PNMA Repository (as of 12/2024)

2024 PNMA Connectivity Good Practices

Case C01	Terragraph Connectivity Project
Location:	Kingdom of Saudi Arabia
Timeframe:	2021-2022
Funding:	The project was co-funded by Meta and KAUST
Responsible institutions / partners / people:	● King Abdullah University of Science and Technology (KAUST) ● Communications, Space and Technology Commission (CST), Kingdom of Saudi Arabia ● META
What is the problem?	● The Modern Architectural Contracting Company (MACC) camp, located about 1.5 km from the KAUST campus, previously offered no internet connectivity due to the lack of high-speed backhaul and distribution capacity to the Wi-Fi nodes. ● Specifics (if any) ○ Fiber would have been way too expensive to deploy, not only as a backhaul between KAUST and the camp, but also as a distribution technology within the camp, notwithstanding the lack of flexibility as housing configurations tend to change.
Which were the actions taken to address the problem(s)?	● KAUST, META and CST have been cooperating to deploy hybrid radio frequency and free space optics developed by the Communication Theory Lab for reliable internet connection to the camp.
Results / Impact / Lessons learned (what worked / remaining challenges)	● Results: ○ Hybrid radio frequency and free space optics (RF/FSO) systems have emerged as a promising solution for reliable high-data-rate wireless connection between KAUST and the MACC camp; ○ The deployment of Terragraph, a gigabit wireless technology developed by Meta, is allowing the validation of KAUST research in extreme bandwidth communication (i.e., mm-wave RF and FSO), with the potential to develop new practical switching algorithms for hybrid mm-wave RF/FSO links; ○ In this context, weather stations installed in KAUST and the camp will be used to monitor climate variables that could affect the operation of FSO systems and the switching between FSO and mm-wave RF backhaul links. ● Impact: ○ The project provided a testing ground for bringing high-speed Wi-Fi service to communities with no or limited affordable access; ○ Success is a framework to bring other remote and unconnected communities – where the deployment of fibers is difficult and costly. ● Lessons learned: ○ We needed a low-cost, high-speed alternative to fiber that can be redeployed at little to no cost. Terragraph was the perfect choice.

Case C02	CNSP License
Location	Kenya
Time Frame	2020 -2021
Funding:	The program was developed with support from the United Kingdom's Digital Access Programme (DAP)
Responsible institutions/ partners / people:	The Communications Authority of Kenya, Association for Progressive Communications and Kenya ICT Action Network, The State Department of ICT and Digital Economy.
What is the problem?	● Many rural and underserved urban areas in Kenya have historically faced a lack of reliable internet access. These regions are perceived as commercially unviable for major telecommunications companies, leaving communities limited to no connectivity solutions. ● Prior to the introduction of the CNSP license, there were no exemptions for non-profit organizations under the existing licensing framework, which imposed high fees and stringent requirements that made it difficult for community-based initiatives to operate legally. ● The need for local community ownership and governance in the design and operation of networks is crucial for ensuring that services are tailored to meet the community's specific needs, fostering a sense of ownership and responsibility among users.
Which were the actions taken to address the problem(s)?	● The Communications Authority of Kenya (CA) created a Licensing and Shared Spectrum Framework for Community Networks in collaboration with the Association for Progressive Communications (APC) and the Kenya ICT Action Network with input from various stakeholders ● The framework emphasized community involvement, requiring that community networks be fully controlled by non-profit entities. This was designed to ensure local governance and operationalization of the networks ● The CNSP license includes a low application fee of Ksh 1,000 and an annual operating fee of Ksh 5,000, making it financially accessible compared to other licensing options. Additionally, CNSPs are exempt from contributions to the Universal Service Fund (USF), further reducing costs ● The framework allows for fee waivers on non-protected access to lightly-licensed and license-exempt frequency bands, facilitating easier access to necessary spectrum for community networks ● The CNSP license integrates community networks into the national regulatory framework, allowing existing networks operating outside this ambit to formalize their operations

Results / Impact / Lessons learned (what worked / remaining challenges)	Impact: ● 15 registered Community Network Service Providers (CNSPs) in Kenya, reflecting the growing interest and engagement in community-driven internet solutions. ● The formation of an association for community networks which aims to provide a platform for collaboration, knowledge sharing, and advocacy for community network operators. ● The draft Universal Service Fund (USF) strategy from the Communications Authority of Kenya (CA) indicates a commitment to funding community networks as part of its broader goals. The draft USF strategy proposes the establishment of 100 community networks in unserved and underserved areas over the next five years. This initiative aims to enhance connectivity and ensure that local communities have access to essential telecommunications services. Lessons Learnt: ● Setting low application and operational fees for the CNSP license has made it financially viable for community-based organizations to participate. This approach has demonstrated that reducing regulatory barriers can significantly enhance participation from underserved areas ● The creation of a specific licensing category for community networks within the Unified Licensing Framework has shown the importance of tailoring regulatory frameworks to accommodate unique operational models, such as those of non-profit entities ● Aligning the CNSP initiative with broader national strategies, such as the Universal Service Fund (USF), enhances the potential for funding and support. ● Governments can benefit from the on-the-ground insights that CSOs provide, allowing for more effective policy-making that addresses the specific needs of communities.

Case C03	Digital Transformation in Rural or Underserved Areas of Latin America and the Caribbean
Location:	Guidelines for the 34 Member States of the Organization of American States - OAS. We have supported 6 member countries until 2024, including: Ecuador, Dominican Republic, Paraguay, Panama, Colombia and Bolivia (initial stage).
Timeframe:	**Past project** in Ecuador **Ongoing:** Dominican Republic, Panama, Paraguay, Colombia, and Bolivia.
Funding:	Regular budget fund of the OAS with support from grants from several international foundations.
Responsible institutions / partners / people:	● **Responsible institution: Executive Secretary of the Inter-American Telecommunication Commission –** CITEL/OAS. ● Counterpart institutions: ICTs Ministries and ICT regulatory agencies. ● Partners: ISOC, European Union.
What is the problem?	Digital inequality in Latin America and the Caribbean, exacerbated by outdated and inefficient regulatory policies, limits the economic, social, and educational development of the region, perpetuating inequities in key areas such as education, employment, and health. This is compounded by collateral issues such as high internet costs, lack of political interest, digital skills, and deficient infrastructure, which hinder the implementation of new technologies, the entry of new players, and aid in disconnected areas, limiting digital transformation.
Which were the actions taken to address the problem(s)?	CITEL has led a comprehensive process to reduce the digital divide in Latin America and the Caribbean through the implementation of the OAS General Assembly resolution AG/RES. 2966 (LI-O/21) with 21 guidelines for reducing the digital divide. This includes diagnosing specific needs by country, designing roadmaps with short, medium, and long-term actions, and establishing an observatory to verify implementation. These 21 guidelines include the efficient use of universal service funds, promotion of public-private partnerships, elimination of regulatory barriers, and adoption of innovative technologies that would directly impact the quality of life of people living in rural areas, maximizing their social, economic, and cultural well-being, and transforming their lives. Additionally, a management observatory supervises and adjusts the implementation of projects, strategies, policies, and/or regulations, ensuring that equitable opportunities for access to the internet, education, and essential services are created in the most vulnerable communities.

Results / Impact / Lessons learned (what worked / remaining challenges)	● Results: The technical support provided by the CITEL Secretariat in Ecuador, the Dominican Republic, Panama, Colombia, Paraguay, and Bolivia has generated significant progress, including the reform of laws and regulations to measure the impact of solutions and facilitate rural digital transformation projects, as well as the promotion of inclusive public policies that prioritize gender equity and essential services in rural or underserved areas. Additionally, the sharing of technological infrastructure has been encouraged to expand coverage and improve affordability, and community telecommunications networks have been promoted to reduce the digital divide. Furthermore, legal and regulatory frameworks have been updated to maximize social well-being, improve the quality of telecommunications services, and stimulate investment in remote areas. ● Impact: The actions taken have achieved greater social inclusion in rural or hard-to-reach areas, connecting communities through self-sustaining systems, which reduces the digital divide in the Americas. This has decreased forced migration by enabling local job creation, facilitated access to funds for new community networks, and promoted technological adoption with access to basic services. Additionally, public-private investment in telecommunications has been encouraged, improving quality of life, economic, social, and cultural development, as well as access to essential services such as health and education. ● Lessons learned: Reducing the digital divide and connecting disconnected rural areas has required neutral technical support focused on the implementation of effective public policies and regulatory reforms in the short, medium, and long term. It has been essential to foster multisectoral collaboration among governments, private companies, NGOs, and local communities, developing sustainable business models and integrating flexible public policies that attract investment in telecommunications. Additionally, it has required a governmental commitment to modernize legal frameworks and make significant investments in infrastructure to drive inclusive and sustainable digital transformation.

Case C04	Meaningful Connectivity in Brazil: The portrait of the population (study)
Location:	São Paulo, Brazil
Timeframe:	Launched in April, 2024
Funding:	Self-funded by NIC.br - Brazilian Network Information Center
Responsible institutions / partners / people:	● Cetic.br – Regional Center for Studies on the Development of the Information Society, department of the NIC.br – Brazilian Network Information Center ● Author: Graziela Castello. Social Scientist and Coordinator of Sectoral Studies and Qualitative Methods at Cetic.br | NIC.br
What is the problem?	● In recent years, the debate on the impact of digital technologies on society has intensified. Internet and digital device usage have grown exponentially, driven by new applications and services, transforming lifestyles. However, many remain excluded from the digital world due to limited infrastructure access, inadequate devices, insufficient digital skills, and socioeconomic barriers. ● Amid rapid changes, technologies like AI, IoT, and the digital economy demand increasing connectivity, which is essential for people to seize opportunities and address potential risks. Human-centered development depends on equitable access to these possibilities. ● A multidimensional approach is crucial to understand connectivity, considering not just Internet access but also device quality, connection reliability, affordability, and opportunities for meaningful usage in different contexts.
Which were the actions taken to address the problem(s)?	In April 2024, Cetic.br published *"Meaningful Connectivity: Measurement Proposals and the Portrait of the Population in Brazil"*, providing new perspectives on measuring connectivity. Chapter 3 offers an overview of the Brazilian population's levels of meaningful connectivity. ● This study proposes a method for measuring the population's level of meaningful connectivity, by constructing a scale derived from data processing from the ICT Households survey, a longitudinal probabilistic household survey on access and use of ICT in Brazil. ● The proposed levels of analysis appear as a first exercise in gauging the population's connectivity conditions from a comprehensive analytical lens. This is an attempt to deepen the effective meaning of digital inclusion beyond, for example, mere usage or non-usage of the Internet, or access or non-access to the web. ● Based on the concept of meaningful connectivity, which presupposes that Internet access should enable satisfactory, secure usage and the possibility of capitalize on network, the levels of meaningful connectivity presented are the result of combining nine indicators across four dimensions: (a) affordability, which deals with connectivity costs; (b) access to equipment, encompassing the possession of suitable devices for intended uses; (c) quality of the connections available; and (d) connectivity environment, considering Internet usage frequency and locations.
Results / Impact / Lessons learned (what worked / remaining challenges)	● Results: ○ **Challenging Connectivity Scenario**: Only 22% of Brazilians aged 10+ achieved the highest meaningful connectivity scores (7-9 points), while 33% scored in the lowest range (0-2 points), indicating significant challenges in digital inclusion. ○ **Persistent Inequalities:** Residents of rural areas, small municipalities, women, self-identified black or brown people, from lower income socioeconomic class, with low levels of education and outside the labor market are those with the lowest scores for meaningful connectivity. ○ **Connectivity and Digital Skills**: Higher meaningful connectivity scores are linked to better technical and safety skills, including privacy protection and information verification. Those with poor access conditions also lack essential skills to navigate risks online. ● Impact: There are two major outcomes of this study, in addition to its role as a reference for guiding public policies in Brazil:

	○ It formed the basis for the Guidelines on Indicators and Metrics for Universal and Meaningful Connectivity, developed in partnership with the ITU and Brazil's Ministry of Communications, and featured in the G20 under Brazil's presidency. It was included in the G20 DEWG declaration and endorsed by all member countries. ○ The study became a reference for measuring Meaningful Connectivity across Latin America, in partnership with UN-ECLAC, where we provide methodological support to countries. To date, two countries — Dominican Republic and Chile — have completed their measurements, and four others — Ecuador, Uruguay, Costa Rica and Peru — are in progress or planning stages. ● Lessons learned: ○ Based on this study on the meaningful connectivity of the Brazilian population, it became clear that there is a need to revise public policy strategies for digital inclusion, also taking into account the identified and quantified dimensions, since, from the perspective of Internet users alone, almost 90% of Brazilians are already online. ○ Public policies focused on reducing inequalities in access must be accompanied by investments in digital infrastructure strategies to reduce the costs of individual devices and democratization of Internet access locations. More than that, inclusion initiatives should target vulnerable groups, promoting digital literacy. ○ At the same time, it is imperative to continue monitoring the progress of meaningful connectivity over time in order to adapt policies and interventions as necessary to ensure that all the population has the opportunity to enjoy the benefits of the digital age.

2024 PNMA Update on 2023 Practice – Focus Area: Connectivity

Update 1	Papua New Guinea's Digital Strategy (2023)
Presented at the 2023 PNMA Plenary Session:	**Yes**
Location:	Papua New Guinea
Funding:	Government Funding Plus support for several international advisers funded by the Economic Social Infrastructure Program administered by DT Global and funded by the Australian Department of Foreign Aid and Trade
Responsible institutions / partners / people:	Department of ICT, Secretary Steven Matainaho
What is the problem?	● How to get people in our rural communities to have the means to access government goods and services through mobile phones without the expense and wasted time of travel and queues? ● Currently much of the country does not have connectivity to the Internet and it is very difficult to close the connectivity and digital gap without access. Affordable, accessible, and reliable infrastructure is the foundation to achieve an inclusive digital transformation. ● How do we get private sector companies to drive down the price of Internet access, expand coverage to the millions that remain unconnected, and build the inclusive foundation for a robust digital economy? ● How does PNG build an inclusive and strong digital economy when most of the nation does not have access to the Internet? ● What policies and incentives do we need to encourage operators and other providers to make connectivity affordable, especially those in remote rural areas? ● How do we incentivise operators to invest the needed infrastructure in the country? ● What actions are needed to build an inclusive community and leave no one behind, with a particular focus on women, indigenous groups and persons with disabilities? These marginalised groups tend to be significantly less likely to own a phone, access the Internet and on-line services, and integrate ICT functions in their daily lives. ● How do we overcome the lack of digital readiness and cultural challenges to transform the country into a strong digital economy? The same is true with overcoming entrenched legacy policies and regulatory frameworks which are siloed and do not work in a digital economy. Our Vision is to transform the nation to become a fully modern, prosperous, and integrated digital/information age economy and society. This will mean that all citizens will have the ability to access and utilise advanced, high-quality information and communication technology (ICT) services, devices, applications, and resources. Access to ICT networks, services, and connectivity has little or no value if people are unable to afford or own modern, multipurpose digital devices, which connect to, and use those networks and services. This policy aims to ensure that appropriate and fully functional devices can be made affordable to all who need them, via a combination of programs, partnerships, incentives, and other mechanisms.

Which were the actions taken to address the problem(s)?	● Developed Several Key Digital Economy Policies. ● Passed Digital Transformation Policy 2020 ● Passed Cybersecurity Policy 2021 ● Passed Digital Government Legislation 2022 ● Passed a Digital Government five-year plan and worked to implement the plan to build the needed connectivity infrastructure to implement the plan ● Revised UAS Policy 2023, currently in front of the NEC ● Developed the First National Broadband Plan to meet Connectivity. Infrastructure, Digital Government and other goals. ● Developed Data Governance and Data Protection Policy 2023 ● Worked to get funding for the ICT sector in the Government's Medium Term Development Plan. Previously ICT sector was not captured in the Government's 5-year plan to Department worked and collaborated with National Planning and other Ministries to get the sector included into the Government's 5-year plans so Digital Government can be funded ● Developed a Media Policy to create standards for the media to help eliminate mis-information and dis-information in the media. ● Conducted a series of workshops on the new policies in each of the 5 regions of the country to educate the public about digital economy and digital government policies ● Brought in IT officers (Digital Transformation Officers) into the capital for several days of training so they can train colleagues in their provinces ● Working with the local and regional offices to train and educate them about the new polices. ● Worked with our stakeholders to gain their comments and suggestions for improvement on policies.
Results / Impact / Lessons learned (what worked / remaining challenges)	● Results: ○ Passed several policies and laws, and working to pass other key digital economy policies that underpin any digital transformation ○ Trained and made aware many stakeholders, agencies, and others about the new policies and the strategies for going forward. ○ Worked to involve stakeholders into the policy process while policies are still in draft form so we can gather their input and feedback allowing them to take ownership of the policies which will help their implementation. ○ Breaking down the transformation process into manageable units, and aligning them with core principles, allows for synergy and scale and binding factor for enabling seamless progress, are effective collaboration and coordination ● Many lessons were learned: ○ Developing a strategic roadmap for addressing and rectifying technological, cultural and policy/regulatory issues is paramount for progress and advancement. ○ Collaborating and coordinating with other agencies and with all stakeholders, government, private sector, and civil society is key ○ Take a bird's-eye view of the shifting landscape, understanding the guiding principles of each component, and devising strategies to navigate failures. The small growths that define success, and collaboration and coordination that allow for a shifting culture to seamlessly complement adoption ○ Breaking down the transformation process into manageable units, and aligning them with core principles, allows for synergy and scale and binding factors for enabling seamless progress, are effective collaboration and coordination. ● Remaining Challenges: ○ How to implement the plan and strategy in a country where readiness and aversion to change is at different levels? Also, when certain agencies are fixated on legacy policies and entrenched regulatory frameworks that do not work in today's economy?
2024 Update	

Has the problem been solved?	Connectivity still remains a problem within PNG because there are so many rural and remote areas to be covered and also that connectivity costs are too high for most people.
Did any new problems emerge during implementation?	Had to resolve some authentication issues and also worked to develop and implement the digital government portal. Some policies took longer than planned as priorities shifted.
Do 2022/2023 solutions still work to tackle the problem? New solutions needed to be developed?	Yes but other methods are also needed. Currently working to revise the ICT Act to provide more licensing options and increase competition, provide increased consumer protection, seeking to increase the number of operators and provide greater customer choice. Passed some new legislation but still working on others. Also working on other connectivity solutions that have not been tried.
Was the solution scaled or localised to other regions? If so, please share examples	Several of the policies and legislation that were created were copied by other similar sized countries. Also working to implement an action plan for all Pacific island countries on Cyber, climate resilience, cybercrime, disaster preparedness, digital government and digital infrastructure issues. Also working to increase capacity building.
New milestones:	• Passed a Data Governance and Data Protection Policy • Passed a Cybersecurity strategy; working on developing legislations for each of these two policies. • Also revising the Digital Government Act to close up some loopholes and tighten up some missing gaps. • Rolled out the first series of Digital Government services a few months ago and began implementing the single window and Digital Government Portal
New challenges:	Connectivity is still a problem as lawsuits and other obstacles are delaying change. It is hoped that the ongoing work to update the ICT Act will speed up competition in the market and also allow for new competitions and solutions to enhancing connectivity through Papua New Guinea.
Lessons learned:	Keep being focused on the problem and looking at creative ways to solve it. Policy, legislation are only part of the answer, also need to increase awareness and get more agencies involved in helping solve these issues.
Next steps:	Update of the ICT Act is ongoing and expected to be completed this year. Also work on updating the cybercrime and related legislation so that PNG can finish up the processes needed before acceding to the Budapest Convention.

2024 PNMA Digital Inclusion Good Practices

Case DI01	**Pakistan Digital Gender Inclusion in ICTs Strategy**
Location:	Islamabad, Pakistan
Timeframe:	3-year strategy (launched in 2024)
Funding:	The strategy was developed by the Pakistan Telecommunication Authority (PTA) with support from the UNESCO and GDIP team.
Responsible institutions / partners / people:	PTA leads the strategy implementation, under the guidance and supervision by the Ministry of IT. However, the strategy, by design, necessitates cooperation among all stakeholders of the digital ecosystem to reduce the gender digital divide in Pakistan.
What is the problem?	Pakistan is among the countries with the widest gender gap in the world. According to GSMA Mobile Gender Gap Report 2024, Pakistan has a 38% gender gap in mobile ownership and mobile internet adoption. This gap of 38% is more than twice as wide as the overall Low-Middle Income Countries (LMICs) gender gap (15%). The World Bank states that women in Pakistan are 43% less likely to use the Internet whereas the Inclusive Internet Index reports a 67.5% gender gap in Internet access and 44.7% mobile phone access gap. Naturally, Pakistan ranks 135 out of 166 countries in the UNDP Gender Inequality Index and 145 out of 146 countries in the WEF's Global Gender Gap Report. While the statistics and rankings present a challenging state of affairs, it is more concerning to note that the gender gap shows no signs of improvement over the recent past.
Which were the actions taken to address the problem(s)?	PTA's all-female team developed the 'Digital Gender Inclusion in ICTs Strategy' based on a nation-wide, community-centered consultation process with the relevant stakeholders. A gender expert was hired to prepare the strategy with consultation sessions held across the country, followed by a validation workshop in Islamabad. Moreover, extensive situational analysis was carried out through policy analysis, literature review, stakeholder mapping, physical and IVR surveys and expert interviews. Resultantly, top barriers to women's digital inclusion were identified such as digital skills & literacy, affordability, family disapproval, safety & security and structural social inequalities. In view of the above mentioned barriers, a three-year digital gender inclusion strategy was developed. The implementation is to be ensured by a high-level Steering Committee, led by the IT Minister and coordinated by PTA, with heads of public and private sector organizations as the members. Six working groups on access, affordability, safety & security, digital literacy, inclusion, research & data. Both the steering committee and the working groups will be assisted by a Technical Advisory Group of international organizations that includes GDIP, ISOC, APC, Tiktok, UNESCO and GSMA.

Results / Impact / Lessons learned (what worked / remaining challenges)	**Results:** The first meeting of the steering committee and technical advisory group was held on 07th August 2024 where the implementation plan was discussed. All (six) working groups have started to convene and develop their own TORs that will be reviewed by the steering committee and tangible initiatives will be taken to bridge the gender digital divide. **Impact:** The strategy has unified the public and private sector entities to work together for the digital gender empowerment in Pakistan. It has created a strong network of stakeholders committed to achieve the working group objectives, backed by their leadership. Moreover, the country is open to international cooperation, making use of the insights, experience and technical resources of the global organizations. This would lead to more collaborations and direct assistance programs for the internet community in Pakistan. **Lessons learned:** Policies and implementation plans on gender digital empowerment should be led by women – nothing about us without us. Inclusive policy development process should be adopted at all levels of the Government to ensure a whole-of-the-society approach to address internet public policy issues like gender digital divide. The unequivocal support by the government and private sector leadership is the key to drive the digital policy changes in the country. Digital gender inclusion is not just a sociocultural issue but has significant economic loss associated with it, that requires perspective shift in the society.

Case DI02	Transforming Financial Inclusion for Persons with Disabilities in Pakistan
Location:	Pakistan
Timeframe:	2013–2021 (ongoing advocacy)
Funding:	n/a
Responsible institutions / partners / people:	● State Bank of Pakistan (SBP) ● Dr. Muhammad Shabbir
What is the problem?	Before December 2014, the financial system in Pakistan posed significant barriers for blind and visually impaired individuals. They were systematically excluded from modern banking services such as ATMs, credit cards, mobile banking, and internet banking. Instead, they were forced to physically visit their respective bank branches to withdraw money—and even then, only in the presence of a designated witness. This practice not only eroded their financial independence but also left them insecure and vulnerable. The very technologies designed to ensure security and convenience were denied to an entire community, exacerbating their marginalization. This systemic exclusion not only undermined their independence but also highlighted the pressing need for policy reform to address the barriers they faced. Moreover, the existing banking framework failed to recognize the rights and dignity of blind individuals. These restrictions reflected broader societal misconceptions about disability and a lack of awareness among policymakers. It became evident that a systemic change was required—one that would protect the financial autonomy and security of persons with disabilities, while fostering an inclusive banking environment.
Which were the actions taken to address the problem(s)?	In 2013-2014, Dr. Muhamad Shabbir, along with other organizations in the community, worked closely with the State Bank of Pakistan (SBP) to address these challenges. Recognizing the critical need for reform, Dr. Shabbir collaborated with SBP to draft the Guidelines for Banking Services to Visually Impaired/Blind Persons. These guidelines marked a significant step forward, compelling banks to: ● Provide literate blind individuals access to all banking services if they meet the other criteria for the required services. ● Ensure reasonable accommodations for visually impaired customers. ● Introduce secure yet inclusive measures for transactions. The issuance of these guidelines in 2014 by SBP catalyzed a shift in the banking sector, enabling blind individuals to access financial services that had long been denied to them.

Results / Impact / Lessons learned (what worked / remaining challenges)	**Results** Building on this success, the SBP developed the Policy for Financial Inclusion of Persons with Disabilities. This policy broadened the scope of inclusion to address the needs of all persons with disabilities. It emphasized creating equitable access to financial products and services while promoting the use of assistive technologies. However, challenges remain, particularly in ensuring the accessibility of online banking platforms. As digital banking becomes the cornerstone of financial services, it is imperative that these platforms are accessible to everyone. There is an ongoing advocacy for SBP to adopt the Web Content Accessibility Guidelines (WCAG) 2.1 as part of their policy framework. These standards will ensure that online banking platforms are user-friendly for individuals with disabilities, including those who rely on screen readers or other assistive technologies. The misconceptions and low expectations about persons with disabilities still haunt their financial independence in a number of developing countries. The journey toward financial inclusion in Pakistan offers a model for other developing countries, as the responsible persons hope to inspire similar reforms across the region. The path to financial inclusion is not without challenges, but the progress made in Pakistan demonstrates what is possible through advocacy, collaboration, and policy reform. The ultimate goal is to create a financial system where no individual is excluded due to their disability. By ensuring that accessibility standards like WCAG 2.1 are embedded in digital banking platforms, we can move closer to a world where financial independence is a right enjoyed by all. This journey is a testament to the power of inclusive policymaking and the resilience of those advocating for change. It reaffirms the belief that accessibility is not a privilege but a fundamental right, and it underscores the importance of continuing this work until every barrier is dismantled. **Lessons Learned** This case story outlines the transformative journey toward financial inclusion for persons with disabilities in Pakistan. It sheds light on the collaborative efforts to create equitable access to banking services, from the development of the Guidelines for Banking Services to Visually Impaired/Blind Persons in 2014 to the more comprehensive Policy for Financial Inclusion of Persons with Disabilities in 2021. By examining these milestones, this story also serves as a call to action for further advancements, including the adoption of international accessibility standards to ensure inclusive digital banking.

Case DI03	No One Left Behind
Location:	Lithuania
Timeframe:	2023 (ongoing)
Funding:	n/a
Responsible institutions / partners / people:	Lithuania's Communications Regulatory Authority – main responsible institution Partners: ● State Register ● State Data Solutions Agency ● State Consumer Rights Protection Authority ● State Data Protection Inspectorate ● National TV and radio broadcaster LRT ● Association of Municipal Public Libraries ● Various regional media outlets ● Universities of the Third Age ● Municipalities across Lithuania ● Banks, state agencies, major railway and bus companies, mobile operators
What is the problem?	Lithuania, like many European countries, faces a rapidly aging society. Statistics indicate that older individuals often possess lower digital skills, limiting their ability to fully benefit from the digital society. Many services are being digitized and often the elderly are not able to access the services due to the lack of skills. This digital exclusion can lead to increased social isolation among the elderly.
Which were the actions taken to address the problem(s)?	The main approach was training of senior citizens in various formats: ● Seminars and workshops: seminars on digital skills at 18 Universities of the Third Age, reaching 796 participants. ● Remote seminars were launched in July 2024 via the digital platform "Senior's World" with sessions on Zoom. ● Municipal collaboration: engaged 33 municipalities to support training by sharing information and providing technical facilities. ● Inclusion of partner lecturers: included experts from banks, state agencies, transport companies, and mobile operators. ● Library network collaboration: partnered with the Association of Municipal Public Libraries, with 40 libraries appointing focal points for public communication about the project. ● Media outreach: collaborated with regional and national media to disseminate information about the project. ● Promotional video: released a video encouraging the elderly to embrace digital technologies with confidence.
Results / Impact / Lessons learned (what worked / remaining challenges)	● Results: ○ By December 2024, approximately 3,500 elderly individuals participated in digital skills training. ○ Reached 26 smaller towns in Lithuania, offering 20 different courses. ● Impact: ○ Enhanced digital literacy among the elderly, reducing digital exclusion and potential social isolation. ○ Strengthened collaboration between public and private sectors, creating a robust platform for digital education. ○ Exact impact is yet to be measured, ideally after more years of such training. ● Lessons learned: ○ Effective partnerships: collaboration with a diverse range of partners, including government agencies, media, and private sector entities, is crucial for the widespread dissemination of digital literacy.

	○ Flexible learning formats: offering various formats of courses (remote, live, recorded) caters to different learning preferences and increases accessibility. ○ Community engagement: involving local municipalities and libraries enhances outreach and provides essential support infrastructure for training sessions. ○ Continuous feedback: regular surveys and feedback mechanisms help in tailoring the program to better meet the needs and expectations of participants. ● Remaining challenges: ○ Digital inclusion of the elderly remains a moving target due to the rapid change of technology, limited resources for training and varied level of skills improvement. ○ Digital inclusion projects like this should become long term with appropriate funding allocated.

Case DI04:	From Mountains to Data: Low-Cost Weather Stations in Kyrgyzstan's Challenging Terrain
Location:	Kyrgyz Republic
Timeframe:	2023-2024
Funding:	Internet Society Foundation
Responsible institutions partners / people:	● Internet Society Kyrgyz Chapter ● Abdus Salam International Centre for Theoretical Physics, Italy (ICTP) ● Central Asia Institute for Applied 11 Geosciences (CAIAG)
What is the problem?	● Kyrgyzstan, a landlocked nation in Central Asia, is characterized by its rugged mountainous terrain covering approximately 90% of its land area. ● This unique geography poses specific challenges related to climate vulnerability. ● The climate crisis has drastically increased the number of natural disasters, such as floods, mudflows, avalanches, etc., over the past years. ● There is a limited number of weather stations to monitor climate conditions in the Kyrgyz Republic due to the high cost and the need for electricity and communications, which leads to a deficit of weather-related information, particularly in rural areas.
Which were the actions taken to address the problem(s)?	● To address these challenges, we propose a comprehensive approach that involves gathering meteorological data and making it accessible to decision-makers. By leveraging LoRaWAN communication technology, which efficiently transmits sparse and low-speed data over long distances while minimizing power consumption, we can enhance climate resilience. We initiated the installation of meteorological sensors and disaster mitigation devices, including river water level sensors, terrain moisture sensors, and tilt detectors. These sensors collect critical data, which is stored within the country on an ad hoc server. ● Low-cost, low-power, and long-range weather stations have seen advancements in recent research. These stations offer a cost-effective solution for monitoring weather conditions both in developed and developing countries. The use of technologies such as LoRa wireless networking for the Internet of Things (IoT) has enabled the development of weather stations that can cover large areas while consuming minimal power. These stations are equipped with various sensors to monitor parameters such as temperature, humidity, air pressure, wind and rain amount. The collected data can be stored in cloud servers and accessed remotely. The implementation of these weather stations aim to adhere to the standards set by organizations like the World Meteorological Organization (WMO). The relevance of these advancements lies in their ability to provide accurate weather predictions, which can have significant impacts on sectors such as disasters mitigation, agriculture, hydroelectric powering and tourism. Additionally, the low-cost nature of these stations makes them more accessible and affordable for deployment in developing countries where resources for such technologies are limited.
Results / Impact / Lessons learned (what worked / remaining challenges)	● We have presented the planning and deployment of a wide range of wireless environmental sensors in the challenging scenario of a mountainous country. ● The sensors have been running for over a year and we can start gathering some insights from their behavior. ● The limited Cellular coverage was addressed by deploying LoRaWAN gateways, which proved well suited to satisfy the requirements of the current application, while their agnostic nature can be leveraged to provide additional services, like messaging in places devoid of cellular coverage or for people who cannot afford the associated recurring costs. ● The meteorological sensors installed are less expensive than traditional automatic weather stations (AWS) without significant compromises in accuracy. The deployment of river water level, soil moisture and tilt sensors also helps in mitigating environmental disasters effects. ● Data is stored inside the country, thus preserving privacy, but made available to international stakeholders with legitimate interest. Several international organizations have shown interest in deploying additional sensors of this type.

2023 PNMA Capacity Development Good Practices

Case CD01	School of Community Networks (SCN) – Indonesia Common Room Networks Foundation
Location:	Nationwide project in rural and remote places in Indonesia with these piloting locations: Ciptagelar indigenous village, Sukabumi Regency, West Java Province (Ongoing, 2019 - present); Ciracap Sub-district, Sukabumi Regency, West Java Province (Ongoing, 2020 - present); Pulo Aceh, Aceh Besar Regency, Aceh Province (Ongoing, 2021 - present); Ketemenggungan Tae, Sanggau Regency, West Kalimantan Province (Ongoing, 2021 - present); Mata Redi village, Central Sumba Regency, East Nusa Tenggara Province (Ongoing, 2021 - present); Tembok Village, Buleleng Regency, Bali Province (Ongoing, 2021 - present); Sukadana Village, North Lombok Regency, West Nusa Tenggara Province (Ongoing, 2021 - present); Hitu Messing village, Central Maluku Regency, Maluku Province (Discontinued, 2021 - 2022); Lapeo Village, Polewali Mandar, West Sulawesi Province (Discontinued, 2021 - 2023); Nimboran District, Jayapura Regency, Papua Province (Discontinued, 2021 - 2023); Bobong Village, Taliabu Island Regency, North Maluku Province (Ongoing, 2022 - present); Don Bosco Training Center, Southwest Sumba Regency, East Nusa Tenggara Province (Ongoing, 2023 - present); Ngata Toro indigenous village, Sigi Regency, Central Sulawesi Province (Ongoing, 2023 - present).
Time Frame:	First Phase (2019 - 2024): The School of Community Networks (SCN) training and capacity building program in Indonesia was officially launched in 2021 along with the development of community-centered internet infrastructure prototype in Ciptagelar indigenous village in 2019 and SCN training program preparation in 2020. Currently the SCN training and capacity building program in Indonesia is still ongoing and expanded to other rural areas and remote places in Indonesia.
Funding:	Association for Progressive Communications (APC), The Swedish International Development Cooperation Agency (SIDA), MEDCO Foundation, ASEAN Foundation, The Foreign, Commonwealth and Development Office (FCDO), the Information Society Innovation Fund (ISIF Asia), and Deutsche Gesellschaft für Internationale Zusammenarbeit GmbH (GIZ).
Responsible institutions / partners / people:	APC was in partnership with Rhizomatica to collaborate with Common Room and initiate Connecting The Unconnected: Supporting Community-led Approaches to Addressing the Digital Divide Indonesia (LocNet Project) in 2019. Subsequently, the initiative became integrated into the Digital Access Programme (DAP), led by FCDO in 2020. Later on, SCN training and capacity-building programs were also developed in collaboration with ISIF Asia by the end of 2021.
What is the problem?	Digital divide challenges in Indonesia are mainly faced with a number of issues, ranging from vast and diverse geographical conditions, insufficient supply of electricity sources, inadequate basic infrastructure, as well as significant disparities in bandwidth costs (both within and outside Java Island). This also includes unavailability of suitable and affordable devices, the inability to generate local content and knowledge, including the gender gaps and limited funding resources available to expand the internet outreach. In 2024, one in five Indonesians are still not connected to the internet. Data from the Indonesian Internet Service Providers Association (APJII) shows that the number of Indonesians connected to the internet in 2024 reached 221,563,479 out of a total population of 278,696,200 (79.50%). As the follow-up to this survey, it is estimated that 82.6% of the population in underdeveloped areas with total numbers around 8,114,273 users out of a total of 9,823,575 people already have internet access in 2024. Digital divide challenges in rural and remote places, as well as among underserved communities still persist, with the following gaps and disparities: Infrastructure and digital connectivity gaps; Skills and digital literacy gaps; Internet security and personal data protection issues; Adaptive digital access policies and regulations; Inclusive digital connectivity (Gender Inclusion, Disability and Social Inclusion - GEDSI).

Which were the actions taken to address the problem(s)?	Training and capacity building program through the School of Community Networks (SCN) in some rural and remote places in Indonesia. The training and capacity building program was developed with a user centered approach, started with participatory rural appraisal (PRA) method to conduct needs assessment and define the targeted beneficiary group. Apart from training and capacity building programs, the initiative was also enhanced with research and policy advocacy from rural, regional to national level that involves multistakeholder approach, ranging from local communities, civil society organizations (CSOs), government, academics, business sector, and technical community. SCN training and capacity building programs also consider 4 core elements, which include: (1) policy and regulatory frameworks, (2) internet safety and security protocols, (3) affordability, and (4) meaningful connectivity. At the technical level, the training and capacity building program was developed with 5L frameworks: ● Low Tech: technology chosen to build the community-centered internet infrastructure should be affordable and accessible at the local level. ● Low Energy: for those on limited power sources, community-centered internet infrastructure development should consider reliable and sustainable electric sources at the local level. ● Low Maintenance: internet infrastructure should be easy to maintain using locally available resources. ● Low Learning Curve: training modules and curricula should be easy to understand so that all members of the community can learn easily regardless of their technical and gender background. ● Local Support: importance of multi stakeholder approach and community engagement - the support from local stakeholders is also essential to develop, maintain, as well as to utilize the internet access and connectivity in rural and remote places. The SCN training and capacity building program was also enhanced with Rural ICT Camp, an annual event organized since 2020 aimed to support and consolidate ongoing effort to sustain community-centered internet access and meaningful connectivity in rural areas and remote places. This event facilitates policy dialogue, a series of workshops on technical skills for community-centered internet infrastructure and digital literacy, as well as arts and cultural events.
Results / Impact / Lessons learned (what worked / remaining challenges)	● Results: ○ The School of Community Networks (SCN) training and capacity building program has been developed in around 13 locations in 11 different provinces in Indonesia. The total number of participants involved was 891 people, consisting of 302 female and 589 male participants. ○ SCN program also able to develop 12 training module and curricula, ranging from (1) COVID-19 pandemic prevention protocols, (2) basic computer, (3) computer networking, (4) internet infrastructure, (5) managing community-centered internet services, (6) internet safety and security, (7) internet utilization for village administration, (8) remote education, (9) internet for SME development, (10) health service and telemedicine, (11) Internet of Things (IoT) and (12) disaster risk reduction (DRR). ○ Community-centered internet infrastructure prototyping has been successfully developed in Ciptagelar indigenous community village (2019) and Ciracap Sub-district (2020). Later on the prototype was expanded to other areas such as Ketemenggungan Tae (2022), Sukadana Village (2022), Mata Redi Village (2022), Tembok Village (2022), Pulo Aceh (2022), Nimboran District (2023), Don Bosco Training Center (2023), Bobong Village (2023), and Toro Village (2024). Some of the prototypes have been able to achieve an advanced level, while others are still in the development process. ○ In early 2023 the community-centered internet infrastructure development was also enhanced with bamboo towers for internet backhaul as an alternative solution for utilizing locally sourced materials and promoting the sustainable development of internet infrastructure in rural areas by addressing the environmental impact of the internet infrastructure. The bamboo tower prototyping was deployed in Buka Tanah Village (2022), Tembok Village (2022), Ketemenggungan Tae (2023), Ciptagelar indigenous village (2023), Don Bosco Training Center (2023), and Ciracap Sub-district (2024). ○ This program was also enhanced with a research and policy advocacy process. From 2021 until present, research and policy advocacy has delivered some policy brief documents, position papers, joint statements, and publications in academic journals.

	○ From 2020 until 2024, Rural ICT Camp has involved 2.268 participants, consisting of 1.076 female and 1.192 male participants from 13 SCN project locations in Indonesia, including national CSOs, and international participants. This also includes online participants from 35 different provinces in Indonesia. ○ Recently the SCN training and capacity building program was also integrated with climate adaptation and mitigation programs while deploying weather stations in some SCN project locations to collect microclimate data to increase knowledge and awareness about climate change, as well as to increase climate resilience at the local level. ● Impact: ○ This initiative has been able to map and identify the digital divide challenges in Indonesia; ○ The project has been able to increase recognition and visibility of community-centered meaningful connectivity initiatives in Indonesia; ○ The project has been able to introduce and identify various community-centered internet service governance model, as well as to implement and develop them with diverse and contextual approach; ○ SCN training and capacity building program has been actively engaged in the development of peer-to-peer learning ecosystem; ○ Provide and facilitate a space for policy dialogue, as well as multi-stakeholder collaboration involving government representatives, civil society organisation (CSO), the business sector, academic institutions, technical communities and communities in rural and remote areas. ● Lessons learned: ○ SCN training and capacity building program is a long-term effort that needs to be developed gradually and sustainably; ○ Internet technology is not rocket science. But it still requires contextual approaches and training techniques in terms of capacity building for rural and remote communities who have never interacted with computers and digital technology; ○ Community engagement can be built if the shared interests and common needs of local communities can be met through the development and utilization of community-centered internet infrastructure; ○ Acceleration can occur through collaboration with the village government and local stakeholders who share the same vision and interests, in addition to having the knowledge to integrate community-centered internet infrastructure into rural development, including other needs such as job creation, economic empowerment, disaster risk reduction (DRR), climate change adaptation and mitigation, etc; ○ Technology transfer in rural communities cannot happen in a hurry. It requires a gradual process with hands-on learning through a human-centered approach; ○ Determination of location and beneficiaries needs to be articulated through a thorough survey and needs assessment that directly involves local communities; ○ There are several SCN locations that failed and could not be continued due to several technical constraints, including transparency and accountability issues. To sustain community-centered internet infrastructure, long-term commitment that includes transparency and accountability is crucial. Ongoing efforts to develop community-centered internet infrastructure can also be improved and refined by learning from failures; ○ In order to sustain community-centered connectivity in underserved areas, a diverse, flexible and responsible funding support is needed; ○ In regards to the development and utilization of community-centered internet infrastructure in underserved areas, local adaptation and contextualization is required to meet the needs and technical challenges in addressing diverse geographic and social contexts; ○ Ongoing efforts are needed to mitigate and anticipate potential conflicts, in addition to anticipating the impact of technological disruption on the local values and traditions among rural and remote communities, including to anticipate the unintended consequences of internet and digital tech adoption such as the spread of hoax news, disinformation, misinformation, online gender-based violence, etc.

Case CD02	Towards an Enabling Policy Environment for Sustainable Community Telecommunications (2024)
Location:	The Americas. Facilitated from Mexico. All OAS member states invited.
Time Frame:	2024 (first edition). January-March (11 weeks)
Funding:	APC covered the costs for transferring content to the OAS learning platform.
Responsible institutions / partners / people:	CITEL partnered with Rhizomatica and APC to embed the program as part of PCC1 2024 training and invite all CITEL members. APC covered platform content costs and several of APC and Rhizomatica collaborators were guest speakers.
What is the problem?	Regulation as a barrier to local models of connectivity; urban-rural digital divide; old paradigms for new technologies
Which were the actions taken to address the problem(s)?	An online training program for regulators and policymakers in Latin America and the Caribbean where paradigms of regulation are reviewed, myths unveiled, and collectively we build an enabling policy and regulation framework for meaningful access to connectivity.
Results / Impact / Lessons learned (what worked / remaining challenges)	Results: ● 35 trainees admitted, from 153 applicants from 12 LAC countries. ● 12 received their certificate of completion. Impact: ● Methodology to help them identify bias, dated paradigms, myths or legacy regulation that hinders inclusion and how to revert that thinking, has proved to be a success. ● Training sessions like this help regulators think out-of-the-box, unlearning myths that are not fit for purpose; act really for the public interest. Know that many colleagues face the same challenges and succeed when doing things differently if using the correct information and methodology. ● Too soon to tell if regulators will put in practice what they learned here. Lessons learned: ● Chatham House Rule worked great to create a circle of trust. Hands-on exercises of analytical thinking, create their own roadmap to inclusion, diversity of group, speakers and facilitators. Tutoring is intense in time. Daily feedback is key and deadlines so no one lags behind. Live webinars (1/unit) were fundamental and we all learned from peer experiences and diverse ways of thinking. ● Admit around 50 as only 50% or less will complete the program. ● Only for regulators, policy makers, law makers, not aimed at community network advocates/reps, but one or two may be guest speakers. ● Book guest speakers far in advance so that all webinars may be calendarized since day 1 of training.

Case CD03	Central American Training Programme in Telecommunications and Broadcasting
Location:	Central America (Guatemala, El Salvador, Belize, Costa Rica & Panamá)
Time Frame:	Two years, one year ongoing
Funding:	● CLUA (Climate and Land Use Alliance) ● Open Society
Responsible institutions / partners / people:	● Escuela Mesoamericana de Liderazgo ● Red Centroamericana de Radios Comunitarias Indígenas ● Alianza Mesoamericana de Pueblos y Bosques ● Cooperativa Sula Batsú ● Redes por la Diversidad, Equidad y Sustentabilidad A.C. ● Rhizomática
What is the problem?	Insufficient technical and organizational capacity building for establishing and sustaining community-centered connectivity and own communication projects in rural and indigenous communities in Central America.
Which were the actions taken to address the problem(s)?	Development of a training program for capacity building in rural and indigenous communities in Central America, focusing on sustaining community-centered connectivity efforts and advocating for the necessary regulatory changes for their recognition.
Results / Impact / Lessons learned (what worked / remaining challenges)	Results: ● Completion of four in-person modules focused on community communication, electricity, community networks, participatory content creation, broadcasting, and sustainability, held in El Salvador, Guatemala, Costa Rica, and Belize. ● Culmination of three virtual sessions focusing on the themes: legal framework and self-determination of indigenous peoples, digital security and critical vision of social networks. Impact: ● Strengthening a network of individuals, organisations and collectives working to strengthen community-centred connectivity projects in Central America. ● Bring visibility to the issues and challenges for community-centred connectivity and communication projects by indigenous communities in Central America. ● Generate alliances for the transformation of regulatory frameworks to facilitate the creation of community-centred communication and connectivity projects. Lessons learned: ● The importance of generating processes of encounter and capacity building with indigenous communities in Central America. ● Major challenges in Central America in terms of regulation and policy, almost entirely designed for large companies. ● Challenges in terms of infrastructure in order to have better connectivity conditions in rural and indigenous communities.

Case CD04	Community Networks Training Program
Location:	23 countries in LAC (Latin America and Caribbean) Region
Timeframe:	2023, 2024
Funding:	Internet Society Foundation
Responsible institutions / partners / people:	● ISOC Foundation ● Inter-American Telecommunication Commission (CITEL)
What is the problem?	● Training requirements in rural communities ● Lack of awareness among policymakers ● Specifics (if any) ○ Community networks need holistic approaches, including technical components on affordable technologies, community engagement, and financial sustainability issues. ○ Policymakers need to be trained in similar programs to create awareness among them, so they can provide a positive influence to authorities.
Which were the actions taken to address the problem(s)?	● ISOC and CITEL decided to improve a program that started back in 2017, originally designed to train participants from the LAC region in the course: "Building Wireless Community Networks" ● In 2023 the program included two courses: Building Wireless Community Networks, and Community Networks Readiness Assessment. Each of them has a duration of 6 weeks. The same approach was conducted in 2024. ● The main audience for the course were participants from American member states, belonging to ICT government agencies and regulator offices. Some other participants came from civil society, involved in Community Networks projects.
Results / Impact / Lessons learned (what worked / remaining challenges)	Results: ● Two training programs with two courses each during 2023 and 2024 ● More than 500 hundred participants completed the program, most of them senior professionals and middle and high-level authorities in government ICT offices such as Telecommunication Agencies and regulators. But also individuals in charge or related to Community Network deployment projects. ● Participants came from more than 20 countries in the LAC region. Impact: ● Positive influence and awareness among government officers, policy, and decision-makers, about the importance of Community Networks as an alternative for affordable connectivity solutions for rural areas. ● Training content going beyond technical components and including community engagement and sustainability strategies. Lessons learned: ● Aiming for this kind of audience promotes Community Networks as an important approach for advancing into Universal and Meaningful Access. ● The practical component is critical to achieving skills development among participants, so practical face-to-face activities should and will be included as part of the training programs.

Table 1	ITU-D: ICT Promoting and Measuring Universal and Meaningful Connectivity
Location:	Global
Funding:	EUR 3 million funding from the EU Global Gateway Program from May 2023 to May 2026
Responsible institutions / partners / people:	ITU-D/DKS/IDA (ICT Data and Analytics Division)
What is the problem?	Depriving vast swaths of humanity from the possibilities offered by the Internet is costly, deepens inequalities, and undermines development. Over the past 30 years, the number of Internet users surged from a few million to 5.5 billion. Yet the potential of the Internet for social and economic good remains untapped: one third of humanity remains offline, and many users only enjoy basic connectivity. Multiple digital divides persist across and within countries, between men and women, between youth and older persons, between cities and rural areas, between those who enjoy a fibre connection and those who struggle on a spotty 3G connection. UMC is the new imperative. To maximize its impact on society and the economy, digital connectivity must be universal and meaningful. "Universal connectivity" means connectivity for all. "Meaningful connectivity" is a level of connectivity that allows users to have a safe, satisfying, enriching, and productive online experience at an affordable cost. The two dimensions are complementary: neither universal connectivity with poor quality nor meaningful connectivity for the few will yield significant, society-wide benefits. At the same time, the two dimensions obviously reinforce each other: more use can lead to more meaningful connectivity, and vice versa.
Which were the actions taken to address the problem(s)?	ITU and the European Commission (EC) have joined forces in the context of a project on "Promoting and Measuring Universal and Meaningful Digital Connectivity", funded by the European Union. Through advocacy at the global, regional, and country levels, the project aims to mainstream UMC and encourage countries and their partners to adapt their digital strategy from a narrow focus on infrastructure to a holistic approach that includes the other enablers of connectivity. The project will monitor and report on progress towards achieving the UMC targets. It will enhance the statistical capacity of countries to measure various aspects of UMC with greater accuracy, timeliness, and granularity. The project will also identify best practices and policy recommendations to accelerate progress towards UMC. Four work streams are being implemented. **Advocacy:** ● Sessions in UN system events, World Telecommunication Indicators Symposium (WTIS), G20, IGF, and other global and regional events ● Mentions of UMC in Global Digital Compact ● G20 Guidelines on Measuring UMC ● Creation of digital communication assets, social media campaigns **Data collection and dissemination:** ● Aspirational targets for the UN SG Roadmap on Digital Cooperation ● UMC website, including a UMC Dashboard ● Online course on the collection and use of UMC indicators (in partnership with ITU Academy) ● Manual on ICT price basket statistics ● Exploratory use of secondary data sources to support UMC measurement **Capacity building:** ● 8 regional workshops for users and producers of UMC statistics ● A dialogue between users and producers of statistics. ● A solid understanding of the concept of universal and meaningful connectivity. ● Greater awareness of the critical role of data in policymaking and the ability to advocate for investment in data infrastructure and capabilities. ● Improved capacity to produce reliable data on UMC.

	Evidence-based research on effective interventions towards achieving UMC: ● Global Connectivity Report ● Regional and thematic analyses
Results / Impact / Lessons learned (what worked / remaining challenges)	**Results:** ● More than 200 professionals from around 110 countries' National Statistical Offices, ICT Ministries, and regulators have been briefed about the UMC policy principle and its measurement. It has been also communicated at international fora of statisticians, policymakers, diplomats, humanitarian NGOs. ● Contacts between users and producers of ICT statistics to monitor progress towards UMC have been strengthened. ● Guidelines for the statistical measurement of UMC have been established by joint work of the Brazilian G20 Presidency and the ITU, publicly available in the project webpage. **Lessons learned:** ● There is a need for sustainable dialogue between users and producers of ICT statistics at the national level, including on the financial resources that should be devoted to the activity. ● Focusing the measurement debate in low-dimensional, composite indicators hides the many inequalities of meaningful connectivity within countries, as well as the different paths towards UMC that countries may adopt. Instead, a rich multivariate set of indicators covering the different dimensions of UMC can help better identify policy alternatives. **Remaining challenges:** ● A significant number of developing countries have weak statistical systems and low levels of connectivity. This is a vicious circle where lack of data hampers the design of efficient policies towards UMC. ● The lack of skilled staff and financial resources are barriers to statistical development. There is no earmarked international funding for statistical systems on UMC.

2024 Updates	
Has the problem been solved?	● The problem of lack of statistical capacity is persistent in developing countries. This affects not only the capacity for producing, but also of using statistics. ● The problem of lack of meaningful connectivity is not directly addressed by the project, except indirectly by improving the evidence base for digital policies.
Did any new problems emerge during implementation?	Problems during the implementation are related to management issues unrelated to the problem that the project addresses.
Do 2022/2023 solutions still work to tackle the problem? New solutions needed to be developed?	n/a
Was the solution scaled or localised to other regions? If so, please share examples	n/a
New milestones:	n/a
New challenges:	The adoption of the Global Digital Compact by the UN opens an opportunity window as it sparks demand for ICT data for its monitoring and includes a commitment to strengthen the corresponding statistical systems. However, the financial resources much needed to implement household surveys on access and use of ICT – the scarcest source of data to monitor progress towards UMC - are not yet identified.
Lessons learned:	see above
Next steps:	● Geographical extension of the project to Western Balkans, Georgia, Moldova and Ukraine ● Strengthening the communication and research activities of the project

2024 PNMA Intersectional Work / Collaboration Streams - ICANN

Table 2	ICANN: Coalition for Digital Africa (2024 update)
Location:	1st Phase: 10 countries; 2nd Phase: 20 countries
Timeframe:	Started in 2022
Funding:	ICANN - budget n/a
Responsible institutions / partners / people:	• ICANN • ITU • Africa Telecommunications Union (ATU) • Africa Top Level Domain Organization (AFTLD) • Association of African Universities (AAU) • Africa Network Operators Group, • Internet Society (ISOC) • Africa Computer Emergency Response Team (AfricaCERT) • Network Startup Resource Center (NSRC) • Association Française pour le Nommage Internet en Coopération (AFNIC) • Associação de ccTLDs de língua portuguesa (LusNIC) • Smart Africa • Commonwealth Telecommunications Organisation • Lawyers Hub
What is the problem?	The Coalition for Digital Africa, initiated by ICANN, addresses key challenges in Africa's digital transformation while harnessing its immense potential. Despite significant progress, with a growing $115 billion digital economy and increasing Internet adoption, Africa's Internet penetration remains at 43%, well below the global average. The Coalition brings together regional and global partners to enhance Internet accessibility, security, and multilingualism while fostering Africa's participation in global Internet governance. By strengthening infrastructure and promoting collaboration, the initiative seeks to bridge digital divides, support sustainable growth, and empower Africa's dynamic and rapidly evolving digital ecosystem.
Which were the actions taken to address the problem(s)?	Launched in December 2022, the Coalition focuses on three key areas: • **A Robust DNS**: Strengthening the Internet infrastructure in Africa by enhancing the security, stability, and resiliency of the DNS. • **Meaningful Connectivity**: Promoting multilingualism and fostering local content development across the continent. • **Capacity Development**: Building skills and knowledge within Africa's workforce to enable greater participation in multistakeholder Internet governance processes. In partnership with governments and local stakeholders, ICANN has implemented numerous activities aligned with its core mandate of improving the security, stability, and resiliency of the Internet, managing unique identifiers, and developing capacity in DNS management. **Initiatives Implemented** • **Capacity Development for Country Code Top-Level Domain (ccTLD) Registries** Training and mentoring was provided to 10 African ccTLD registries to enable them to operate more effectively in the domain industry. The project partners include ICANN, AFNIC, AFTLD, ITU, and NSRC. This project was announced during the World Telecommunication Development Conference in Kigali in June 2022 in the context of the ITU's Partner2Connect roundtable. • **ICANN Managed Root Server (IMRS (L-Root)) Infrastructure** The Coalition is committed to expanding the L-Root (IMRS) infrastructure to contribute to a more stable and resilient Internet in Africa. The coalition received expressions of interest for organizations interested to host an L-Root Single, a single-server "appliance". • **Universal Acceptance Readiness in Academic Institutions**

	ICANN is partnering with the AAU to encourage higher education institutions to include UA in their academic curricula and have their systems fully compatible with UA. ICANN provides specialized training, workshops, and educational material to AAU and its members to increase institutional expertise on UA matters. ● **2023 Africa Domain Name Industry Study** This study leverages the methodology of the 2016 Africa DNS Study and examines the current realities of the African domain name industry landscape. The outcomes help inform the coalition of future growth opportunities and development. The study, commissioned by ICANN, was conducted by PowerSoft Africa. ● **DNS Security Extension (DNSSEC) Roadshows** This initiative aims to increase DNSSEC adoption and deployment in 15 countries in Africa through awareness building and capacity development. The roadshows will encourage DNS operators, registries, and registrars in select countries to implement and deploy DNSSEC, while working with network operators to turn on DNSSEC validation. This effort will include the development of an enhanced DNS resource portal for Africa. ● **Internet Exchange Points (IXP) Development in Africa** ICANN is supporting ISOC's efforts to strengthen peering in the region by developing IXPs and interconnection across the continent so that the Internet is cheaper, faster, and more resilient for African users. ISOC is leading the implementation of this project, which supports activities to help the IXPs improve their services and infrastructure. ● **Internet Governance Capacity Development for Governments and Lawmakers** Strengthening the African Internet ecosystem by assisting governmental bodies in understanding the technical functioning of the Internet, especially the DNS. Launched earlier this year in partnership with Smart Africa and collaboration from the African Parliamentary Network on Internet Governance (APNIG). ● **ICANN's Service Level Agreement Monitoring (SLAM) System** Expansion and enhancement of the SLAM system in Africa by deploying monitoring two probe nodes, in addition to an existing node in Johannesburg, South Africa. Improvements have enabled these nodes to meticulously monitor support of both IPv4 and IPv6 transport for the Registration Data Directory Service (RDDS) and DNS services provided by TLD registry operators.
Results / Impact / Lessons learned (what worked / remaining challenges)	Key accomplishments to date: ● Deployment of **two L-Root (IMRS) installations**, in Kenya (November 2022) and Egypt (October 2023), enabling 80% of Africa-based Internet DNS root queries to be resolved within the region for improved resiliency and stability. ● **Extension of the SLAM system** with new monitoring probe nodes in Lagos, Nigeria, and Cairo, Egypt.. ● **Strengthened three IXPs in Benin, Malawi, and Rwanda**, allowing them to enhance their technical infrastructure and local capabilities.. ● **DNSSEC deployment for Botswana** (.bw) in May 2024. ● Published the **2023 Africa Domain Name Industry Study and Trial Observatory**. ● ICANN and Smart Africa MoU to boost Internet governance across Africa ● In 2024, capacity development for 58 African parliamentarians (23 from 15 countries attended in-person) These efforts have bolstered Africa's DNS infrastructure, enhanced local Internet services, and increased stakeholder participation in ICANN's policy processes.

Table 3	Digital Inclusion with the Universal Acceptance of Internationalized Domain Names
Location:	Global
Timeframe:	Since 2009
Funding:	n/a
Responsible institutions / partners / people:	Internet Corporation for Assigned Names and Numbers (ICANN) Organization and Community
What is the problem?	● Many people around the world are currently excluded from experiencing the full benefits of the Internet simply because they are unable to use a domain name or email address of choice in their language and script. ● Internationalized Domain Names (IDNs) are domain names in local languages or scripts. IDNs allow organizations, governments, and businesses the ability to reach citizens and consumers in their native language or script. ● Based on protocol set by Internet Engineering Task Force (IETF), ICANN and its community have worked to make IDN labels available at the second level of domain names since 2003, and IDN Top-Level Domains (TLDs) since 2009. ● However, many software applications do not recognize or appropriately process them, e.g., by not automatically linking IDNs or not allowing a user to register for an app with an email address in local language. ● This issue is called Universal Acceptance (UA), and many Internet-enabled applications, devices, software and systems have not kept up with changes in the Domain Name System and are not UA-ready. ● Becoming UA-ready ensures that all valid domain names and email addresses, regardless of script, language, or character length, can be used seamlessly by all Internet-enabled applications, devices, and systems. ● UA is essential for meaningful access to the multilingual Internet.
Which were the actions taken to address the problem(s)?	ICANN and its community are committed to supporting a digitally inclusive and multilingual Internet by enabling domain names in local languages and scripts, which requires UA-readiness. ICANN has worked with the community for this purpose: ● Delegating both country code TLDs and generic TLDs. ● Creating awareness of IDNs and the need for UA globally. ICANN has supported the Universal Acceptance Steering Group, a focused community initiative to promote UA, since 2015. ICANN also supports the UA Committee of the Country Code Name Supporting Organization and IDN Working Group of At-Large Advisory Group. ● Organizing UA Day on or around 28 March each year since 2023, to develop capacity in addressing UA challenges. ● Interacting with both the open-source software maintainers and technology organizations, encouraging them to make their software applications UA-ready, and providing the technical documentation they need to accomplish that. ● Promoting integration of IDNs and UA topics in the technical curricula of the universities. ● The next round of generic TLDs will continue to expand the DNS and give new opportunities to billions of people to access a multilingual Internet in their language or script.
Results / Impact / Lessons learned (what worked / remaining challenges)	● Results: ○ A total of 151 IDN TLDs have been delegated since 2010, in 37 languages and 23 scripts, with millions of IDNs registered for use around the world. ○ UA Day is raising awareness of IDNs and UA. For UA Day 2024, 52 events were organized in 47 countries and territories, attended by more than 6500 people. ○ Many open-source communities and technical organizations are now supporting domain names and email addresses in local languages and scripts.

	○ Universities are evaluating the integration of IDN and UA concepts in their technical curricula. ● Impact: ○ Achieving UA is enabling important economic and social benefits by allowing multilingual Internet users to access and connect to businesses, e-commerce and local communities, as well as embrace cultural traditions. ● Lessons learned: ○ Awareness of IDNs and UA is a key towards adoption. ○ Adoption of IDNs, and their UA, requires collaboration of and concrete measures from many stakeholders, including the domain name industry, software technology organizations, open-source communities, public sector, and academia. ○ Sustainable capacity development is needed to enable software professionals to acquire skills to build UA-ready applications.

2024 PNMA Intersectional Work / Collaboration Streams – UN DESA

The United Nations Department of Economic and Social Affairs (UN DESA) serves as a central entity within the United Nations system, dedicated to advancing sustainable development globally. Its mandate includes fostering international cooperation on economic, social, and environmental issues, delivering policy analysis, and supporting Member States in achieving the 2030 Sustainable Development Goals (SDGs).

Within UN DESA, the Division for Public Institutions and Digital Government (DPIDG) plays a pivotal role in leveraging digital transformation to support sustainable development. Through its work, including the production of the United Nations E-Government Survey, DPIDG aids Member States in enhancing digital governance, fostering digital inclusion, and building capacities to harness technology for development.

The UN E-Government Survey, now in its thirteenth edition (2024), evaluates the digitalisation of public administration across all 193 Member States, providing valuable insights and benchmarking opportunities. The Survey highlights areas of progress, such as increased investments in resilient infrastructures, while also identifying regions facing persistent digital divides that need to be addressed to meet global targets for digital government transformation.

The Survey offers a model framework to guide Member States in planning, implementing, and assessing their digital government initiatives. Evaluations cover both national and local levels, supported by toolkits designed to facilitate these processes. Additionally, the Survey encourages Member States to contribute success stories to a public compendium, fostering information exchange and collaboration.

A detailed repository of selected projects and best practices from the 2024 Survey, including national and local examples, is enclosed. These cases provide valuable insights into effective strategies and innovative approaches for digital transformation.

Table UN DESA Focus Area	Case Study	Summary	Source Link
Connectivity	Canada's Agile Digital Government Strategy	Canada’s 2022 Digital Ambition focuses on agile development to adapt to evolving citizen expectations the digital age.	https://www.canada.ca/en/government/system/digital-government/digital-ambition.html
Connectivity	GovTech Singapore’s Cloud Adoption (GovCloud)	Over 70% of Singaporean government systems utilize unified platform for enhanced observability and securi in the cloud.	https://www.tech.gov.sg/
Connectivity	Thailand’s Government 4.0 Initiative	Thailand's framework encourages government agencie to embrace digital transformation, monitored by national KPIs and incentivized by the Public Sector Management Quality Award 4.0.	https://www.opdc.go.th/
Connectivity	Africa’s Digital Transformation Strateg (2020–2030)	Spearheaded by the African Union, this strategy accelerates sustainable development through digital innovation, infrastructure, and policy frameworks aligned with SDGs.	https://au.int/en/overview
Connectivity	Nigeria and Ethiopia’s National Digital Identity Systems	EA partners with governments to enhance digital identity systems, streamlining access to services and reducing fraud.	https://www.itu.int/en/ITU-D/
Digital Inclusion	France’s Digital Republic Act	Mandates full accessibility of public sector websites b 2025, guided by standards like WCAG 2.0/2.1.	https://www.gouvernement.fr/en/the-digital-republic-ac
Digital Inclusion	Bangladesh’s Smart Business Profile Platform (SBPP)	Connects MSMEs with financial institutions to addres the $3.1 billion financing gap through streamlined digital services.	https://www.un.org/development/desa/
Digital Inclusion	Australia’s Be Connected Initiative	Targets digital inclusion for older citizens by enhancin access to public services.	https://www.beconnected.esafety.gov.au/
Digital Inclusion	China’s Multilingual Digital Platform	Beijing Service offers digital resources in eight languages to support expatriates and businesses, enhancing accessibility.	http://www.beijingservice.gov.cn/

Table UN DESA Focus Area	Case Study	Summary	Source Link
Capacity Developmeı	Tony Blair Institute Digital Academy	Strengthens digital skills for public sector staff in African nations like Ghana and Senegal, advancing government digitalization.	https://institute.global/
Capacity Developmeı	Policy and Regulation Initiative for Digital Africa (PRIDA)	Provides spectrum harmonization, governance frameworks, and stakeholder training for over 1,500 Africans in digital policy.	https://prida.africa/aboutus/
Capacity Developmeı	Costa Rica's Digital Governance Roadmap	EA helped define a national interoperability model through training and technical support for 12 government institutions.	https://www.eap.gov/
Capacity Developmeı	Japan's Digital Garden City Initiative	A $42 billion initiative to develop 5G, smart agriculture, and digital healthcare, fostering local innovation.	https://www.digital.go.jp/
Capacity Developmeı	New Zealand's Digital Strategy for Aotearoa	Builds an inclusive digital society by improving connectivity, digital literacy, and participation in the digital economy.	https://www.digital.govt.nz/

2024 PNMA Intersectional Work / Collaboration Streams – UNESCO-IFAP

Despite the transformative potential of digital technologies, 2.6 billion people still remain offline. Among them, women, girls, and vulnerable populations are disproportionately affected. Furthermore, 1.2 billion persons with disabilities must be included in our digital strategies to ensure equitable access.

Digital technologies shape our lives and economies. Yet, for many women and girls in marginalised communities, the lack of digital connectivity exacerbates inequalities. IFAP's - Information for All Program of UNESCO - grass-roots efforts seek to reduce digital literacy disparities, ensuring that everyone can access and utilize these tools to their full potential.

IFAP has updated its Strategic Plan for 2023-2029 to address the pressing challenges of our time. This plan prioritises bridging digital divides and promoting inclusion for women, girls, rural communities, and persons with disabilities. It ensures all individuals can create and access digital and AI-driven content in their local languages. By addressing inequalities both within and between countries and communities, IFAP aims to build inclusive, equitable, and sustainable knowledge societies.

A recent survey[1] from the Global Digital Inclusion Partnership (GDIP) of over 6,000 women in India, Mozambique, Nigeria, and the Philippines revealed the significant barriers they face in achieving meaningful connectivity, such as the lack of affordable high-speed internet and suitable devices. As emerging technologies like AI and quantum computing rapidly evolve, UNESCO calls on all partners to empower Member States and stakeholders in crafting policies that promote inclusive, equitable and sustainable digital societies. These policies must balance opportunities with the ethical and societal risks posed by these technologies.

IFAP actively addresses these gaps. Through collaborations with the International Federation of Library Associations and Institutions (IFLA), we have developed policy briefs on leveraging digital technologies while mitigating risks. In India, IFAP's project empowered 265 rural women with digital skills through the "Swawlamban" program. In Georgia, 60 women - including Ukrainian refugees - mastered digital technologies through targeted training. In Iran, women participants of IFAP training now proficiently use digital tools, exemplifying the transformative power of inclusive interventions.

Three main points of consideration for IFAP's policy development are

- Embrace everyone: digital technologies shape our lives and economies. In today's world, it is critical to ensure that everyone can learn how to use these new tools for receiving and creating information, especially women and girls living in marginalised communities.
- Do not forget the gender gap: the COVID-19 pandemic revealed that digital disparities are more likely to leave women at risk of disconnection. The lack of digital connectivity for women is exacerbating existing inequalities and restricting access to crucial digital resources.
- Work with them, where they are: IFAP is taking up the challenge and working on the ground to reduce gender and divide digital literacy disparities.

[1] Connected Resilience: Gendered Experiences of Meaningful Connectivity through a Global Pandemic. Global Digital Inclusion Partnership (GDIP), March 2024.

2024 PNMA Intersectional Work / Collaboration Streams - UNHCR

Connectivity is a lifeline for refugees. For the UN High Commissioner for Refugees - UNHCR, it is vital that forcibly displaced and host communities have accessible and affordable connectivity to support their digital inclusion, so that they can access increasingly digital humanitarian services, and so that they can use the internet for whatever they choose. It is equally vital that the humanitarian community has the connectivity it needs to transform digitally and to meet the needs of the communities they serve.

While connectivity is a matter broader than humanitarian response or UNHCR's own work, the agency acknowledges its importance in its 2022 Digital Transformation Strategy. This document committed UNHCR to:

- Gather baseline data on connectivity needs and enhance the mapping network availability;
- Develop stronger relationships with the private sector to deliver sustainable connectivity solutions;
- Strengthen links with development finance to ensure inclusion of forcibly displaced people in large scale infrastructure investment supported by development banks and multilateral organisations;
- Explore innovative and transformative models of extending connectivity in hard-to-reach refugee-hosting areas;
- Coordinate connectivity in emergency preparedness and response.

Work is ongoing within UNHCR to meet these commitments - much of it is taking place under the umbrella of the multistakeholder Connectivity for Refugees Initiative, which is co-convened with the GSMA, ITU, and the Government of Luxembourg.

Table 4	**Connectivity for Refugees Initiative (CfR)**
Location:	CfR is a global initiative currently prioritising 15 countries across multiple continents.
Timeframe:	CfR was launched in 2023 and will run until 2030, aiming to advance the availability and affordability of connectivity for 20 million forcibly displaced people and the communities who host them.
Funding:	CfR currently receives direct funding from the Governments of Luxembourg and Spain, as well as from Cisco. Indirect funding is also provided from CfR initiative partners.
Responsible institutions / partners / people:	CfR was founded and convened by UNHCR, ITU, GSMA and the Government of Luxembourg in 2023, as a multi-stakeholder pledge at the Global Refugee Forum. Through the Global Refugee Forum (GRF) process the initiative expanded its base of supporters and implementers, including the Government of Spain and Cisco. Other stakeholders are invited to support the work of the initiative in any way they can.
What is the problem?	Connectivity has never been more critical for people forced to flee. It supports access to potentially life-saving information, as well as education, livelihoods, leisure and hobby activities, and enhanced humanitarian protection. Forcibly displaced people are articulating, with urgency, the importance of connectivity as a basic and fundamental need and a right. However, refugees and the communities who host them are often disproportionately excluded from accessing connectivity services. This could be due to their rural locations having limited network access, poor financial resources pricing them out, restrictive regulatory environments, and much more. Whilst there have been several discreet initiatives supporting connectivity access for refugees and those who host them over the years, there has not been, until now, a global concerted effort to shift this at a systematic level.
Which were the actions taken to address the problem(s)?	To start with, the initiative was launched as a multi-stakeholder pledge within the auspices of the 2023 Global Refugee Forum, galvanizing commitments from a range of stakeholders around the world from multiple sectors. The initiative has grown into a delivery focused multi-stakeholder and cross-sectoral initiative, currently prioritizing interventions in 15 countries around the world, as well as global policy and influence interventions. At a country level, the initiative is working in partnership with a range of in-country stakeholder partners to develop evidence backed country plans which will expand the availability and affordability of connectivity services in refugee hosting areas. Going forward, from 2025 dedicated Connectivity for Refugees Coordinators will be recruited in a number of UNHCR offices to support project delivery and coordination amongst local stakeholders. At a global level, the initiative is working with range of global partners to continue advocating in key fora on the importance of connectivity in situations of forced displacement, to share lessons and evidence around successful approaches, coordinate amongst global stakeholders with an interest in this issue, and to support with connectivity responses to future displacement emergencies. Going into 2025, CfR will be seeking to expand the network of initiative partners.
Results / Impact / Lessons learned (what worked / remaining challenges)	At the Global Refugee Forum in 2023, the initiative solicited 55 pledges from 25 entities to take action in support of connectivity for refugees. This included pledges from the private sector, academia, non-profit organisations and 10 member states. The work of the initiative and its programming is still nascent, with major impact and results expecting to be identified in future years. The programming is building on the lessons learned from many years of focus on these topics by all of the initiative partners, and future lessons will be incorporated in public outputs.