. Being located in rural and remote areas have proved a disadvantage in terms of speed and quality of connectivity. In Brazil, individuals in urban areas have higher Internet use when compared to those living in rural areas (68.4 and 59.3 per cent, respectively), with 38.3 per cent referring to the high costs of equipment and services as the main reason for not being online.[5] The COVID-19 pandemic threatens to push an extra 71 million people into extreme poverty, many in low-income countries (UNDESA, 2020a).

To effectively harness ICTs for poverty reduction, building the ICT infrastructure and making ICT services more affordable are foundational, but insufficient to achieve positive outcomes. For example, although there are over 1 billion mobile money accounts worldwide, only 36 per cent of these accounts are active (GSMA, 2020b). Their usage should be targeted at improving the lives of the poor. It is important to understand the needs of poor and marginalized groups and co-design solutions based on their needs, as well as incentivize and support the development of such ICT products and services.

Frontier technologies are also bringing about challenges related to privacy, security and trust. As more people and devices are connected, the risk and impact of breaches are much higher with implications on people's safety and well-being. Compromised devices can, for example, allow the hacker to listen to conversations from smart TV's built-in microphone, or control smart home systems, causing them to behave in unwanted and potentially dangerous ways. Additionally, frontier technologies can potentially perpetuate existing inequalities. For instance, bias in the datasets or AI applications for screening job applications or credit scoring can introduce discrimination and create unfair exclusions in job opportunities or access to financial services, respectively. More diverse teams working in the development of such technologies may help in identifying biases and preventing them.

In Mongolia, the government has developed an inclusive national digital strategy – "Mongolia in the Digital Age" with support from international partners. In the development of the strategy, multi-stakeholder dialogues were conducted that involved excluded and marginalized groups. The initiative resulted in a digital strategy that explicitly identifies the need to increase ICT access for nomadic herders and urban migrants in *ger* districts as a priority target (ECOSOC, 2020a).

Governments will need to plan and collaborate with civil society, the private sector and the international development community in developing policies and regulations that are inclusive – that proactively empowers the poor and marginalized in utilizing ICTs to improve their lives, while protecting them from potential harms. Just as trickle-down economic growth has failed to deliver inclusive development, so too will trickle-down digitalization (Pathways for Prosperity Commission, 2019).

2.2 ICTs for women's empowerment and gender equality

ICTs offer vast potential to enhance women's empowerment and advance SDG 5 on gender equality. From improving women's health outcomes and extending access to educational tools, to boosting their participation in economic activities such as e-commerce, ICTs can connect women to the global community and bypass some of the sociocultural and mobility barriers they face offline. ICTs have also enabled women to organize advocacy campaigns for women's rights, and participate in online forums to voice their views and concerns.

4 Based on ITU and World Population Prospects from the United Nations Department of Economics and Social Affairs.

5 ITU (2019). *ICT indicators database*. Available at: https://www.itu.int/en/ITU-D/Statistics/Pages/publications/wtid.aspx.

Despite the benefits of being connected, women and girls represent a disproportionally high share of the world's offline population. In 2019, the worldwide Internet penetration rate stood at 58.3 per cent for men, compared to 48.4 per cent for women (ITU, 2019c). This figure translates to 400 million fewer women using the Internet when compared to men. Women are also 8 per cent less likely to own a mobile phone and 20 per cent less likely to own a smartphone (GSMA, 2020a).

The unavailability of safe spaces to use the Internet, lack of technical skills and know-how, and cultural constraints such as lack of participation in decision-making are some barriers that lead to women's marginalization (World Wide Web Foundation, 2020). Even when they are included, cyber violence and online hate speech against women limit the continuous use of these technologies, while lack of legal frameworks fails to capture the prevalence of violence and the social and psychological harm it produces (EIGE, 2017). Globally, one in five girls have left or significantly reduced use of a social media platform after being harassed (Plan International, 2020). Driving girls and women out of online spaces is disempowering them in an increasingly digital world, and affects their ability to vocalize their interests and become leaders.

In FEALAC member countries, digital gender inequality persists. With the exception of Colombia, Costa Rica, Dominican Republic, Mongolia, Panama, Paraguay and Uruguay, women have lower Internet use rates compared to men (ITU, 2018a). In Peru, 55 per cent of men accessed and used the Internet in 2018, compared to 50 per cent of women (ITU, 2019a). However, the gender digital divide is also heightened by other socioeconomic characteristics as 21.9 per cent of men speaking a native language used the Internet, while only 13.7 per cent of women sharing the same ethnolinguistic identity did (Flores and Albornoz, 2019). Thus, women who belong to racial minority groups or are poor experience the negative effects of digitalization more acutely. It is also worrying that the experience of discrimination against the Afro-descendant population or ethnic group is extend to areas typical of the digital age. A study revealed that two-thirds of girls, boys and adolescent Internet users in Brazil declare that they have seen discrimination towards someone on the Internet because of the color of their skin (Trucco and Palma, 2020). The COVID-19 pandemic is likely to widen already existing gender inequalities (UN Women, 2020a).

Women need to play a more active role in shaping the digital world (UNESCO, 2019). Gender-responsive policies that create opportunities for women to engage with ICTs is critical to challenging imposed gender norms, enhancing economic independence, and enabling them to participate in content and technology production (World Wide Web Foundation, 2018). ICT solutions are primarily designed by and for high-income groups and men. As a result, the needs of poor marginalized groups, including women and girls are invisible from the outset (UNICEF and ITU, 2020). Their exclusion from using and designing ICT applications means missing out on their perspectives and ingenuity in meeting challenges.

For instance, women continue to lag behind men in terms of access to financial services (ESCAP, 2019)2019. GSMA reports that the gender gap in mobile money account ownership across low- and middle-income countries has only slightly narrowed from 36 per cent in 2014 to 33 per cent in 2017 (GSMA, 2020b). Digital finance technologies with its less stringent requirement for identification and documentation, lower fees for opening and maintaining accounts, and ease and convenience of making transactions compared with traditional financial institutions are factors driving financial inclusion (Sioson and Kim, 2019). Gender-responsive interventions that involve training female agents at retail shops and kiosks to provide digital financial services and assistance to women who may not have digital skills have increased women's uptake of digital financial services, which are important in unlocking women's access to other services to improve their livelihood and well-being (CGAP, 2018).

Moreover, online content by women for women is a strong motivation for women to use ICTs, which requires moving beyond ICT literacy efforts

to developing the capacity of women and girls as online content creators, including apps and services in local languages (Internet Society, 2017). This includes collaborative efforts to promote and support women and girls' education and careers in the fields of Science, Technology, Engineering and Mathematics (STEM) (UNICEF and ITU, 2020).

In Australia, for example, the government has committed to a ten-year AUD 25 million investment to increase the participation of indigenous girls in STEM, which includes supporting up to 100 indigenous girls each year to explore the possibilities of a STEM career through school and tertiary education and help transition into the workforce. The programme also involves training about 100 indigenous female teachers of STEM subjects (Ibid.).

In Costa Rica, the Gender, Science and Technology Policy, which was approved in 2018 and is currently in its first Action Plan (2019-2021), aims to eliminate the barriers to women's participation in the technology sector by addressing gender stereotypes and employment gaps, and providing incentives to educational institutions and companies to achieve gender equality in science and technology (World Wide Web Foundation, 2020).

These interventions show that ICTs alone will not automatically empower marginalized people and break traditional power structures. Long-term investment and commitment are needed by multiple stakeholders to overcome existing inequalities (Ibid.).

2.3 ICTs and access to quality education, lifelong learning and decent work

The use of ICTs for education is both extensive and diverse and they play a vital role in the achievement of SDG 4 (UNESCO, 2018). It started with the use of conventional media – radio and television – to increase access to education, which continues to be used today together with newer digital technologies. They have been used to bridge learning divides, enhance the quality and relevance of learning, and strengthen inclusion – to provide educational access to those who, for reasons of poverty, physical disability, geographic location, gender, conflict, occupational commitments or cultural restrictions, are unable to go to school. ICTs for education and lifelong learning also contribute to decent work once in adulthood.

In Myanmar, for example, a competency-based teacher training reform allowed 155 teachers across 31 rural schools to use mobile broadband to enrich classroom lessons and foster digital citizenship (UNESCO, 2017b). This enabled over 20,000 students to benefit from low-cost quality education (UNESCO, 2016). Similarly in China, ICTs helped to fill the shortage of qualified teachers in rural schools (UNESCO, 2017a). Moreover, with the continuous increase in mobile broadband and Internet coverage, e-government and e-businesses have enabled the delivery of online educational services through Massive Open Online Courses (MOOCs),[6] while STEM education has been steadily expanding and impacting student's learning outcomes, skills development and future job prospects.

The use of ICTs to remove barriers to education and enhance the quality of education is encouraged, particularly when it is introduced in the context of system-wide reform in educational policies and practices that increases access to ICTs alongside teacher training on how to use the technology, curriculum reforms and reducing class size.

The COVID-19 pandemic has resulted in school closure across the world. The use of distance learning solutions is only possible for those with an Internet connection and compatible devices. There are challenges related to unequal access to devices and connectivity, and the lack of appropriate skill set among both educators and learners that prevent participation in online teaching and learning, which can potentially widen educational gaps. UNICEF found at least a third of the world's children are left without the

6 MOOCs are courses made available over the Internet to a very large number of people. Anyone who decides to learn online can log on to the given website and sign up for the course. Popular MOOC platforms include Coursera, edX, FutureLearn and Udacity.

technology they need for remote learning during the pandemic (UNICEF, 2020a).

As a result, education and lifelong learning has changed dramatically with the rise of online learning and the creation of innovative applications and partnerships that have enhanced teaching and learning. In Colombia, for example, the government has partnered with a MOOC provider, Coursera, to offer free access to online learning for the unemployed as part of their Workforce Recovery Initiative.[7] Similar measure has been implemented in Costa Rica (*Plan Habilidades Proteger*).

For MOOCs, language remains a significant barrier as most of the MOOCs are currently in English. The official recognition of the certifications issued by MOOC providers for employment, and the ability to accumulate and transfer academic credits across educational systems are also challenges that need to be addressed. To tackle these issues, some countries, such as Thailand, have developed their own MOOC platform in local languages (Theeraroungchaisri and Khlaisang, 2019).[8]

Girls' relatively lower enrolment and graduation in STEM disciplines, which would allow them to thrive in a digital world, perpetuates a cycle of widening gaps and greater inequalities. Only 18 per cent of girls in tertiary institutions globally pursue STEM fields compared to 35 per cent of boys (UNICEF and ITU, 2020). Global multi-stakeholder programmes such as the EQUALS Skills Coalition and the Global Fund for Women's Technology Initiative are efforts focused on closing the digital skills gap (UN Women, 2020b).

However, rapid ICT advancements are reshaping the labour market and skills requirements, and could even disrupt people's livelihoods and jobs. Automation and robotics could displace workers who do not have ICT literacy skills and are thus unable to transfer their skills to new positions. Worldwide, it is estimated that 33 per cent of individuals lack basic ICT skills, such as using copy and paste tools; 41 per cent have standard skills, such as using basic formulas on spreadsheets; and only 4 per cent are able to use specialist language to write computer programs (ITU, 2018b).

Skills gap and wages are widening between those who can adapt to these technologies and those who cannot. In Argentina, Australia, China, Japan, Mexico and New Zealand, the share of national income going to labour have drastically fallen when compared to the returns to capital. In Bolivia, Costa Rica, Dominican Republic, El Salvador, Guatemala, Honduras, Malaysia, Mongolia, Panama, the Philippines and Thailand, automation have resulted in a hollowing out of middle-income jobs (WB, 2016). Worldwide, it is estimated that automation in the workplace will amount to 1.2 billion workers losing their job (ESCAP, 2018). Without effective policies, the gap between adequately skilled and non-skilled workers will increase income inequality, leading to social instability and undermining inclusive growth efforts.

The proportion of work that can be done remotely varies among regions and countries for structural reasons. During the COVID-19 pandemic, teleworking has proved fundamental to the survival of some companies and for preventing the spread of the coronavirus. Although 7.9 per cent of the world's workforce worked from home on a permanent basis before the pandemic, mainly industrial outworkers and artisans, only a minority were teleworkers. In the case of Latin America and the Caribbean, the Economic Commission for Latin America and the Caribbean (ECLAC) estimates that teleworking is feasible for roughly 21.3 per cent of employed persons. Data from Chile, the Dominican Republic, Ecuador, El Salvador, Mexico and Uruguay show that in wage quintiles I, II and III more than 80 per cent cannot telework, while in quintiles IV and V more than 50 per cent can. Therefore, in the absence of policies to support the most vulnerable workers against the inequalities in access to technological tools, skills and a productive structure concentrated on low-value-added activities, teleworking deepens and perpetuates inequalities (ECLAC, 2020b).

7 Coursera for Government. Available at https://www.coursera.org/government/workforce-recovery.

8 Thai MOOC. Available at https://thaimooc.org/

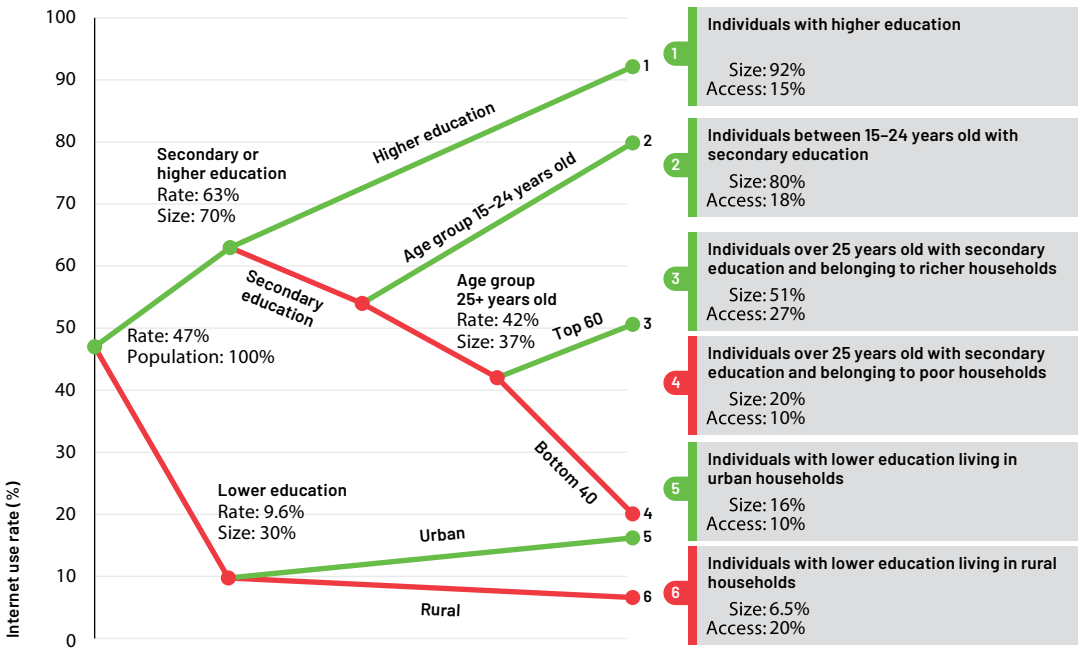
3 Data analysis: Inequality in access to ICTs and the furthest behind

To identify the profiles of those least likely to access and use ICTs in FEALAC member countries, the Classification and Regression Tree Analysis is used to explore the gaps between population groups. This approach is used to determine the shared characteristics and circumstances of individuals most likely to be left behind. An algorithm splits the sample into groups with significantly different Internet access rates based on the following circumstances: wealth (bottom 40 per cent and top 60 per cent of the population in wealth distribution); residence (urban and rural); highest level of educational attainment (lower, secondary or higher education); gender (male or female); and availability of electricity in the household (yes or no) (see Table 2). In the case of household's mobile phone ownership or access, the algorithm splits the sample based on the following circumstances: wealth, place of residence and the household's highest level of educational attainment (see Table 3). The analysis makes use of both individual-level data (Internet access) and household-level data (mobile phone access) from the Demographic and Health Survey (DHS) and the Multiple Indicator Cluster Survey (MICS) of countries to further explore the characteristics and intersectionalities perpetuating patterns of discrimination of those left behind in accessing ICTs.

3.1 The furthest behind in Asia and the Pacific

To illustrate how different circumstances may interact to produce a disadvantage (or advantage) in Internet access, the example of Indonesia is used below. The classification tree for Indonesia indicates that almost half of the population have access to the Internet (Figure 4). The overall user rate is 47 per cent. The first level of significant split comes from the highest level of educational attainment:

FIGURE 4
Classification tree for Internet use rate in Indonesia, 2017



Source: ESCAP elaboration using DHS Indonesia data, 2017.

individuals with secondary or higher education have an Internet use rate of 63 per cent, compared to 9.6 per cent among individuals with lower education. The second split among individuals with secondary or higher education further splits individuals by education into those with higher education (92 per cent user rate) and those with secondary education (54 per cent user rate) In the case of individuals with lower education, the second split comes from residence: individuals living in urban areas have a user rate of 16 per cent, while the user rate among those with lower education in rural areas drops to 6.5 per cent. This is also the group identified as being furthest behind in terms of Internet use.

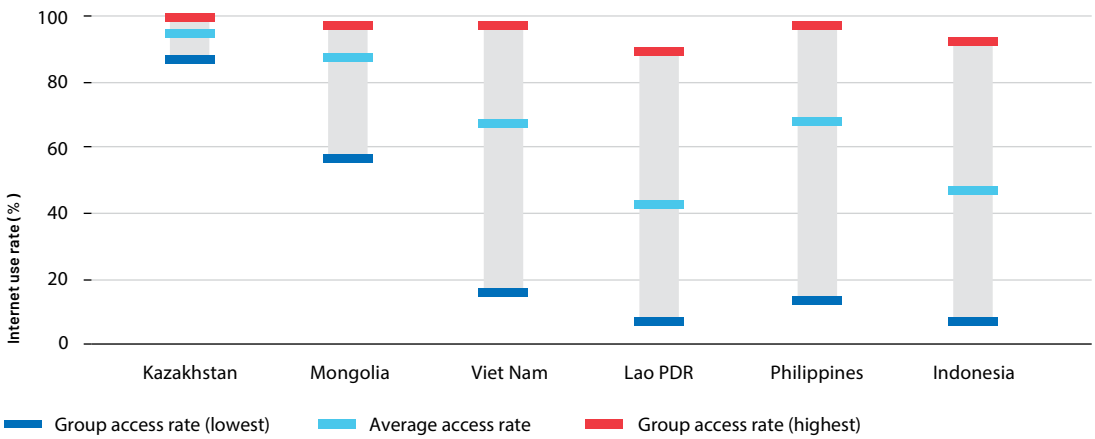
The same Classification Tree Analysis is produced for five other countries in the Asia-Pacific region for which comparable data are available. These trees are used as the basis to identify the circumstances driving inequality in access to the Internet, as well as highlight how these interact to create additional layers of discrimination and disadvantages. Figure 5 shows the gaps between the best-off and the furthest behind groups. The upper line of each bar represents the Internet use rate of the most best-off group (those with highest rate) for each country, while the bottom line represents the Internet use rate of the furthest behind group (those with lowest rate). The middle line across each bar is the average Internet use rate by which countries are sorted.

In four of the six countries (Kazakhstan, Mongolia, the Philippines and Viet Nam) overall Internet use is over 50 per cent. However, in Indonesia, Lao People's Democratic Republic, the Philippines and Viet Nam, less than 20 per cent of individuals belonging to the furthest behind group use the Internet. The gap between the best-off and the furthest behind group is high at over 40 percentage points in all countries, except in Kazakhstan. Table 2 shows that belonging to the bottom 40 per cent of the wealth distribution (B40) is the main characteristic restricting Internet use, highlighting that the affordability of services is a major barrier to higher ICT uptake. A lower educational level is also an important characteristic in Indonesia, Lao People's Democratic Republic and Viet Nam.

These findings reinforce results from other research (Pathways for Prosperity Commission, 2018; Woodhouse, 2020) that people from low-income groups, living in rural areas and those with lower levels of education are less likely to have access to ICTs and use them. Gender also plays a significant role in ICT access, where sociocultural norms that restrict the role of women in society serve to hinder their access to and use of ICTs.

FIGURE 5

Gaps in Internet use rate in Asia and the Pacific, latest year available



Source: ESCAP elaboration based on latest DHS and MICS surveys.

TABLE 2

Characteristics of the furthest behind groups in Asia and the Pacific, latest year available

	WHO ARE THOSE LEFT BEHIND IN TERMS OF INTERNET USE								
COUNTRY/ CIRCUMSTANCES	WEALTH	RESIDENCE	EDUCATION	AGE GROUP	GENDER	ELECTRICITY	INTERNET USE RATE OF THE MOST DISADVANTAGED GROUP	SIZE OF THE MOST DISADVANTAGED GROUP	GAP FROM MOST ADVANTAGED GROUP (PP)
Indonesia		Rural	Lower education				6%	20%	86 pp
Kazakhstan	B40						87%	35%	13 pp
Lao PDR	B40		Lower education		Female		6%	16%	82 pp
Mongolia	B40	Rural			Male		57%	7%	40 pp
Philippines	B40			35 + years old			13%	12%	84 pp
Viet Nam	B40		Lower education				16%	19%	82 pp

Source: ESCAP elaboration based on latest DHS and MICS surveys.
Note: B40 refers to households belonging to the bottom 40 of the wealth distribution; pp stands for percentage points.

3.2

The furthest behind in Latin America and the Caribbean

To illustrate how different circumstances may interact related to household's mobile phone access or ownership, the example of Mexico is presented below. Although the overall mobile phone access rate in Mexico is 87 per cent, factors such as household wealth and level of education shows important differences between sub-groups.

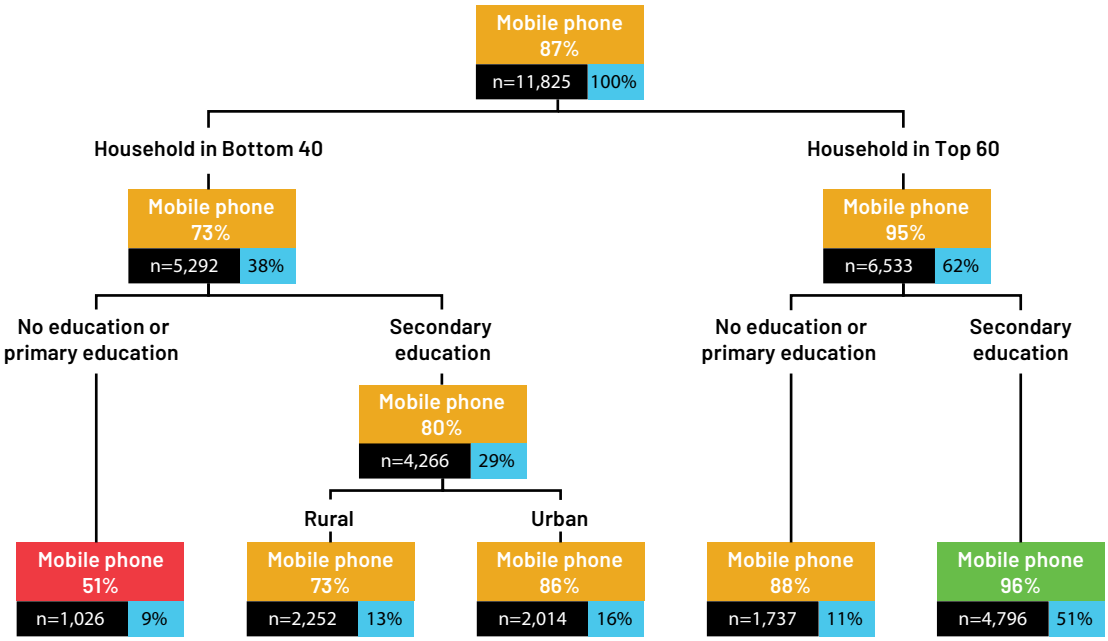
The classification tree for Mexico indicates that almost 9 out of 10 households have a mobile phone (Figure 6). The sample is subsequently split into two groups (or branches), according to the determinant factor that in this case is the household wealth level. The data indicates that 73 per cent of the households in the poorest 40 per cent (that comprise 38 per cent of the sample) have access to mobile phone, while 95 per cent of the households belonging to the richest 60 per cent do. For both households in the poorest 40 per cent and richest 60 per cent of the wealth distribution, the next determinant factor or predictor is the household's highest level of education. Those households belonging to the poorest 40 per cent with no education or primary education have a mobile phone access rate of 51 per cent – being the furthest behind group, compared with 80 per cent of those with secondary education.

There is a third determinant factor that shapes mobile phone access rates for households belonging to the poorest 40 per cent with secondary education – the place of residence. Those households in urban areas have higher mobile phone access rates (86 per cent) than households in rural areas (73 per cent). Households in the richest 60 per cent with no education or primary education have an access rate of 88 per cent, while those with secondary education (51 per cent of the sample) have an access rate of 96 per cent – being the most advantaged group.

The same Classification Tree Analysis is produced for 18 other countries in the Latin America and the Caribbean region for which comparable data are available. Figure 7 shows the gaps that exist within countries between the best-off and the furthest behind groups. The upper line of each bar represents the mobile phone access rate of the most best-off group (those with highest rate) for each country, while the bottom line represents the access rate for the furthest behind group (those with lowest rate). The middle line across each bar is the average rate by which countries are sorted.

From this type of graph, it is possible to conclude that all the countries have made progress in allowing access to a device, such as mobile phone. For instance, all the countries have an average rate over 50 per cent, with the exception of Argentina where access rates remain low and

FIGURE 6
Classification tree for mobile phone access rate in Mexico, 2015



Source: ECLAC calculation using data from the 2015 MICS survey for Mexico.

disparities persist. The lowest and highest access rates fluctuate, respectively, between 14 and 89 per cent, and 65 and 100 per cent. The gap between the best-off and the furthest behind group range from 10 to 74 percentage points. It is high at over 40 percentage points in six countries, while is below 20 percentage points in five countries. Barbados, Colombia, Paraguay and Trinidad and Tobago have made progress in access while maintaining narrow gaps between the best-off and furthest behind groups. Finally, other countries have made overall progress but large gaps remain (for example, Bolivia, Guyana and Haiti).

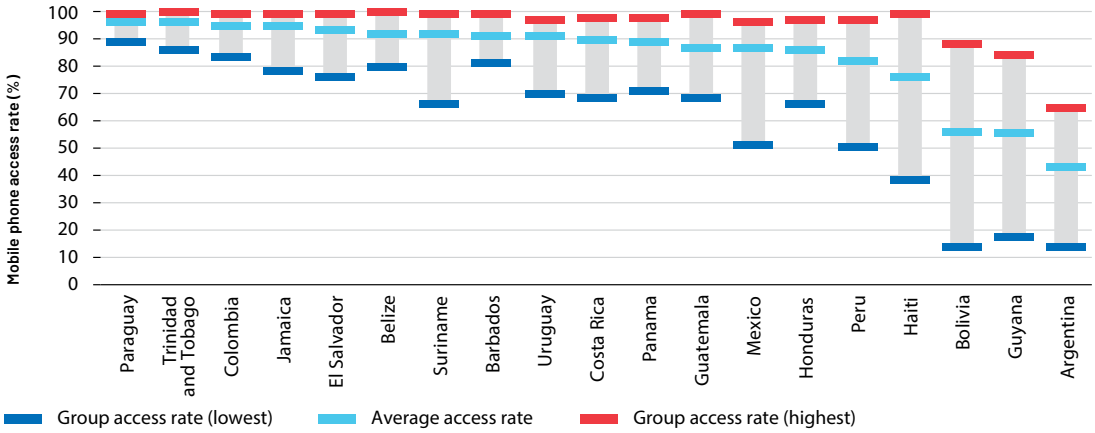
Table 3 shows that belonging to the bottom 40 per cent of the wealth distribution (B40) is the main factor hampering access to a mobile phone in 12 countries, followed by a lower educational level, which is significant in 14 countries. Finally, an important characteristic is the place of residence, although only present in Barbados, Belize, Costa Rica, Panama and Paraguay.

In the context of the COVID-19 pandemic, mobile phones have proven to be essential tools to facilitate, for example, the payments of the measures implemented to mitigate the socioeconomic consequences on the most vulnerable populations (Argentina, Colombia, Guatemala, Haiti, Peru). Besides, it should be noted that Internet access through mobile phones has become a gateway for excluded populations, mainly because of two mobile phone characteristics: more user-friendly (it does not require advanced digital skills) and affordability (cost much less than a computer or a tablet).

However, the progress made in access to a mobile phone and in reducing gaps reflects partial inclusion in the digital society, in that it enables and makes certain practices specific to a particular device possible. The difference between the highest and lowest economic strata deepens socioeconomic inequalities: the middle and upper levels have greater access to the full range of digital devices to connect and be able to do so with few limitations, while those belonging in the lower socioeconomic statuses mainly obtain access through mobile phones (Trucco and Palma, 2020).

FIGURE 7

Gaps in mobile phone access rate in 19 countries in Latin America and the Caribbean, latest year available



Source: ECLAC calculations based on latest DHS and MICS surveys.

TABLE 3

Characteristics of the furthest behind groups in 19 countries in Latin America and the Caribbean, latest year available

	WHO ARE THOSE LEFT BEHIND IN TERMS OF MOBILE PHONE OWNERSHIP					
COUNTRY/ CIRCUMSTANCES	WEALTH	RESIDENCE	EDUCATION	MOBILE PHONE OWNERSHIP RATE OF THE MOST DISADVANTAGED GROUP (%)	SIZE OF THE MOST DISADVANTAGED GROUP (%)	GAP FROM MOST ADVANTAGED GROUP (PERCENTAGE POINTS)
Argentina	B40			14%	39%	51 pp
Barbados	B40	Urban		81%	26%	18 pp
Belize	B40	Rural		80%	27%	20 pp
Bolivia	B40		No education or primary education	14%	26%	74 pp
Colombia			No education or primary education	83%	16%	16 pp
Costa Rica		Urban	No education or primary education	68%	8%	30 pp
El Salvador	B40		No education or primary education	76%	16%	23 pp
Guatemala	B40		No education or primary education	68%	26%	31 pp
Guyana	B40		No education, primary education or higher education	17%	11%	67 pp
Haiti	B40		No education or primary education	38%	25%	61 pp
Honduras	B40		No education or primary education	66%	26%	31 pp
Jamaica			No education or primary education	78%	9%	21 pp
Mexico	B40		No education or primary education	51%	9%	45 pp
Panama	B40	Rural		71%	24%	27 pp
Paraguay	B40	Rural		89%	26%	10 pp
Peru			No education or primary education	50%	18%	47 pp
Suriname			No education or primary education	66%	5%	33 pp
Trinidad and Tobago			No education or primary education	86%	16%	14 pp
Uruguay			No education or primary education	70%	16%	27 pp

Source: ECLAC calculations based on latest DHS and MICS surveys.

Note: B40 refers to households belonging to the bottom 40 of the wealth distribution; pp stands for percentage points.

4 The impact of ICTs on future inequality trends

Frontier technologies are creating both opportunities and challenges in achieving the SDGs. These innovations have automated business processes, cutting costs and increasing ease of use and convenience. They have also turned vast troves of data generated by ICTs into insights that drive new policies, products and services.

Section 2.3 warns of the widening gap in skills and wages due to rapid ICT advancements and automation. Nevertheless, frontier technologies have also given rise to new business models and forms of work, such as the gig or platform economy, like Uber and Upwork in which independent workers are hired for short-term on-demand commitments. A 2018 report indicates that 84 per cent of hiring managers in Asia and the Pacific outsource work to freelancers (Gigonomy, 2020). The adoption of e-commerce has also been rising steadily, enabling small producers to sell their products nationwide and worldwide. In China, for example, an estimated 10 million small and medium-sized enterprises sell on the Taobao platform – nearly half the entrepreneurs on the platform are women, and more than 160,000 are persons with disabilities (UNDP, 2019).

Not everyone is able to reap the benefits of these frontier technologies and digital platforms. The lack of access to affordable devices and broadband is a key barrier. Other barriers include the lack of specific skills, such as entrepreneurship financing, trade logistics infrastructure, and legal framework for electronic transactions, data protection and online consumer protection in countries (UNCTAD, 2019).

One growing trend is the rapid growth of the platform-based economies. While the gig economy and e-commerce platforms can boost labour market participation, effective protection for workers needs to be ensured. The pandemic has brought attention to the need for increased efforts to protect informal and gig workers who are often not given employee entitlements such as paid sick leave, medical insurance and pensions, and are not eligible for government assistance because there are no mechanisms to formalize the sector (Vipra, 2020).

Social protection plays a central role in protecting those vulnerable against the current crisis and future shocks. Social protection schemes provide cash or in-kind support for people facing social and economic risks (ESCAP and ILO, 2020b). These risks include having children, getting sick or acquiring a disability, losing a job or a breadwinner, and growing older. They also include shocks such as natural disasters, economic crises and pandemics (Ibid.). SDG Target 1.3 calls on all countries to implement nationally appropriate social protection systems and measures to reduce poverty and inequalities. The COVID-19 crisis has provided a wake-up call to the significant gaps in coverage and adequacy of existing social protection systems, and governments have been taking unprecedented steps to fill these gaps (ESCAP ILO, 2020a).

Some countries have considered ways to expand social protection coverage to a growing number of people under non-standard working arrangements, such as those working in the gig economy. For example, the Malaysia Digital Economy Corporation, a government agency, has incorporated training in its gig economy platform and is in discussion with the Employees Provident Fund and insurance companies to provide a retirement plan for freelancers (ITU, 2020). In Singapore, the government is piloting a Contribute As You Earn Scheme in which freelancers' contributions to the national medical savings scheme will be matched dollar for dollar by the government in 2020, capped at SGD 600 (USD 443). In addition, the government is providing freelancers with a training allowance of SDG 7.50 (USD 5.50) per hour to upskill themselves (Sin, 2020). In the Philippines, Senate Bill 1469 or the National Digital Careers Act was filed in May 2020 to establish a legal framework for the gig economy that will map out strategies to promote and strengthen digital careers and institutionalize employment standards for digital career workers (Senate of the Philippines, 2020).

In response to COVID-19, many countries have introduced social protection measures, and many are leveraging mobile money platforms to distribute emergency cash assistance to poor households safely and rapidly. Yet, studies show that low-income women who live in remote areas with limited connectivity, or who have low ICT literacy, are less likely to access these benefits (Bill and Melinda Gates Foundation *et al.*, 2020). ICTs need to be integrated in social protection for their potential to improve the efficiency and effectiveness of social protection systems, such as more efficient disbursement to beneficiaries through online or mobile payments and reduced opportunities for fraud. These solutions, however, require careful assessment to ensure they do not create new challenges and embed exclusion.

Social protection and cash transfer programmes should be informed by gender analysis and designed for women's empowerment. For example in Peru, cash transfers are made to the oldest adult woman under 60 in the household, whenever possible (Ibid.). Additionally, social protection systems can contribute to ICT inclusion programmes, for example, in using the existing system to rapidly identify and engage with marginalized groups – those who receive food assistance or cash benefits should automatically qualify to participate in ICT inclusion programmes. Costa Rica's ICT inclusion plan subsidizes the cost of Internet connections (up to 80 per cent) and laptop purchases (up to 100 per cent) for poor families, as well as provides ICT literacy training, allowing millions to find ways to support themselves and their families (A4AI, 2019).

Government and industry will need to invest in training programmes for women to gain the necessary skills; develop infrastructure and networks that enhance women's mobility; and raise women's access to and knowledge of technology. Possible interventions include providing women-only Internet cafes or skills labs, promoting "connected" female role models, and showing leaders and peers rejecting patriarchal norms.

Social protection is also important for other vulnerable groups such as older persons and persons with disabilities. The Asia-Pacific region is ageing at a more rapid pace than all other regions of the world. The percentage of older persons over the age of 60 in the region is projected to increase from 14 per cent in 2020 to 25 per cent in 2050 (ESCAP and ILO, 2020b). Similarly, the population of persons with disabilities is likely to increase because of the combined effects of population ageing, poverty, the rapid spread of non-communicable diseases, natural disasters and humanitarian crises. Trends show that overall life expectancy is growing faster than healthy life expectancy, which means people live longer, but they also spend a longer period of their life with a disability. Statistics also show that women tend to spend more years with disabilities than men (ESCAP, 2017).

An ESCAP survey indicates that two-third of ESCAP member countries are implementing measures to increase the quality of long-term care services for older persons through a range of initiatives, including innovative technology solutions (Ibid.). The healthcare sector has started to explore how AI and big data can contribute to long-term care for older persons, from early diagnosis and more effective treatment of diseases and mental health issues, to at-home health monitoring and fall detection.

For persons with disabilities, applications that assist access to the Internet – such as screen readers, speech recognition software, and video communication that incorporates sign language and visual assistance – are increasing and becoming more affordable. Some of these applications are integrated in mobile devices and have enabled persons with disabilities to live independently.

In addition, countries are promoting innovations using frontier technologies to reduce disaster risks and build the resilience of vulnerable groups to shocks and crises, especially since the region is the most disaster-prone region in the world, with disaster risks increasing in severity, scale and frequency (UNDP, 2020). Innovations include using AI to predict and detect disasters, harnessing big data from social media and mobile phones to respond faster and more effectively when disasters strike, and providing

targeted alerts and safety advices based on the location of those affected by disasters through cell broadcasting services (Ibid.).

As these initiatives show, ICTs are a critical part of development responses to existing and emerging challenges that can further exacerbate inequalities in the region. Nevertheless, major barriers in the adoption of such technologies remain, including the inadequate ICT infrastructure and systems to support frontier technologies like AI and big data, and the users' lack of access to these ICTs and ability to use them. These barriers need to be collaboratively addressed by government, private sector and civil society groups. Now is an opportunity to influence a path to more equitable economic and social development, in which ICTs empower rather than disempower those most marginalized. Without targeted measures towards advancing equality, however, the broadband connectivity gap and the skills to use ICTs will widen, causing ripple effects on inequality of opportunities to improve people's socioeconomic outcomes.

Digital transformation will require a holistic approach that: (1) builds foundational infrastructure and systems to allow everyone access to fast, reliable and low-cost ICT services; (2) makes ICTs affordable for the poorest; (3) addresses other barriers that prevent use such as restrictive sociocultural norms, and lack of digital skills and relevant local content; and (4) strengthens social protection systems to support the poorest and those left behind – taking advantage of ICTs to deliver support.

5 Key takeaways

Governments, the private sector and civil society should collaborate to address inequalities in ICT access and use. Concrete actionable policy recommendations are provided below for policymakers and regulators, ICT network operators and business entities, and civil society and international organizations. These recommendations are in line with the SDGs and the United Nations Secretary-General's Roadmap for Digital Cooperation presented in Section 1.1.[9]

The High-Level Panel on Digital Cooperation that provided recommendations for the Roadmap for Digital Cooperation calls for multi-stakeholder collaboration that involves a more diverse spectrum of stakeholders and more diverse voices, particularly from developing countries and traditionally marginalized groups (UN, 2019). These are people who are more likely to not have access to ICTs. Therefore, alternative ways to ensure their participation in decision-making are needed to engage people and enhance their capacity to participate effectively and meaningfully. This means, wider issues related to: (1) generating the political will to engage with all stakeholders; (2) developing the capacity of marginalized groups; and (3) reducing barriers and providing safe spaces to participate, need to be addressed. At the same time, it is necessary to accelerate efforts to increase access to affordable ICTs and their use for the SDGs.

5.1

Build foundational infrastructure and systems to allow everyone access to fast, reliable and low-cost ICT services

Policymakers and regulators

- Develop and implement national broadband policies with specific actions to target excluded populations, including commitment of funds (e.g., through the use of Universal Access and Service Funds[10] to invest in initiatives that reduce inequalities in ICT access, including subsidizing data and devices).[11]
- Adopt Meaningful Connectivity (A4AI, 2020) for all as the target for ICT use. This means:
  - » Regular Internet use (minimum threshold: daily use)
  - » An appropriate device (minimum threshold: access to a smartphone)
  - » Enough data (minimum threshold: an unlimited broadband connection)
  - » A fast connection (minimum threshold: 4G mobile connectivity)

This involves building broad consensus with national stakeholders from across public and private sectors, and civil society, to discuss the applicability and adoption of this target; reviewing the national policy and regulatory environment to assess the current state of connectivity policy and targets; and strengthening the capabilities of statistical institutions to measure the target. Data collected should be sex-disaggregated.

9 These recommendations are also based on World Wide Web Foundation (2019) and Broadband Commission for Sustainable Development (2020).

10 Universal Service and Access Funds are managed by governments and dedicated to expanding the ICT infrastructure to unserved and underserved communities. These funds are typically financed through mandatory contributions by ICT network operators and service providers.

11 For instance, ECLAC has estimated the annual cost of a basic basket of technological products comprising a laptop, a smartphone and a tablet. In many countries of the region, a basic ICT basket can be provided to households that do not have digital devices at an annual cost of less than 1 per cent of GDP.

5.2
Make ICTs affordable for the poorest

ICT network operators and business entities

- Develop corporate policies that address the needs of excluded groups, such as designing inclusive data plans that are affordable to all, and ensuring user interfaces and customer service are offered in languages and mediums that are accessible to minorities and persons with disabilities.

5.3
Address other barriers that prevent use such as restrictive sociocultural norms, and lack of digital skills and relevant local content

Policymakers and regulators

- Make a public commitment to closing the gender digital divide and protecting women's rights online, with clear budget commitments to holistically address all barriers including lack of infrastructure, affordability, relevance, skills, security and sociocultural challenges. Include:
  - » Gender-responsive ICT literacy programme, STEM learning and career opportunities;
  - » Collection and use of gender data in the technology sector for decision-making; and
  - » Safeguarding the online security and privacy of women, girls and other marginalized groups.

This requires collaboration among government ministries in education, vocational training, ICT, finance, women, youth, labour, community development, trade and industry, and social protection, as well as with educational institutions, business entities and civil society organizations.

- Make a public commitment to closing the rural-urban digital divide with clear budget commitments to support rural-centric initiatives that advance ICT access, adoption and meaningful use.
- Integrate ICT literacy skills in formal and non-formal education, and provide training to educators in delivering ICT literacy skills courses. Ensure that ICT literacy programmes are inclusive of out-of-school children, youth not in education, employment and training, persons with disabilities, indigenous people and afro-descendants, people living in rural areas, as well as illiterate and/or unemployed adults.
- Incentivize and support local content creation and ICT innovation by and for poor and vulnerable groups.
- Develop the capacity of government officials and regulators to leverage ICTs for inclusive development and achieve the SDGs, including the ability to engage with the private sector and civil society to understand the operations of the digital economy and respond to ICT-related threats and risks.

ICT network operators and business entities

- Establish effective channels for consultation during the development of ICT products and services, and after their release, to ensure the rights and interests of all communities – in terms of gender, race, ethnicity, age, ability and other intersectionalities – are taken into account.
- Respect and protect people's privacy and personal data, and address risks created by ICTs, to build online trust.
- Develop corporate policies to build and strengthen a diverse workforce by promoting training, skills upgrading and lifelong learning.
- Collaborate with government and civil society in the development and delivery of inclusive curricula and programmes for ICT skills development, particularly for women and marginalized groups, and provide apprenticeship opportunities.
- Collect, analyse and track disaggregated customer data across demographic groups related to ICT access and use, and share them with other stakeholders in a safe and secure manner, within the limits of data protection requirements and privacy protection frameworks.

Civil society and international organizations

- Provide support with expertise, research, innovation, thought leadership and resource mobilization efforts to ensure that ICTs are affordable and accessible to poor and marginalized groups, including women, older persons, youth, children, persons with disabilities, ethnic minorities, indigenous groups, migrants, refugees, internally displaced persons, and people living in rural and remote areas.
- Support women and other marginalized groups in developing ICT literacy and skills, addressing barriers they face in accessing and using ICTs in their communities, and using ICTs to increase economic opportunities, become entrepreneurs and/or serve as community ICT leaders. Possible interventions include providing women-only Internet cafes or skills lab, promoting "connected" female role models, and showing leaders and peers rejecting old sociocultural norms.
- Support women and other marginalized groups in creating relevant ICT content, applications and services in local languages by funding innovations or by incentivizing enterprises that demonstrate social impact.
- Advocate for inclusive approaches, as well as "leave no one behind" principles in ICT policies and programmes by holistically addressing the multiple barriers – lack of infrastructure, low incomes and affordability, limited ICT skills, and lack of incentives to use ICTs due to sociocultural norms, low awareness and understanding of ICTs, and insufficient relevant local content.
- Raise awareness of the threats and barriers that prevent women and other marginalized groups from accessing and using ICTs.
- Convene multi-stakeholder forums to improve understanding of the complexity of the different dimensions of inequality and facilitate the development of concerted actions to address priority challenges, including knowledge sharing, technology transfer and upscaling of successful initiatives. This includes bringing together expertise to improve understanding about the impact of frontier technologies like AI and how various threats and risks can be addressed.
- Promote greater coherence and coordination in capacity building efforts through, for example, facilitating collaborative teams of educational and training institutions, ICT industries and government organizations to enhance the development and delivery of inclusive curricula and programmes for ICT skills development.
- Help address data gaps and the building of ICT capacity to collect, analyse, visualize and disseminate data in relevant and useful formats for decision-making and reducing inequalities.

5.4

Strengthen social protection systems to support the poorest and those left behind – taking advantage of ICTs to deliver support

Policymakers and regulators

- Leverage the use of ICTs to expand coverage, improve efficiency, effectiveness and transparency, and reduce opportunities for fraud and duplication in design and delivery of social protection systems.

The use of ICTs will not automatically benefit the poor and marginalized. We need to consciously design for inclusiveness as part of our shared vision to deliver the SDGs in this United Nations Decade of Action. The time to act is now to accelerate change and together create a future in which ICTs are used to reduce inequalities and achieve the SDGs. Among FEALAC countries, it is important to share knowledge, experience and best practices on the inclusive and sustainable use of ICTs to achieve the SDGs, and foster inter- and intra-regional cooperation to fast track progress and drive transformations.

References

Access Now (2020). *Rights Con Online 2020 Outcomes Report*. Available at: https://www.rightscon.org/cms/assets/uploads/2020/10/RightsCon-Online-2020-outcomes-report-1.pdf.

Alliance for Affordable Internet (A4AI) (2019). *Costa Rica: Closing the digital divide with universal service leadership*. Available at: https://a4ai.org/studies/closing-the-digital-divide-with-universal-service-leadership/.

_____ (2020). 'Meaningful Connectivity: A New Target to Raise the Bar for Internet Access'. Available at: https://a4ai.org/meaningful-connectivity/.

Banco Bilbao Vizcaya Argentaria (BBVA) (2020). 'Dissecting digital payments: how they are evolving around the world', 4 February. Available at: https://www.bbva.com/en/dissecting-digital-payments-how-they-are-evolving-around-the-world/.

Better Than Cash Alliance (2017). 'Social Networks, e-Commerce Platforms, and the Growth of Digital Payment Ecosystems in China: What it Means for Other Countries', 9 April. Available at: https://www.betterthancash.org/tools-research/case-studies/social-networks-ecommerce-platforms-and-the-growth-of-digital-payment-ecosystems-in-china.

Bill and Melinda Gates Foundation *et al.* (2020). *Digital Cash Transfers in the Time of COVID-19: Opportunities and Considerations for Women's Inclusion and Empowerment*. Available at: https://www.cgap.org/sites/default/files/publications/2020.Digital-Cash-Transfers-in-Times-of-COVID-19-Opportunities-and-Considerations-for-Womens-Inclusion-and-Empowerment.pdf.

Broadband Commission for Sustainable Development (2020). *COVID-19 Crisis: Broadband Commission Agenda for Action: For faster and better recovery*. Available at: https://www.broadbandcommission.org/Documents/Agenda_for_Action.pdf.

Consultative Group to Assist the Poor (CGAP) (2018). '4 Regulatory Enablers for Digital Finance: A Gender Perspective', 10 October. Available at: https://www.cgap.org/blog/4-regulatory-enablers-digital-finance-gender-perspective.

Coursera for Government (no date). Available at: https://www.coursera.org/government/workforce-recovery.

European Institute for Gender Equality (EIGE) (2017). *Cyber violence against women and girls*. Available at: https://eige.europa.eu/publications/cyber-violence-against-women-and-girls.

Flores, M. and Albornoz, D. (2019). *Are we connected? Digital gender gap in Peru*. World Wide Web Foundation; Hiper Derecho. Available at: http://webfoundation.org/docs/2020/01/Reporte_Peru_Ingles_Digital.pdf.

Gigonomy (2020). 'The Gig Economy in Southeast Asia', 1 July. Available at: https://gigonomy.info/the-gig-economy-in-the-southeast-asia/.

GSM Association (GSMA) (2018). *Connected Society: State of Mobile Internet Connectivity 2018*. Available at: https://www.gsma.com/mobilefordevelopment/wp-content/uploads/2018/09/State-of-Mobile-Internet-Connectivity-2018.pdf.

_____ (2020a). *Connected Women: The Mobile Gender Gap Report 2020*. Available at: https://www.gsma.com/mobilefordevelopment/wp-content/uploads/2020/02/GSMA-The-Mobile-Gender-Gap-Report-2020.pdf.

_____ (2020b). *State of the Industry Report on Mobile Money 2019*. Available at: https://www.gsma.com/sotir/wp-content/uploads/2020/03/GSMA-State-of-the-Industry-Report-on-Mobile-Money-2019-Full-Report.pdf.

_____ (2020c). *The State of Mobile Internet Connectivity 2020*. Available at: https://www.gsma.com/r/wp-content/uploads/2020/09/GSMA-State-of-Mobile-Internet-Connectivity-Report-2020.pdf.

Iglesias, C. (2020). 'The gender gap in internet access: using a women-centred method', *World Wide Web Foundation*, 10 March. Available at: https://webfoundation.org/2020/03/the-gender-gap-in-internet-access-using-a-women-centred-method/.

International Telecommunication Union (ITU) (2017). *Fast forward progress: leveraging tech to achieve the global goals*. Available at: https://www.itu.int/en/sustainable-world/Pages/report-hlpf-2017.aspx.

_____ (2018a). *Country ICT data: Gender ICT statistics*. Available at: https://www.itu.int/en/ITU-D/Statistics/Pages/stat/default.aspx.

_____ (2018b). *Measuring the Information Society Report 2018*. Available at: https://www.itu.int/en/ITU-D/Statistics/Pages/publications/misr2018.aspx.

_____ (2019a). *ICT Indicators Database*. Available at: https://www.itu.int/en/ITU-D/Statistics/Pages/publications/wtid.aspx.

_____ (2019b). 'ICTs to achieve the United Nations Sustainable Development Goals', February. Available at: https://www.itu.int/en/mediacentre/backgrounders/Pages/icts-to-achieve-the-united-nations-sustainable-development-goals.aspx.

_____ (2019c). *Measuring digital development: Facts and figures 2019*. Available at: https://www.itu.int/en/ITU-D/Statistics/Documents/facts/FactsFigures2019.pdf.

_____ (2020). 'WSIS Prizes 2020: Nominated Projects - Digital Income Opportunities via Crowdsourcing / Sharing Economy Model'. Available at: https://www.itu.int/net4/wsis/stocktaking/Prizes/2021/Nominated?jts=E2NU9Y&idx=10&page=#start.

_____. *2030 Agenda for Sustainable Development*. Available at: https://www.itu.int/en/ITU-D/Statistics/Pages/intlcoop/sdgs/default.aspx.

International Telecommunication Union (ITU) and United Nations Educational, Scientific and Cultural Organization (UNESCO) (2020). *The State of Broadband 2020: Tackling Digital Inequalities*. Available at: https://www.itu.int/dms_pub/itu-s/opb/pol/S-POL-BROADBAND.21-2020-PDF-E.pdf.

Internet Society (2017). 'Issue Paper: Asia-Pacific Bureau – Gender', 26 July. Available at: https://www.internetsociety.org/resources/doc/2017/issue-paper-asia-pacific-bureau-gender/.

Leng, C. *et al.* (2020). 'ICT adoption and income diversification among rural households in China', *Applied Economics*, 52(33), pp. 3614–3628. doi: 10.1080/00036846.2020.1715338.

Pathways for Prosperity Commission (2018). *Digital Lives: Meaningful Connections for the Next 3 Billion*. Available at: https://pathwayscommission.bsg.ox.ac.uk/digital-lives-report.

_____ (2019). *The Digital Roadmap: How developing countries can get ahead*. Available at: https://pathwayscommission.bsg.ox.ac.uk/digital-roadmap.

Plan International (2020). 'Abuse and Harassment Driving Girls Off Facebook, Instagram and Twitter', 5 October. Available at: https://

plan-international.org/news/2020-10-05-abuse-and-harassment-driving-girls-facebook-instagram-and-twitter.

Prats Cabrera, J. and Puig Gabarró, P. (2017). *Telecommunications Governance: Toward the Digital Economy*. Inter-American Development Bank (IDB). Available at: https://publications.iadb.org/en/telecommunications-governance-toward-digital-economy.

Senate of the Philippines (2020). *Angara sees the growth of digital careers in the country after COVID-19*. Available at: http://legacy.senate.gov.ph/press_release/2020/0517_angara1.asp.

Sin, Y. (2020). 'Parliament: Freelancers to get training allowance of $7.50 an hour for eligible courses in next 3 months', *The Straits Times*, 3 March. Available at: https://www.straitstimes.com/politics/parliament-freelancers-to-get-training-allowance-of-750-an-hour-for-eligible-courses-in.

Sioson, E. P. and Kim, C. J. (2019). *Closing the Gender Gap in Financial Inclusion through Fintech*. Policy Brief No. 2019-3 (April). Asian Development Bank Institute. Available at: https://www.adb.org/sites/default/files/publication/498956/adbi-pb2019-3.pdf.

Thai MOOC. Available at: https://thaimooc.org/.

Theeraroungchaisri, A. and Khlaisang, J. (2019). *Thai MOOC Sustainability: Alternative Credentials for Digital Age Learners*. Available at: http://ceur-ws.org/Vol-2356/experience_short20.pdf.

Trucco, D. and Palma, A. (2020). *Childhood and adolescence in the digital age: A comparative report of the Kids Online surveys on Brazil, Chile, Costa Rica and Uruguay*. UN Economic Commission for Latin America and the Caribbean (ECLAC). Available at: https://www.cepal.org/en/publications/45835-childhood-and-adolescence-digital-age-comparative-report-kids-online-surveys.

UN Economic and Social Commission for Asia and the Pacific (ESCAP) (2017). *Adressing the Challenges of Population Ageing in Asia and the Pacific: Implementation of the Madrid International Plan of Action on Ageing*. Available at: https://www.unescap.org/publications/addressing-challenges-population-ageing-asia-and-pacific-implementation-madrid.

_____ (2018). *Inequality in Asia and the Pacific in the era of the 2030 Agenda for Sustainable Development*. Available at: https://www.unescap.org/publications/inequality-asia-and-pacific-era-2030-agenda-sustainable-development#.

_____ (2019). *Inequality of Opportunity in Asia and the Pacific: Financial Inclusion*. Available at: https://www.unescap.org/resources/inequality-opportunity-asia-and-pacific-financial-inclusion.

_____ . *Reducing Multiple Dimensions of Inequality*. Available at: https://www.socialprotection-toolbox.org/inequality.

UN Economic and Social Commission for Asia and the Pacific (ESCAP) and International Labour Organization (ILO) (2020a). *Social protection responses to COVID-19 in Asia and the Pacific: The story so far and future considerations*. Available at: https://www.unescap.org/resources/social-protection-responses-covid-19-asia-and-pacific-story-so-far-and-future.

_____ (2020b). *The Protection We Want: Social Outlook for Asia and the Pacific*. Available at: https://www.unescap.org/publications/protection-we-want-social-outlook-asia-and-pacific.

UN Economic and Social Council (ECOSOC) (2020a). *Guidelines for inclusive technology and innovation policies for sustainable development: Note by the secretariat*. Available at: https://www.unescap.org/sites/default/files/CICTSTI_4_item%205a_E.pdf.

_____ (2020b). *Promoting regional cooperation for inclusive broadband connectivity through the Asia-Pacific Information Superhighway initiative: Note by the secretariat*. Available at: https://www.unescap.org/sites/default/files/ESCAP_CICTSTI_2020_2_Broadband%20connectivity.pdf.

UN Economic Commission for Latin America and the Caribbean (ECLAC) (2020a). *Afrodescendientes y la matriz de la desigualdad social en América Latina: retos para la inclusión*. Available at: https://www.cepal.org/es/publicaciones/46191-afrodescendientes-la-matriz-la-desigualdad-social-america-latina-retos-la.

_____ (2020b). *Universalizing access to digital technologies to address the consequences of COVID-19*. Available at: https://www.cepal.org/en/publications/45939-universalizing-access-digital-technologies-address-consequences-covid-19.

UN Women (2020a). *Policy Brief: The Impact of COVID-19 on Women*. Available at: https://www.unwomen.org/-/media/headquarters/attachments/sections/library/publications/2020/policy-brief-the-impact-of-covid-19-on-women-en.pdf?la=en&vs=1406.

_____ (2020b). *The Digital Revolution: Implications for Gender Equality and Women's Rights 25 Years after Beijing*. Available at: https://www.unwomen.org/-/media/headquarters/attachments/sections/library/publications/2020/the-digital-revolution-implications-for-gender-equality-and-womens-rights-25-years-after-beijing-en.pdf?la=en&vs=1837.

United Nations Children's Fund (UNICEF) (2020a). *COVID-19: At least a third of the world's schoolchildren unable to access remote learning during school closures, new report says*. Available at: https://www.unicef.org/press-releases/covid-19-least-third-worlds-schoolchildren-unable-access-remote-learning-during.

_____ (2020b). *LACRO COVID-19 Education Response: Reaching the Most Vulnerable Children*. Available at: https://www.unicef.org/lac/en/media/14531/file.

United Nations Children's Fund (UNICEF) and International Telecommunication Union (ITU) (2020). *Towards an equal future: Reimagining girls' education through STEM*. Available at: https://www.unicef.org/reports/reimagining-girls-education-through-stem-2020.

United Nations Conference on Trade and Development (UNCTAD) (2019). *Digital Economy Report 2019. Value Creation and Capture: Implications for Developing Countries*. Available at: https://unctad.org/en/PublicationsLibrary/der2019_en.pdf.

United Nations Department of Economic and Social Affairs (UNDESA) (2020a). *COVID-19 shifts forecast on the global goal to end extreme poverty*. Available at: https://unstats.un.org/sdgs/report/2020/goal-01/.

_____ (2020b). *E-Government Survey 2020: Digital Government in the Decade of Action for Sustainable Development*. Available at: https://publicadministration.un.org/en/Research/UN-e-Government-Surveys.

_____. *Sustainable Development*. Available at: https://sdgs.un.org/goals.

United Nations Development Programme (UNDP) (2019). *Human Development Report 2019*. Available at: http://hdr.undp.org/en/2019-report.

_____ (2020). *Recovering from COVID-19: Lessons from Past Disasters in Asia and the Pacific*. Available at: https://www.undp.org/content/undp/en/home/librarypage/crisis-prevention-and-recovery/recovering-from-COVID-19-lessons-from-past-disasters-in-asia-pacific.html.

United Nations Educational, Scientific and Cultural Organization (UNESCO) (2016). 'Rural Myanmar teachers turn on mobile ICT', 19 September. Available at: https://bangkok.unesco.org/content/rural-myanmar-teachers-turn-mobile-ict.

_____ (2017a). 'From rural outreach to high-tech training: 2017 Wenhui Award winners celebrate innovative teacher development', 11 October. Available at: https://bangkok.unesco.org/content/rural-outreach-high-tech-training-2017-wenhui-award-winners-celebrate-innovative-teacher.

_____ (2017b). 'Transforming Myanmar rural schools with ICT: One Teacher at a Time', 27 March. Available at: https://bangkok.unesco.org/content/transforming-myanmar-rural-schools-ict-one-teacher-time.

_____ (2018). *Positioning ICT in education to achieve the Education 2030 Agenda in Asia and the Pacific: recommendations for a regional strategy*. Available at: https://unesdoc.unesco.org/ark:/48223/pf0000261661.

_____ (2019). *I'd blush if I could: closing gender divides in digital skills through education*. Available at: https://unesdoc.unesco.org/ark:/48223/pf0000367416.page=1.

United Nations (UN) (2015). *General Assembly Resolution 70/1, Transforming our world: The 2030 Agenda for Sustainable Development*. Available at: https://www.un.org/ga/search/view_doc.asp?symbol=A/RES/70/1&Lang=E.

_____ (2019). *The Age of Digital Interdependence: Report of the Secretary-General's High-level Panel on Digital Cooperation*. Available at: https://www.un.org/en/pdfs/HLP%20on%20Digital%20Cooperation%20Report%20Executive%20Summary%20-%20ENG.pdf.

_____. *Secretary-General's High-level Panel on Digital Cooperation*. Available at: https://www.un.org/en/digital-cooperation-panel/.

United States Department of State (USDOS) (2012). *Country Report on Human Right Practices for 2012: Mongolia*. Available at: https://2009-2017.state.gov/j/drl/rls/hrrpt/2012humanrightsreport/index.htm?year=2012&dlid=204222#wrapper.

Vipra, J. (2020). 'Gig economy must share rewards as well as risks with workers', *Nikkei Asia*, 30 June. Available at: https://asia.nikkei.com/Opinion/Gig-economy-must-share-rewards-as-well-as-risks-with-workers.

Woodhouse, T. (2020). 'Mobile devices are too expensive for billions of people — and it's keeping them offline', *World Wide Web Foundation*, 6 August. Available at: https://webfoundation.org/2020/08/mobile-devices-are-too-expensive-for-billions-of-people-and-its-keeping-them-offline/.

World Bank Group (WB) (2016). *World Development Report 2016: Digital Dividends*. Available at: https://www.worldbank.org/en/publication/wdr2016.

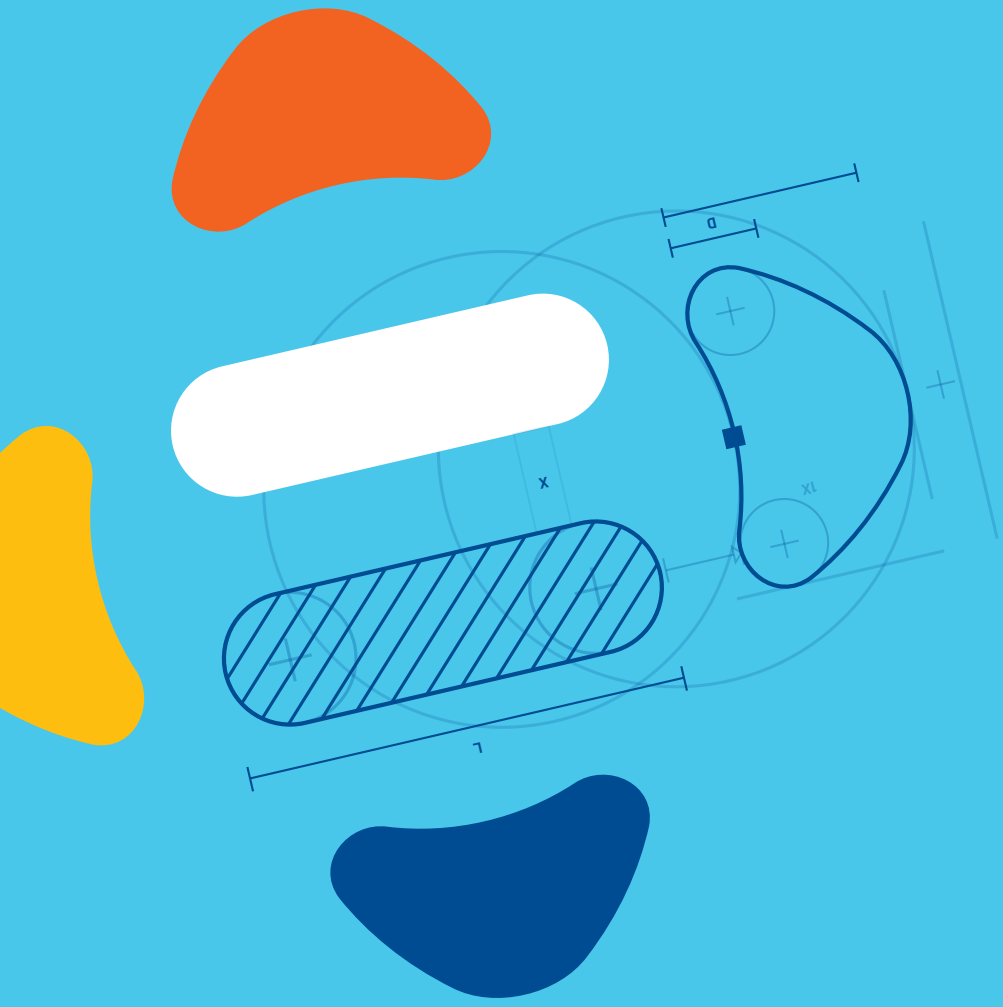
_____ (2018). *Digital Connectivity in Lao PDR – Lagging Behind Peers : A Short Assessment with Policy Recommendations to Catch Up*. Available at: https://openknowledge.worldbank.org/handle/10986/31258.

_____ (2020). 'How countries are using edtech (including online learning, radio, television, texting) to support access to remote learning during the COVID-19 pandemic'. Available at: https://www.worldbank.org/en/topic/edutech/brief/how-countries-are-using-edtech-to-support-remote-learning-during-the-covid-19-pandemic.

World Wide Web Foundation (2018). *Advancing Women's Rights Online: Gaps and Opportunities in Research and Advocacy*. Available at: https://webfoundation.org/research/advancing-womens-rights-online-gaps-and-opportunities-in-research-and-advocacy/.

_____ (2019). *Contract for the Web*. Available at: https://contractfortheweb.org/.

_____ (2020). *Women's Rights Online: Closing the digital gender gap for a more equal world*. Available at: http://webfoundation.org/docs/2020/10/Womens-Rights-Online-Report-1.pdf.


a
x
L