The Challenge of "Connecting the Next Billion"

IGF Intersessional Contribution - Policy Options for Connecting the Next Billion

Microsoft

Introduction

The challenge of "Connecting the Next Billion" is pressing for the entire global community. There has been a lot of progress over the last 10 years: the number of Internet users has tripled to approximately 3 billion, and the number of Internet users from the developing world has increased by nearly two thirds; but much more remains to be done. There is the other half of the world's population to bring online, and to fully realize the benefits of an Information Society, we must expand our focus from connectivity to the socio-economic benefits that can be realized with that connectivity. Access is not, after all, an end in itself, but an avenue to improve quality of life.

As part of Microsoft's mission to "empower every person and every organization on the planet to achieve more," we are focused on creating innovative ICT solutions and initiatives that are inclusive, and help to realize the full potential of peoples around the world, while enabling sustainable social and economic development through partnerships with local business, governments, civil society, and others. By "ICT," we don't just mean the technology, but a more holistic, layered framework to bridge the digital divide. This includes two key components:

1) affordable and universal access to broadband services and the Internet; and
2) local capacity building to enable adoption, production, and consumption of localized content and services.

Microsoft is actively engaged in many projects globally to realize both of these goals – a few of which will be shared in this contribution. These case studies show how partnerships with a broad set of stakeholders (public, private, local, and international) have the best chance to succeed and make progress in expanding access to the Internet, promoting sustainable and inclusive economic development, building local capacity, and empowering citizens. When considering policy options, multistakeholder approaches are manifestly invaluable.

Benefits of Multistakeholder Partnership

The case studies below demonstrate how innovative solutions that bring real socio-economic results can be developed and deployed more effectively through multistakeholder cooperation, and benefit all parties, including national governments and local communities. Examples of these outcomes include:

- government ministries developed new means to deliver services and achieve national policy goals, including a greater ability to respond to challenges like rural healthcare delivery and natural disasters;
- government regulators gathered more data to inform policymaking to increase broadband access and ICT capacity;

- local communities realized enhanced connectivity, gained more disaster-resilient communication infrastructure, increased the quality of schools, increased access to health services, and improved access to information and services for disabled persons; and
- local students and ICT professional improved their skills and capacity to develop solutions and services that benefit their local communities, created new small businesses, and enhanced their competitiveness in the global economy.

These experiences demonstrate that private sector expertise and innovation can be harnessed by governments to achieve policy goals, while government support and collaboration can also expedite the development and deployment of new solutions by the private sector. Flexible solutions and different combinations of stakeholders allow more effective adaptation to the needs of local communities. Building partnerships inclusive of local actors also facilitates the process of capacity building and the development of indigenous ICT capacity. Achieving higher levels of productivity and diversification, and facilitating the North-South, South-South, and triangular cooperation for technology transfer called for by the United Nations in current proposals for Sustainable Development Goals (SDGs) 8 and 17, can best be achieved through such multistakeholder approaches. Further linkages between such policy approaches and other relevant UN SDGs are referenced throughout this contribution.

Philippines – TV White Space Project

In both the Philippines and elsewhere around the world, there exists unused TV band spectrum (essentially unused TV channels) that can be used for a range of wireless applications, including broadband access. Commonly referred to as TV White Space (TVWS), innovative use of this spectrum has the potential to provide the last mile of connectivity to millions worldwide, especially in rural areas where other forms of communications infrastructure may not exist or lack affordability. The Philippines' TVWS project presents an innovative way to deploy this new technology, provide affordable connectivity to remote communities, and support disaster resilience. The Philippines project is currently the largest active TVWS project in Asia.

In part because of challenging topography, communities in the Bohol province suffer from poor last-mile infrastructure, a gap which leaves dozens of schools and communities without access. Existing infrastructure deficits are exacerbated by natural disasters, several of which have occurred in the region recently.

Partners for TVWS in the Philippines

In order to plan, finance, and implement the projects above, a wide variety of stakeholders have contributed financial support, hardware, manpower, and expertise. In July 2013, Microsoft entered into a partnership with the Philippine Department of Science and Technology's Information and Communication Technology Office (DOST-ICT Office), Department of Agriculture's Bureau of Fisheries and Aquatic Resources (DA-BFAR) and the U.S. Embassy Manila's United States Agency for International Development (USAID) to explore delivering broadband connectivity to remote areas in the Bohol municipalities of Talibon, Trinidad, Bien Unido, Ubay and Carlos P Garcia. The partnership built upon an existing project between the Government of the Philippines and USAID, and was joined later by several

other partners who signed an agreement with the government to support a wider regional TVWS deployment. This experience demonstrates the need for multiple stakeholders to be involved in fully leveraging technology to meet the unique needs in each community. In the Philippines, these partners include the following:

- *Government*: Department of Science and Technology (DOST); Local Schools, Community Centers, and Rural Health Units; National Telecommunications Commission; Department of Education; Bureau of Fisheries and Aquatic Resources;
- *International Private Sector:* Microsoft; Nityo InfoTech;
- *Local Private Sector:* Federation of International Cable TV and Telecommunications Association of the Philippines (FICTAP); ABS-CBN Corporation; and,
- *International:* USAID.

As a non-commercial project, the program:
1) brings broadband connectivity to more than 20 underserved public primary and secondary schools in Bohol province;
2) supports the Ecofish sustainable fisheries project; and
3) facilitates disaster-resilient communication.

Educational and Community Access

The primary purpose of the Bohol project is to improve the quality of local education – the most important first step towards sustainable and inclusive development. By providing schools and teachers with reliable connectivity, TVWS technology allows for new forms of multimedia instruction, access to higher quality information and resources, and more effective teacher training and management. Connectivity increased the ability of older students to conduct research over Internet search platforms and other academic resources online, while teachers were able to access previously unavailable video and audio material to integrate into their curriculum. This put these students and communities on a path towards realizing the universal access to quality education called for in SDG 4, giving them the skills to succeed in the global economy.

Some teachers and community members were initially resistant because they were unaware of the benefits of connectivity. This scepticism was quickly overcome, however, as they gained access to new resources. In addition, schools and public areas that were newly connected to the Internet have become social gathering places and focal points for the community. By opening broadband connections after school hours, existing bandwidth is not wasted and a new resource has been made available to the community at large. Peak usage at most public hotspots occurs between the hours of noon and midnight, carrying as many as 80 connected devices at a time. Residents use it to access social media and communications platforms to stay in touch with friends and family, to access government services and public information, and to engage in e-commerce.

Sustainable Fisheries

The Ecosystems Improved for Sustainable Fisheries (Ecofish) project is an ecological sustainability program whose objective is to make local fishing more sustainable through effective management. It was initiated at the national level by the Bureau of Fisheries and Aquatic Resources in partnership with USAID. Improved connectivity was identified as a tool to improve compliance with fishing regulations, and the TVWS project in Bohol presented a unique opportunity for the two programs to work together at the local level to achieve better implementation.

New broadband access for fishing communities allows local governments to access a national registration system directly. TVWS technology was able to overcome inconsistent (and unreliable) terrestrial infrastructure in municipalities involved in the program, enabling municipalities to immediately distribute critical identification documents and certificates and licenses to the fishermen that need them, while also allowing law enforcement to more effectively monitor compliance. By improving the management of marine resources, the government can better protect and manage sensitive, biodiverse areas and provide broadband access for small fishing communities, thus protecting this valuable ecological resource for future generations. In such a way, TVWS-enabled access supports SDG 14, which seeks to conserve and sustainably use the oceans, seas and marine resources for sustainable development.

Disaster Resilient Communications

The Philippines has faced particular challenges from poor and vulnerable communications infrastructure during natural disasters. SDG 13 recognizes the need for more reliable connectivity for mitigation of and recovery from disaster events, and calls for efforts to "strengthen resilience and adaptive capacity to climate-related hazards and natural disasters in all countries." During recent disasters, such as the October 2013 Bohol Earthquake, quickly followed in November by Typhoon Haiyan (also known as Yolanda), many people of Bohol and nearby provinces found themselves isolated from the outside world, hampering relief and recovery efforts.

In the wake of these disasters, TVWS systems proved indispensable in post-disaster recovery. In the nearby city of Tacloban, the ICT Office of DOST set up TVWS transmitters provided by Microsoft and other private sector partners after Typhoon Haiyan. Established several days after the disaster, these provided communication capabilities for first responders, victims, and coordination of relief efforts. This network did not require specialized devices, allowing citizens and official rescue workers alike to benefit from immediate two-way voice and data connection using any functioning handsets, laptops, or other wireless devices within 3-5 km. This was accomplished at less than 1/10th the cost of alternative solutions and required little to no specialized expertise to deploy. During this period, TVWS technology connected over 500 residents, enabled greater than 75,000 hours of Skype calls, and coordinated 5,000 rescue workers.

In the final analysis, deployment of TVWS technology in Tacloban was limited not by the capabilities of the network, but rather by the logistics of moving supplies and the battery life of network-enabled

devices. This highlights the importance of having TVWS devices and power systems pre-positioned, in order to deploy them as rapidly as possible after a disaster.[1]

Botswana – Project Kgolagano

The TVWS project being deployed in Botswana illustrates the potential of multistakeholder partnerships in another critical development domain: telemedicine. Launched in March 2015, project Kgolagano aims to bring specialized health services to local hospitals and clinics. This not only fills a connectivity gap for dozens of local clinics, but also gives them the means to provide specialized healthcare services that are currently unavailable to rural populations, especially maternal care. Over time, this TVWS system is expected to be expanded from clinics to other sites such as government offices and small businesses, further spreading access and socio-economic growth.

Partners for Project Kgolagano

Project Kgolagano is being financed and implemented by a broad coalition of public and private sector stakeholders who contribute both through direct financing and in-kind contributions of software, hardware, support, and expertise. Led by the Botswana Innovation Hub, Microsoft joined the project and contributed nearly $500,000 in project expenses, including software application development, the telemedicine program, a supply of Nokia phones distributed to local health personnel and centers, and Windows 8.1 desktop computers. Partners include:

- *Government:* Ministry of Health; Botswana Communications Regulatory Authority; Ministry of Infrastructure, Science, and Technology;
- *International Private Sector:* Microsoft; University of Pennsylvania; Global Broadband Solutions; Vista Life Sciences; Adaptrum;
- *Local Private Sector:* Botswana Innovation Hub; Botswana Fiber Networks; and
- *International:* USAID; NetHope*.*

A key stakeholder in this project is the Botswana Innovation Hub (BIH), itself an important example of multistakeholder cooperation. BIH is a state of the art science and technology park which provides a location for knowledge-intensive high-tech businesses to establish themselves and grow. It serves as a focal point for the tech community and provides the chance for innovative companies, individuals, scientists, and entrepreneurs to interact. It fosters creative partnerships, innovation, and job creation. Microsoft has supported the endeavor by founding a Microsoft Innovation Center within the BIH, through which it supports research and development, local start-ups, and capacity building of ICT professionals.

Enabling Telemedicine

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[1] Microsoft is also active in Kenya, where a multistakeholder partnership has helped distribute solar powered TVWS devices to the community of Nanyuki. Solar powered devices avoid the common challenge of limited power supply following a disaster. In addition to opening educational and commercial opportunities, these devices have proved invaluable in facilitating vital communications and Red Cross relief work during floods.

Telemedicine has the potential to provide a low-cost, high-impact solution to rural health challenges. In Botswana, rural hospitals and health clinics suffer from a lack of capacity, especially to offer specialized healthcare and quality maternal care that may be more available in larger cities. Project Kgolagano provides a system to capture and send high resolution images over TVWS signals from local clinics to regional hospital. From hospitals, they are sent via backhaul fibre networks to specialized medical personnel located in Gaborone, Botswana's capital, and to partners such as the University of Pennsylvania, resulting in more accurate diagnoses and better care, without requiring the patient to travel.

The telemedicine services enabled by this project now support the SDG 3 to "ensure healthy lives and promote well-being for all at all ages." But achieving the goal requires more robust effort to fully meet the healthcare needs of the underserved. ICTs and new ways of delivering services will be key to filling this gap. Efforts to provide better maternal care represent a critical step to ensuring the life-long health of all and are consistent with the strong emphasis on reducing child mortality and enhancing maternal and reproductive health in current SDG proposals.

Local Capacity Building Projects

One of the biggest challenges to realizing deployment of ICTs for development globally is the need to build local ICT capacity. Microsoft takes this challenge seriously and has undertaken a number of initiatives to support the development of local ICT skills, in support of youth, students, professionals, and government agencies.

YouthSpark

In 2012, Microsoft launched YouthSpark in order to empower the next generation with appropriate skills for success in an Information Society. As of the end of 2014, the worldwide initiative consisted of 30+ programs and partnerships with more than 350 youth-serving non-profits, creating new opportunities for more than 227 million young people in over 100 countries.

YouthSpark supports myriad summer camps, field trips, training programs, digital literacy curricula, and initiatives such as WeSpeakCode and the Image Cup competition for youth of all ages. Accompanying these programs is a network of Innovation Hubs that provide training, guidance, and resources to local entrepreneurs and developers. Microsoft strongly supports efforts to empower women and girls and supports the SDG 5 goal of enhancing the use of enabling technologies to promote women's empowerment. Youth Spark includes specific programs for girls in order to give them the skills to succeed in the global economy and help close the Digital Gender Divide.

Developing these programs requires close coordination with governments, civil society, non-profits, and businesses both globally and locally in order to understand the challenges that young people face. To support such diverse partnerships, Microsoft provides grants to partnering organizations, and donates software and services to an array of eligible non-profits.

Accessibility and Inclusiveness for All People

Another important aspect of capacity building is addressing accessibility and inclusiveness, empowering all people, regardless of age, ability, or language. Overall, about one billion people, or 15% of the world's population, have some form of disability, and 80% of them live in the developing world. Microsoft also embraces the multistakeholder approach in meeting this accessibility challenge. Examples of efforts to include the disabled include working with a school for blind students in Kenya (see hyperlinked videos of the project here and here), low income populations with disabilities in Latin America, and accessible electronic voting machines.

In 2013, Microsoft joined with the Broadband Commission for Digital Development, the Global Initiative for Inclusive Information and Communication Technologies (G3ict), the International Telecommunication Union (ITU), The United Nations Educational, Scientific and Cultural Organization (UNESCO), and others to jointly produce a report, "The ICT Opportunity for a Disability Inclusive Development Framework." G3ict also produced a UNESCO report on WSIS progress relative to people with disabilities, with specific recommendations and a call to action for governments. These efforts help disadvantaged communities not only access information, but build capacity to utilize that access in meaningful ways.

Hackathons and Open Data in the Philippines

In order to support local professionals and help develop innovative solutions to local challenges, Microsoft has coordinated a string of hackathons in partnership with the Philippine government's Open Data Task Force as well as an array of private sector actors. During these events, local ICT students and professionals compete over a short timeframe in order to develop solutions to the challenges presented. Through a variety of ICT related events in the Philippines, participants have developed solutions for more transparent and participatory local budgets, expanded their knowledge of the growing Internet of Things, and created educational apps to make lessons more engaging.

The May 2014 "Readysaster: Hack for Resilience" event is an excellent example of these efforts and the multistakeholder cooperation which enables them. Organized together with the Philippine government's Open Data Task Force and the World Bank's Global Facility for disaster Reduction and Recovery (GFDRR), the two-day event focused on creating locally relevant solutions to disaster recovery challenges using inclusive technology and open data from partnered government agencies. An estimated 200 developers and designers collaborated to produce new mobile and web apps based upon publically available governmental geospatial data. This event produced several new apps to encourage citizens to take a more proactive role in disaster preparedness and to help the national government respond more effectively to disasters.

Microsoft has worked with a number of different government agencies, private sector actors, and international institutions to support local capacity through hackathons and use of open data in the Philippines, including:

- *Government:* Office of the Presidential Spokesperson; Presidential Communications Development and Strategic Planning Office; Department of Budget and Management; National Mapping and Resource Information Authority;
- *International Private Sector:* Microsoft; Google Developers; Mozilla Firefox; Palet Express;

- *Local Private Sector:* JumpSparc; Globe Labs; Vibal Group; Smart Communications; dozens of local startups;
- *Civil Society:* Union of Local Authorities of the Philippines; and
- *International:* World Bank Global Facility for Disaster Reduction and Recovery.

Conclusion

In order to meet the challenge of connecting the next billion and realizing people-centered, inclusive, and sustainable development, it is crucial that all stakeholders collaborate and continue to pursue flexible and innovative approaches. Current proposals for the Sustainable Development Goals rightly acknowledge the critical role that applications of ICTs play in enabling sustainable development, and these case studies demonstrate how they are being put to use at this very moment to support universal access to quality education, responsible stewardship of the oceans, rural health services, and local capacity building. Multistakeholder approaches have the best chance to build upon these successes and to develop the deep linkages between societal actors needed to develop and spread the benefits of affordable and universal access.

There are diverse policy tools to facilitate connecting the next billion, but the ones detailed here share some important traits:

1. openness to dialogue among a wide variety of partner institutions and organizations (including government agencies, local communities, international organizations, and non-government actors);
2. inclusiveness of local actors who are uniquely aware of and responsive to community needs;
3. an enabling environment for joint planning and execution of policies and projects among partners;
4. identification of socio-economic development opportunities and priorities, which can speed the process of identifying stakeholders and resources; and
5. application of successful models across disciplines, alongside flexibility to pilot new solutions.

Many stakeholders can contribute unique value to a project. By building on what works and providing appropriate policy and regulatory frameworks, governments can best harness every stakeholder's contribution. Such approaches can enable more rapid integration of new technologies and create more opportunities to leverage these innovations that address real social and economic needs.

These and countless other examples demonstrate how a multistakeholder approach can promote sustained investment and innovation, and enable the flow of information necessary to support development of new ICT services and applications for the next billion users. Microsoft will continue to fulfil its commitment to work with willing governments and other stakeholders in order to develop solutions that empower every person and organization on the planet to reap the full potential of the Information Society.