MEANS OF TRANSFORMATION
HARNESSING BROADBAND FOR THE POST-2015 DEVELOPMENT AGENDA

A REPORT OF THE BROADBAND COMMISSION TASK FORCE ON SUSTAINABLE DEVELOPMENT

In collaboration with:

ERICSSON

ITU

UNESCO
United Nations
Educational, Scientific and
Cultural Organization

ABOUT

About The Commission

The Broadband Commission for Digital Development was launched by the International Telecommunication Union (ITU) and the United Nations Educational, Scientific and Cultural Organization (UNESCO) in response to UN Secretary-General Ban Ki-Moon's call to step up efforts to meet the Millennium Development Goals (MDGs). Established in May 2010, the Commission unites top industry executives with government leaders, thought leaders and policy pioneers and international agencies and organizations concerned with development.

The Broadband Commission embraces a range of different perspectives in a multi-stakeholder approach to promoting the rollout of broadband, as well as providing a fresh approach to UN and business engagement. To date, the Commission has published a number of high-level policy reports, best practices and case studies.

More information about the Commission is available at **www.broadbandcommission.org.**

ACKNOWLEDGEMENTS

This Report has been written collaboratively, drawing on rich insights and contributions from members of the Broadband Commission Task Force on Sustainable Development and other individuals. We would like to thank Ericsson for its leadership in the production of this report, and Hans Vestberg for chairing the work of the Task Group.

The members of the Task Force on Sustainable Development are as follows, listed in alphabetical order of institution, followed by alphabetical order of surname:

Florence Gaudry-Perkins (Alcatel-Lucent), Joanna Rubinstein (The Earth Institute at Columbia University), Reza Jafari (E-Development International), Elaine Weidman Grunewald (Ericsson), Neelie Kroes (European Commission), Estelle Schnitzler (EUTELSAT), Virginie Bongeot (INSEAD eLab), Amir Dossal (Global Partnerships Forum), Belinda Exelby (GSMA), Hoda Baraka (ictQatar), Peter Pitsch (Intel), Antonio Garcia Zaballos (Inter-American Development Bank), Renata David Brazil (ITSO), Hamadoun Touré, Patricia Benoit-Guyot, Phillippa Biggs, Simao Campos, Gary Fowlie, Hani Eskandar, Piers Letcher, Hiroshi Ota, Anna Polomska, Susan Schorr and Nancy Sundberg (ITU), Paul Budde (Paul Budde Communication Pty Ltd), Tom Wasilewski (Qualcomm), Ivo Ivanovski (Republic of Macedonia Ministry of Information Society and Administration), Suvi Linden (Special Envoy to the Broadband Commission), Indrajit Banerjee and Dov Lynch (UNESCO), Janice DiDominick, Avrille Hanzel and Anita Sharma (UN Foundation), Ricardo Dunn and Louise Stoddard (UN-OHRLLS), Amina Mohammed (UN Secretary-General's Special Adviser on Post-2015 Development Planning) and Yesim Baykal and Michele Woods (WIPO).

In addition, we would like to thank Jessica Dorr (Bill and Melinda Gates Foundation), Irina Bokova (UNESCO) and Margaret Chan (WHO) for contributing to the report. The editorial team included Elaine Weidman-Grunewald (Ericsson), Jose Maria Diaz Batanero, Gabrielle Swaby and Mischa Liatowitsch (ITU), and Amy Brown and Andrea Spencer-Cooke (One Stone).

FOREWORD

The world is at an important crossroads. We have an enormous opportunity – and a great responsibility – to carry on the mission and momentum of the Millennium Development Goals beyond 2015. A new, inclusive, multi-stakeholder development agenda is emerging, to be framed by a new set of goals and targets, the Sustainable Development Goals.

While the final framework for this agenda is still evolving, the members of the Broadband Commission for Digital Development are convinced that the global community must work together to apply the best means and most innovative solutions to tackle enduring challenges and achieve shared sustainable development goals. ICT and broadband are key transformative technologies that can be harnessed for this purpose.

ICT and broadband can play a major role in delivering integrated, cross-sectoral, sustainable development outcomes. But to do so effectively, they must be acknowledged and embedded as a core means of implementation for the post-2015 agenda.

In 2013, the Broadband Commission Task Force on Sustainable Development published a report, Transformative Solutions for 2015 and Beyond, offering ten recommendations for harnessing the power of ICT and broadband for sustainable development. This follow-up report builds on those recommendations to offer practical guidance for governments and other stakeholders on concrete actions they can take to leverage ICT in support of sustainable development goals.

Through this report, the Broadband Commission urges the international community to join the dots between our collective moral imperative to act swiftly on the post-2015 development agenda, and the huge, unrealized potential of ICT and broadband to build a more inclusive, sustainable society. The members of the Commission hope this report will provide inspiration for governments and decision-makers to seize these opportunities and incorporate them within National Broadband Plans.

The report is based on interviews and supporting material from leaders and experts across industry, government, academia and international organizations, including members of the Broadband Commission for Digital Development.

We welcome your feedback and hope that the report will be a springboard for further discussion and action.

Dr Hamadoun I. Touré

Secretary-General, International Telecommunication Union (ITU), Co-Vice-Chair of the Broadband Commission for Digital Development

Hans Vestberg

President and Chief Executive Officer, Ericsson, Chair of the Broadband Commission Task Force on Sustainable Development and the Post-2015 Development Agenda

INTRODUCTION

Building an inclusive and sustainable knowledge-based society is one of the most important goals of the global community. To that end, a new development agenda is currently being defined to guide world leaders in addressing social, economic and environmental priorities beyond 2015. Spurred by the momentum created by the Millennium Development Goals (MDGs) over the past decade and a half, this new development agenda will be framed by a new set of goals and targets – the Sustainable Development Goals (SDGs).

In 2012, one of the main outcomes of the United Nations Conference on Sustainable Development (Rio+20) was the agreement by Member States to launch a process to develop a set of SDGs. A 30-member Open Working Group (OWG)[1] of the General Assembly was therefore established and tasked with preparing a proposal on the SDGs in time for the 69th United Nations General Assembly. In July 2014, the OWG submitted its proposal for 17 SDGs, including 169 targets.

The complexity and interconnected nature of development challenges making up the post-2015 agenda call for a approach which leverages multi-stakeholder partnerships and innovative, integrated solutions. As facilitating, crosscutting technologies, Information and Communication Technology (ICT) and broadband in particular can serve as the backbone of such solutions. Poverty alleviation, the first of the proposed SDGs, continues to be a primary focus area and is thus the mandate for all stakeholders working towards sustainable development post-2015.

Highlighting this enabling potential of broadband in achieving a sustainable society is a key objective of the Broadband Commission for Digital Development. Although much progress has been achieved, the Broadband Commission believes more emphasis should be placed on the transformative role of broadband in building sustainable societies. Digital technologies have immense potential to serve as powerful means of implementation in realizing the proposed SDGs.

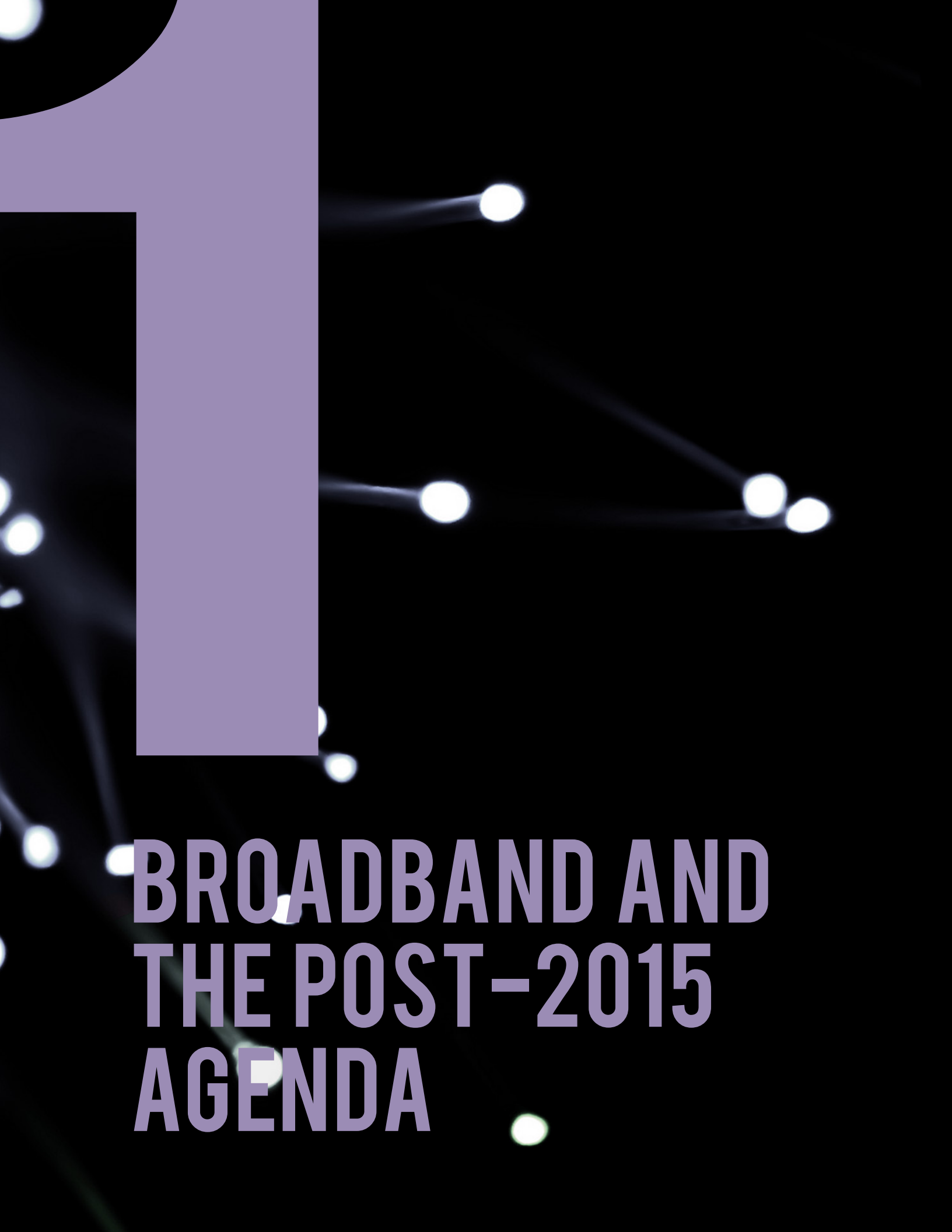
ICT and broadband are increasingly integrated into every aspect of the global economy and, as a vital part of our modern infrastructure, should be central elements in any institutional framework for addressing sustainable development. A truly transformative and sustainable international development agenda that delivers for all, within planetary boundaries, will depend on the enabling role of ICT and broadband.

In 2013, the Broadband Commission released a report, *Transformative Solutions for 2015 and Beyond*, setting out 10 key multi-stakeholder recommendations for harnessing ICT and broadband as positive forces for sustainable socioeconomic development. Accompanying it was a manifesto signed by 55 prominent sector leaders and international organizations to present their shared belief in the benefits of broadband for sustainable development.

The present report builds on this foundation by identifying concrete opportunities for countries to leverage broadband as an enabling, crosscutting infrastructure to deliver on the post-2015 development agenda. Intended as a practical guide, it outlines opportunities, best practice examples and key success factors for using broadband to achieve sustainable development objectives. It concludes with general recommendations for creating an enabling environment to fully harness this remarkable technology in creating a more sustainable society. The aim is to provide inspiration for governments launching – or reviewing – their own national development agendas and broadband plans, and an invitation to envision ICT and broadband not just as means of implementation, but as means of transformation across all sectors involved in meeting sustainable development objectives.

The report is structured as follows:

- **Section One** describes the result of a gap analysis to identify possible opportunities where ICT and broadband could play a greater enabling role in supporting the proposed SDGs. We identify ten proposed goals in particular where ICT and broadband could help achieve sustainability objectives.
- **Section Two** showcases best practice examples from around the world where governments are already using ICT and broadband to meet sustainable development objectives. It features key factors for success to help government stakeholders design robust ICT-enabled strategies for achieving the proposed SDGs.
- **Section Three** builds on these success factors to present a number of policy-focused, market-based recommendations to help governments create the necessary enabling framework to fully capture ICT and broadband's transformative role in sustainable development.



1

BROADBAND AND THE POST-2015 AGENDA

The path to 2015 – and beyond

In 2000, world leaders embarked on an ambitious process to achieve eight international development goals – the UN Millennium Development Goals (MDGs) – by 2015. As that date fast approaches, a 'Post-2015 Development Agenda' is underway and countries around the world are devising a new set of universal goals and targets – the Sustainable Development Goals (SDGs) – to build on the MDGs and respond to new challenges. Human development and poverty eradication remain at the core of the proposed SDGs (Box 1), with recognition that a healthy and resilient environment underpins sustainable social and economic progress.

Box 1: Sustainable Development Goals, as proposed by the OWG

Source: Proposal of the Open Working Group for Sustainable Development Goals (July 2014)[2]

1. **End poverty in all its forms everywhere**
2. **End hunger, achieve food security and improved nutrition, and promote sustainable agriculture**
3. **Ensure healthy lives and promote wellbeing for all at all ages**
4. **Ensure inclusive and equitable quality education and promote life-long learning opportunities for all**
5. **Achieve gender equality and empower all women and girls**
6. **Ensure availability and sustainable management of water and sanitation for all**
7. **Ensure access to affordable, reliable, sustainable, and modern energy for all**
8. **Promote sustained, inclusive and sustainable economic growth, full and productive employment and decent work for all**
9. **Build resilient infrastructure, promote inclusive and sustainable industrialization and foster innovation**
10. **Reduce inequality within and among countries**
11. **Make cities and human settlements inclusive, safe, resilient and sustainable**
12. **Ensure sustainable consumption and production patterns**
13. **Take urgent action to combat climate change and its impacts**
14. **Conserve and sustainably use the oceans, seas and marine resources for sustainable development**
15. **Protect, restore and promote sustainable use of terrestrial ecosystems, sustainably manage forests, combat desertification, and halt and reverse land degradation and halt biodiversity loss**
16. **Promote peaceful and inclusive societies for sustainable development, provide access to justice for all and build effective, accountable and inclusive institutions at all levels**
17. **Strengthen the means of implementation and revitalize the global partnership for sustainable development**

From goals to action

The proposed SDGs are designed to be action-oriented, global in nature, and universally applicable to all countries, while taking into account different national realities, capacities and levels of development and respecting national policies and priorities.

The success of the proposed SDGs will depend in large part on the development and use of innovative means of implementation (MOI).[3] Putting in place effective delivery mechanisms is absolutely critical for actioning a new set of global goals. Without adequate MOI, the proposed SDGs will remain a visionary, well-intentioned global aspiration, but not implementable.

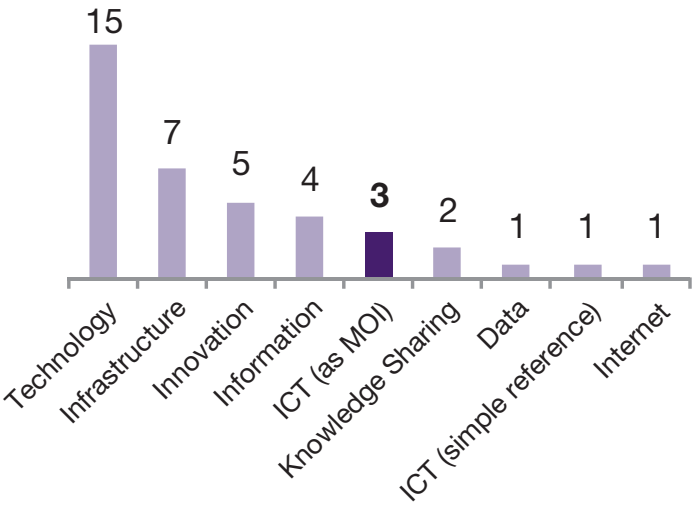
ICT is a relatively new and rapidly evolving industry and the full reach and capabilities of the technology are yet to be uncovered. Nonetheless it is already clear that ICT and broadband will be pivotal levers in moving the proposed SDGs from vision to action and should be universally recognized as a crucial component in the means of implementation for reaching global sustainable development objectives.

The important role of ICT and broadband is already reflected in some of the 17 proposed SDGs, but a systematic approach to integrating ICT as a means of implementation is lacking. Four SDGs reference ICT specifically. The latter three (5, 9 and 17) specifically feature clear targets on ICT as a means of implementation:

- **Proposed Goal 4:** "Ensure inclusive and equitable quality education and promote life-long learning opportunities for all" includes a target referencing the need for ICT training in both developing and developed countries.
- **Proposed Goal 5:** "Achieve gender equality and empower all women and girls" includes a target to enhance the use of enabling technologies, "in particular ICT," to promote women's empowerment.
- **Proposed Goal 9:** "Build resilient infrastructure, promote inclusive and sustainable industrialization and foster innovation" includes a target to "significantly increase access to ICT and strive to provide universal and affordable access to Internet in LDCs (least developed countries) by 2020."
- **Proposed Goal 17:** "Strengthen the means of implementation and revitalize the global partnership for sustainable development" includes a target to "…enhance the use of enabling technologies in particular ICT."

Other general ICT-related references are also made in various targets across the 17 proposed SDGs (Figure 1).

Figure 1: Number of targets with general references to ICT and ICT-related terms*



Source: OWG Proposal for SDGs, analysis by the Broadband Commission Secretariat

*Some targets included multiple references to ICT-related terms, so there is overlap with the number of references. E.g., Target 5.b mentions both ICT and technologies, so this target was counted twice.

The Broadband Commission believes there is considerable scope to integrate the unique role of ICT more fully into the current proposal for SDGs. As a technology-based means of implementation, broadband's potential contribution to realizing the proposed SDGs is unmatched. Around the world, mobile broadband as today's fastest-growing form of ICT, is already delivering far-reaching benefits and enabling progress in economic development, health, education, low-carbon development, environmental management as well as peace, justice and social inclusion.

A window of opportunity

Given the proven capability of ICT- and broadband-enabled solutions to shape a more sustainable world, the Broadband Commission strongly believes that broadband and ICT should be explicitly included as means of implementation in fulfilling most, if not all, of the proposed SDGs. It should be viewed as a crosscutting, systems-oriented platform. Yet at present a total of 14 proposed goals make no direct reference to broadband and/or ICT as means of implementation.

As shown in Table 1, this report focuses on ten proposed SDGs that in particular could significantly benefit from the enabling potential of broadband, as underlined in previous reports of the Broadband Commission.

For example, increasing ICT accessibility enhances social inclusion and boosts livelihoods for those active in today's digital economy. Mobile banking services in Africa demonstrate the positive impact it can have in supporting the economy and creating jobs. Digital Health, especially mobile solutions in developing countries, has significantly improved access to health services and efficiency gains for health delivery in general.

Farmers can gain more accurate weather information and sales prices, order seeds and fertilizers online, and contract or pay loans via their mobiles. Students around the world can benefit from 24/7 connectivity, borderless learning and the global exchange of ideas. ICT-enabled smarter energy management can drive efficiency and spur the shift to intelligent, low-carbon, closed-loop systems.

And by developing their ICT skills, girls and women gain access to life-enhancing health, education, financial and entrepreneurial support.

Table 1: Proposed SDGs that could significantly benefit from broadband/ICT as a MOI

Proposed SDGs	Potential benefits of ICT/Broadband
Economic Development **Goal 1:** End poverty in all its forms everywhere **Goal 8:** Promote sustained, inclusive and sustainable economic growth, full and productive employment and decent work for all	• E-business, e-commerce and mobile financial services increase social and financial inclusion of the poor • ICT is a trigger for increasing productivity and competitiveness among Small and Medium Enterprises (SMEs) and for digital entrepreneurship • ICT increases literacy and engagement of people living in poverty and develops vocational skills of the future
Health **Goal 3:** Ensure healthy lives and promote wellbeing for all at all ages	• Remote access to healthcare for patients in rural and remote areas is increased with m-health, e-health and telemedicine • Digital health systems improve efficiencies • ICT facilitates early warning of outbreaks and real-time data collection • Universal Health Coverage increases via m-health micro-insurance systems • Digital tools enhance the training of health-workers and education of the population on prevention and management of disease ICT enables birth registration
Education **Goal 4:** Ensure inclusive and equitable quality education and promote life-long learning opportunities for all	• Distance and online courses / e-learning increase access to and quality of education, regardless of location and level of development • ICT facilitates better teacher training and development • Management information systems increase efficiency and effectiveness of educational administrations
Low Carbon Development **Goal 7:** Ensure access to affordable, reliable, sustainable, and modern energy for all **Goal 11:** Make cities and human settlements inclusive, safe, resilient and sustainable **Goal 13:** Take urgent action to combat climate change and its impacts	• Efficiency of energy generation, distribution and consumption is increased through smart buildings, smart transportation, smart logistics, smart grids and smart meters • Early warning systems, disaster risk reduction and climate monitoring are enhanced by ICT. In cities, e-governance and use of social media & digital technology for boost collaboration and social inclusion. • ICT facilitates the transition from physical to virtual infrastructure through dematerialization, decoupling economic growth from GHG emissions

Proposed SDGs	Potential benefits of ICT/ Broadband
Environmental Management **Goal 14:** Conserve and sustainably use the oceans, seas and marine resources for sustainable development **Goal 15:** Protect, restore and promote sustainable use of terrestrial ecosystems, sustainably manage forests, combat desertification, and halt and reverse land degradation and halt biodiversity loss	• Environmental / climate monitoring and remote sensing, e.g. to track deforestation • Geographic Information Systems • E-agriculture and smart agricultural practices • Smart water management and access to clean water
Peace, justice and social inclusion **Goal 16:** Promote peaceful and inclusive societies for sustainable development, provide access to justice for all and build effective, accountable and inclusive institutions at all levels	• ICT increases social inclusion and accessibility for persons with disabilities • E-governance, e-diplomacy and e-voting are enabled by ICT • Social networks for freedom of expression and crowdsourcing rely on ICT • Mobile services support reporting / tracking on violence, harassment, corruption, etc. • Improves transparency and accountability

Source: Broadband Commission Secretariat

Section 2 explores in more detail transformative solutions that can help achieve these ten proposed SDGs, with best practice examples of how countries are already driving sustainable outcomes through use of broadband. Each example is accompanied by key success factors for leveraging broadband as a means implementation for sustainable development.


2
BEST PRACTICES
AND KEY FACTORS
FOR SUCCESS

This section features best practice examples which underscore how broadband can drive progress towards the ten proposed SDGs identified in Section 1 where ICT is not currently cited as a primary means of implementation.[5]

By sharing the experience of countries already leveraging ICT / broadband policy to meet these sustainability challenges, the cases demonstrate how broadband networks, services and applications can be effective means of implementation to advance social development, economic growth and environmental protection. The aim is to provide inspiration for governments launching – or reviewing – their own national development agendas and broadband plans, and an invitation to envision ICT and broadband not just as a standalone industry sector, but as a powerful means of connecting and interlinking all sectors involved in meeting sustainable development objectives.

Given the potential of broadband to enable progress for economic development, health, education, low-carbon development, environmental management, and peace, justice and social inclusion, the ten proposed SDGs are grouped under these six main themes. A short summary of how broadband can address each theme is followed by a best practice snapshot from around the world. For each example, key factors for success are highlighted to help policymakers pinpoint actions and strategies that successfully leverage broadband as a means implementation.

Economic development

"Doubling the broadband speed for an economy increases GDP by 0.3%."[6]

ICT and broadband contribute to poverty eradication by fostering economic growth and generating employment. Especially in developing countries, where weak and uneven global economic recovery has yielded little progress in reducing low-quality employment,[7] the digital economy is sparking access to new markets, innovation and competitive advantages for entrepreneurs and businesses of all sizes. For the 2.5 billion people estimated to be unbanked in lower- to middle-income countries, mobile phones can enable access to credit and banking services;[8] more than 55 million Africans use basic mobile phones to transfer money, take out insurance policies and collect payment from government agencies.[9] E-commerce, teleworking and mobile applications can also positively impact inclusive economic growth by expanding employment opportunities for less advantaged and marginalized groups.

Proposed Goal 1. End poverty in all its forms everywhere

Vietnam connecting rural communes[10]

Recognizing ICT and access to information as potent tools for poverty eradication, Vietnam is developing infrastructure and universalizing telecommunications and Internet services for those living in extreme poverty. A program was initiated with the explicit goal of providing public Internet access points to 70% of Vietnam's extreme poverty communes by 2010. The government of Vietnam invited major telecommunications companies – including the VNPT Group, Viettel, EVN Telecom and the Vietnam Maritime Communication and Electronics Company (VISHIPEL) – to support the program and provide technical capacity. Four years after implementation, over 20 million people in rural areas have been able to use and access telecommunication services.

Key Success Factors:

Partnerships among government agencies, the telecommunications sector and development communities are key. By inviting major telecommunications companies to support provision of telecommunications services, the government was able to encourage business investment, leading to mobilization of financial resources and technical capacity.

Proposed Goal 8. Promote sustained, inclusive and sustainable economic growth, full and productive employment and decent work for all

E-commerce boosts employment in Belize[11]

The Belizean government successfully stimulated e-business and employment growth by encouraging expansion of private e-commerce parks in Export Processing Zones (EPZs). Many of the country's licensed Business Processing Outsourcing organizations – such as broadband-reliant call centers – are based in these parks. Exempting incoming dotcoms from taxes has resulted in nationwide expansion: in 2012, there were 11 known call centers employing over 1,300 people. A conservative 3-year projection shows 150% to 160% increase in employment, creating around 3,000 additional jobs, boosting international investment and productivity.[12]

Key Success Factors:

The Belizean government provided investment incentives to the private sector and harnessed market dynamics and competition to create good socioeconomic outcomes. By adopting a regulatory framework that reduces barriers to new entrants and removing taxes and import duties on ICT products and related accessories, the government spurred use of ICT and growth of the ICT industry. A pro-investment environment can be established through sound regulatory policy, fair and transparent regulation, and constructive dialog with stakeholders.

Health

"More than one million lives could be saved in Sub-Saharan Africa by 2017 with just m-Health solutions"[13]

Faced with increasing demand for health services and rising costs, many governments are starting to recognize ICT and broadband as an effective means to deliver high-quality services at low cost. Mobile applications have a key role to play in monitoring patient health – especially for marginalized or underserved populations, and in simplifying medical-related financial transactions. Under the OneMillion Community Health Worker Campaign and the Mobile Alliance for Maternal Action (MAMA) , for example, mobile phones are enabling real-time disease surveillance, child and maternal health monitoring, and mobile training across sub-Saharan Africa. Thus, mobile phones and ICT contribute to strengthening primary health systems in developing countries. Broadband-enabled technology is also valuable for driving demand for services and commodities by improving access to information, encouraging behavior change and empowering people to make informed decisions about their health and that of their families.

Proposed Goal 3. Ensure healthy lives and promote wellbeing for all at all ages

Mapping Nigeria's social infrastructure[16]

The Earth Institute has been working with the Office of Senior Special Advisor to the President on the MDGs (OSSAP- MDGs) of the Nigerian government to assist with the information systems to support the LGA-track of the Conditional Grant Scheme (CGS). CGS was designed to support the building and staffing of facility infrastructure for health, education, water and other social sectors. With Earth Institute's SEL (Sustainable Engineering Laboratory), a platform to locate, assess, aggregate and display facility-level was created. This platform was updated in 2014 and was launched by the Nigerian Government as a public resource in August 2014 through NMIS (nmis.mdgs.gov.ng). This nationwide inventory of health, water and education facilities has the latest status of more than 250,000 facilities. The Nigeria MDG Information System (NMIS) is an online interactive data management system to monitor and evaluate data generated by smartphone-based lean data gathering and management tools,

which have now been transferred to the Nigeria Government (formhub.org). Through the efforts of the hundreds of field enumerators that were deployed by OSSAP, the whole of Nigeria was mapped and recorded within months. "Gathering that information in a couple of months rather than years without the use of paper, means real-time data for decision-making," says Joanna Rubinstein of the Earth Institute. The data will be used to help the Nigerian government track and assess progress toward achieving the MDGs and the CGS.

Improving Indian health services[17]

Key Success Factors:

ICT initiatives work best when nationally co-ordinated (through OSSAP) enabling policies and support are matched with action on the ground, when lessons from pilots are leveraged and when effective and affordable use is championed along with transparency of data. This was the case for NMIS, a LGA-level project in Nigeria that harnessed the organizational structures provided by OSSAP, supported by tools and smart phone functionality to record details about infrastructure and facilities around the country to create a national database. By connecting on-the-ground use of ICT with national development objectives, the vital information that now makes up the NMIS can be used to inform government decision-making around the proposed SDGs.

Since the launch of its national broadband plan in 2010, India has experienced improved access to broadband in the health sector. M-health and telemedicine offer the ability to extend coverage significantly by allowing healthcare workers to conduct consultations, diagnostics and treatment remotely.[18] Mobile technology has also played a role in reducing mortality rates, extending access to healthcare facilities to rural areas, improving disease recovery by lowering default rates and increasing people's knowledge of health danger signs. This translates into savings – in lives and resources – with direct health improvements for the overall population. With nearly 900 million mobile phone connections and over 200 million Internet users, experts say wireless technology can decentralize India's USD$250 billion healthcare industry by 2020.[19]

Key Success Factors:

Close collaboration among ICT/telecom and health government ministries and industry can enhance the development of guidelines and standards for an ICT-enabled healthcare infrastructure that delivers cost-effective health services. These guidelines and standards – which can be developed within the framework of public policies such as national broadband plans – should leverage existing technologies to ensure innovative, cost-effective solutions. In this regard, it is important to conduct market analysis to assess the best ways of harnessing existing national market dynamics.

Education

Globally over 70 million school-age children do not attend school and 781 million adults and 126 million youth lack basic literacy skills – over 60 per cent of them women.[20]

Access to quality education for all – including access to ICT and the Internet – is an imperative for building inclusive and participatory knowledge societies. Against a background where a global learning crisis is costing governments USD$129 million a year,[21] ICT and broadband are transforming traditional learning models, providing cost-effective access to quality education materials, allowing students to self-customize learning and helping teachers facilitate rather than disseminate knowledge. Use of online courses and cloud-based solutions such as Connect to Learn[22] are enriching lives by opening up learning opportunities in regions where access to quality education is low (especially for girls) and enhancing lifelong learning by enabling workers to up-skill and qualify online. Currently, there are more than 5 million people taking university courses online through massive open online courses (MOOC); 40% of them come from developing countries.[23] Developing the skills to effectively use technology and navigate the digital world is key for participating fully in today's knowledge economy.

"We need to make the most of every multiplier to promote access by all to quality education – broadband and ICT are essential here, to widen access, to enhance the quality of learning, to bridge digital divides and to allow every learner to participate fully in building inclusive knowledge societies. This is why I call today for ever stronger political will from all stakeholders to harness fully the power of broadband and ICT for the benefit of all."

Dr. Irina Bokova, Director-General of UNESCO

Proposed Goal 4. Ensure inclusive and equitable quality education and promote life-long learning opportunities for all

Smart schools in Egypt[24]

Launched in 2003, the Smart Schools Network in Egypt aims to improve administration in preparatory schools and leverage technology to raise educational standards and promote computer literacy. IT companies provide schools with modern classroom technology in addition to software for computer education, technology-aided education, teacher training and learning centers. In its use of ICT for "smart schools," the Egyptian government mobilized schools to serve as community learning centers. Several software applications were introduced to assist in school management by facilitating their web presence so that the schools' communities can interact effectively with other communities. The result: IT infrastructure and appropriate software were successfully installed in 38 schools; schools were equipped with 2,677 PCs, and some 2,401 teachers and 307 school administrators were trained to better utilize school and learning management systems. In total, 18,384 students have benefited from the project.

Key Success Factors:

A key determinant in securing wide diffusion of broadband-based solutions is ensuring mass uptake of facilities and services, through demand stimulation. In Egypt, e-education demand stimulation policies, involving promotion and utilization of ICT in education programs, improved the education and learning process by reinforcing 21st century skills and building an ICT-based community.

Public libraries featured in Peru's Digital Agenda[25]

Development and education outcomes require ICT access points that are promoted as community spaces open to everyone. Peru is making important steps forward to make its libraries development-oriented community access points. As the public face of access to information, libraries benefit from ongoing public support and dedicated funding under local, regional or national government budgets. With 70% of the world's 320,000 public libraries in developing countries, these critical community assets provide access to information for all and equal opportunities in technology, training and education. This is especially important in many countries for girls and women, for whom libraries are seen as safe, reliable and affordable resources, with trained female staff contributing to high levels of comfort in using library facilities. As stated by Jessica Dorr, Deputy Director of Global Libraries at the Gates Foundation, "There is no community or economic development without access to information."

Key Success Factors:

To make the best use of existing resources, governments and development agencies should reference public libraries as part of their digital agenda to strengthen and expand the services libraries currently offer. Peru is making important steps forward in this regard by featuring libraries in the Digital Agenda 2.0, which provides a blueprint for an inclusive knowledge and information society.

Development practitioners should also seek to partner with libraries where available as a way to sustainably support initiatives in a variety of fields, including health, agriculture, civic engagement, education, information literacy and others.

Low-carbon development

"Use of ICT could cut projected 2020 global greenhouse gas (GHG) emissions by 16.5%, leading to 1.9 trillion USD in gross energy and fuel savings."[26]

ICT can help overcome the challenges associated with climate change by facilitating consumption reduction, energy efficiency and resilient development, and unlocking opportunities to transition towards a 'green economy.' At this pivotal moment in global climate change negotiations, broadband-enabled solutions can contribute to all areas of action, including science and data monitoring, adaptation and mitigation. Recognizing their potential to reduce energy use and build climate change resilience, the UN Framework Convention on Climate Change (UNFCCC) Momentum for Change features ICT Solutions as one of its four pillars for change.[27] Transitioning toward a low-carbon economy is of particular importance for cities and urban areas, where two-thirds of the global population is expected to live by 2050.[28] ICT and broadband are integral to the smart, sustainable city, making delivery of services more efficient, raising quality of life, encouraging collaboration and innovation, and increasing quality and accessibility of city administrations, among other things.

Proposed Goal 7. Ensure access to affordable, reliable, sustainable, and modern energy for all

Reliable energy with smart grids[29]

The use of smart grids will radically transform the way energy is generated, distributed and consumed, allowing for better use of renewable energy sources without destabilizing the power grid. The United States is undertaking a massive ICT build-out to produce the Smart Grid. As the current patchwork grid in the USA is increasingly interconnected and complex, reliability has become more critical: currently power blackouts cost the nation as much as US$164 billion per year. Smart grids prevent blackouts by sensing problems and routing power around them, but require a major communications network to do this. With about 99% of Americans already covered by at least one 3G network, the US Federal Communications Commission (FCC) recognizes that a hardened commercial wireless data network could serve as a core part of the smart grid, and makes recommendations to that end.

Key Success Factors:

The FCC's National Broadband Plan discusses broadband integration into the Smart Grid at length. It proposes several wide-ranging recommendations in this regard and acknowledges that development of the Smart Grid is a national priority. This has triggered multiple review, rulemaking, and legislative proceedings at the state and federal levels to consider commercial broadband communications networks for delivering mission-critical and wide-area utility communications for smart energy systems, especially during emergency scenarios.

Proposed Goal 11. Make cities and human settlements inclusive, safe, resilient and sustainable

ICT and the new urban agenda

"By 2017, it is estimated that a majority of people will be living in urban areas, especially in less developed countries."[30]

Today, cities are the greatest contributor to GHG emissions and the UN-Habitat report, *State of the World's Cities 2012/2013*,[31] notes that urban inequality is increasing. With much of tomorrow's city infrastructure yet to be built, there is a window of opportunity to get urbanization right and agree on a new urban agenda[32] that fosters quality of life, adequate infrastructure, equity and environmental sustainability.

ICT can enhance proactive decision-making by providing city stakeholders with appropriate, up-to-date and actionable intelligence. This could improve the efficiency, operation and transparency of physical infrastructure, roads, water, wastewater, emergency and other services. For data collection, city leaders within different departments can gain access to a rich range of current spatial and environmental information about their cities' activities through urban sensors and advanced analytics. Technologies for monitoring, analysis and automation help physical infrastructure and operation of different urban sectors.[33]

As ICT transforms cities, it also transforms the ways in which companies, industries, governments and citizens innovate. Collaboration has become synonymous with innovation. With strengthened collaborative capabilities, cities are better prepared for collaboration with groups that are focused on responding to social issues and urban development, thus increasing productivity. By creating a more collaborative ecosystem, businesses can achieve both greater efficiency and improved innovation, resulting in increased overall success. This allows for new job opportunities and a more vibrant economy, while realizing efficiency gains that benefit the environment.

In Sweden, the City of Stockholm's Royal Seaport project is a multi-sector partnership to transform a former industrial area into a state-of-the-art ICT-enabled living and working environment. Its aim is to be a world-class, sustainable, climate-positive city district by 2030. Launched in 2012, the 'Smart ICT for living and working in Stockholm Royal Seaport' project is exploring how ICT infrastructure can help create a socially, ecologically and economically sustainable city district.

Key Success Factors:

Sustainable urban development requires a multi-level, multi-sectoral, multi-stakeholder approach. Piloting innovative, collaborative approaches is a good way to test-drive solutions before scaling. By sharing best practices, cities can contribute to a shared global vision for urban sustainability.

Proposed Goal 13. Take urgent action to combat climate change and its impacts

Rwanda leads in climate observation[36]

Located on Mt. Karisimbi, Rwanda's Climate Change Observatory project aims to improve the capacity of the countries in the region to monitor climatic conditions and meteorological forecasting, enhance regional and international cooperation on climate change and increase the capacity to respond to climate change challenges. Among its features, the center will include: a weather center, seismic monitoring unit, hydrology unit, geothermal unit, atmospheric emission and a precipitation monitoring unit, most of which are reliant on wireless technology systems. The first of its kind in Africa, this project is a result of collaboration among the local government, the IT sector ministry, the Massachusetts Institute of Technology (MIT) and the Common Market for Eastern and Southern Africa (COMESA).

Key Success Factors:

Highlighting best practice, knowledge-sharing and cooperation among stakeholders are critical to ensure broad dissemination of ICT innovation and lessons learned from pilot projects. Through collaboration, practical barriers to broadband infrastructure deployment can be reduced or removed. In this case, the involvement of MIT has been especially important in providing expert input in scoping suitable instrumentation and potential sites for the observatory, and in developing a plan for installation, maintenance and capacity building for Rwandan scientists to run the Observatory.

Environmental management

With resources becoming scarcer, ecosystems under pressure and planetary boundaries being exceeded, monitoring has never been more important. The sustainable use and management of natural resources is possible only if the state of the environment is monitored and data collected and managed in a professional manner. Broadband wireless systems and ICT are critical tools for this by supporting monitoring of environmental conditions – such as oceanographic habitats and land-use changes – through use of satellite imagery and radiocommunications / wireless applications. By facilitating information exchange based on accurate, real-time scientific information, broadband supports better decision-making and improved assessment of progress in meeting environmental targets.

Proposed Goal 14. Conserve and sustainably use the oceans, seas and marine resources for sustainable development

Mauritania managing marine resources sustainably[37]

To ensure the sustainable management of Mauritania's marine resources, one of the most abundant in fish stocks worldwide, a fishing vessel observation system was created to gather information on the identification and positioning of ships, via radio technology. As a result, localized objects can get assigned to fishing licenses – so that the missions of observation units can be optimized – and the fishing authorities are better enabled to intervene with fishing operations when necessary.

Key Success Factors:

This observation system was originally financed by the German Development Bank.[38] However, the project-executing agency, the DSPCM (Délégation à la Surveillance des Pêches et au Contrôle en Mer), has managed to maintain services and operations independently at an adequate level over the past years because the Mauritanian state continues to provide sufficient funding.

More generally, efforts must be made to ensure that project-executing agencies can self-generate income so as to ensure proper internal operations and to make necessary investments, provided it is subject to appropriate public supervision. For example, while the raw data should remain free and open and be shared at the global scale, data products and services can provide highly needed financial income for government agencies as well as the private sector.

Proposed Goal 15. Protect, restore and promote sustainable use of terrestrial ecosystems, sustainably manage forests, combat desertification, and halt and reverse land degradation and halt biodiversity loss

United Arab Emirates monitors its environment[39]

The UAE National Statistics Center, with the Ministry of Environment, decided to develop a common environmental database that will support the assessment of the UAE's sustainable development initiatives. Experiences will be exchanged to build an integrated statistical database and co-ordinate the design of forms and applications to be used in collecting data and statistical information. Through this agreement and strategic partnership this decision-making tool on environmental issues will be used by policymakers, as well as regional and international organizations, for decision making based on real-time data. This database will also be valuable for regional and international organizations in assessing UAE's sustainable development initiatives.

Key Success Factors:

Harnessing the 'data revolution'[40] is fundamental to building shared global understanding of challenges related to natural resource management and environmental protection. Broadband-enabled technologies can facilitate the collection, processing and distribution of massive quantities of information and ensure accessibility for the general public.

Peace, justice and social inclusion

Broadband policies which integrate accessibility services and open government activities can help build the foundations for long-term civil stability. Improving interactions between government and citizens – for example, through e-government and e-diplomacy – can prevent corruption, promote accountability and facilitate enhanced transparency around human rights. Additionally, promoting inclusive societies and institutions includes amplifying accessibility to persons with disabilities (PwDs). This entails removing barriers – so that persons with disabilities can use ICT – and establishing enabling environments for ICT accessibility, including web accessibility. By offering alternative communications links, broadband technologies and services help promote equal opportunities for PwDs.

Proposed Goal 16. Promote peaceful and inclusive societies for sustainable development, provide access to justice for all and build effective, accountable and inclusive institutions at all levels

Promoting peace with ICT[41]

In early 2014, the Whitaker Peace and Development Initiative (WPDI) founded the Youth Peacemaker Network (YPN) project in Tijuana, Mexico. WPDI, with its technology partner, Ericsson, aims to break the cycle of violence in Tijuana by empowering youth with ICT and education solutions to help catalyze positive social change. Young people are being taught ICT skills and responsible use of the internet, and how technology can assist them in their community-building efforts. With other projects based in South Sudan and North Uganda, WPDI is inspiring a new generation of leaders in conflict-affected areas to become agents of positive change through ICT, thus laying the foundations for peaceful and prosperous global human development.

Key Success Factors:

Collaborative, multi-stakeholder partnerships have been crucial in the implementation and success of the YPN, with each organization providing expertise and support in various ways. As technology partner, Ericsson provides internet access via mobile broadband, tablets, and mobile phones alongside basic ICT and social media training and tools.

One-stop-shop for e-government in the Republic of Macedonia[42]

The Former Yugoslav Republic of Macedonia has been an early adopter of e-Government. The interoperability system for connecting the institutions for exchanging data and documents has a crucial role in providing one stop shop administrative services, but also speeding up the process of implementation of new and better e-services. Completely electronic public procurements, e-tax services, e-cadastre, e-registration of a company, are one of the positive examples keeping Macedonia among the world's top 5 reformers in the World Bank Doing Business Report.

Key Success Factors:

By using a combination of new and amended legislation, the Republic of Macedonia has eliminated barriers for usage of e-Government services. Legislation designed in this way allows for e-government services to be integrated into a single platform, thus facilitating easy access and making governance processes more efficient and streamlined.

Denmark improving IT accessibility for persons with disabilities[43]

In Denmark, IT accessibility for people with impaired functionality is an important focus area in the achievement of joint public goals regarding full digital communication between citizens and the public sector. However, a 2010 Danish IT and Telecom Agency 'Webtjek' survey of accessibility of public websites showed that there was room for improvement: only a little under half (48%) had few or no serious accessibility problems, while a little over half of websites surveyed (52%) had several functionalities or content that were not accessible. Following the survey, information and consultancy provision has been tightened up, and new e-learning modules on IT accessibility have been developed for a wide range of public employees.

Key Success Factors:

Establishing a comprehensive monitoring framework based on industry-wide metrics and indicators is an important aspect of broadband and ICT deployment to ensure equal access for all. Government web accessibility includes surveying existing government websites to measure their accessibility levels in compliance with international standards and setting targets for implementation of web accessibility guidelines by all government websites, including training of web developers. Valuable insights gained from surveys can help shape strategies to improve current policies and activities for overcoming the digital divide.

Section 3 will expand on these success factors to provide more general recommendations on how governments can create a policy environment and market conditions that encourage widely accessible and affordable broadband deployment.


3
THE WAY
FORWARD

Sections 1 and 2 have proven that there is considerable scope to leverage the transformative potential of ICT and broadband to achieve sustainable development for all. Best practice examples from around the world show that governments are already reaping the benefits of ICT in the form of better governance, economic growth, environmental management, resource efficiency as well as social development and inclusion. They also show that, for broadband to deliver these benefits, an enabling policy and market framework must be actively created. Long-term planning, incentives, collaboration, cross-ministry coordination, community engagement, use of existing infrastructure, knowledge transfer and effective monitoring and evaluation are all important factors for success.

As we consider the post-2015 development agenda and embark on a process of creating a set of global Sustainable Development Goals, it is important that ICT and broadband are recognized as key crosscutting means of implementation. Not only can these technologies bring innovation, connectivity and efficiency gains to other sectors, they can overcome the effects of social and economic exclusion, boost enterprise productivity and strengthen resilience by protecting critical infrastructure.

One of the key challenges the proposed SDGs are trying to address is the interconnectedness of development issues – for example that human health ultimately depends on environmental health; and that education of girls is a catalyst for improved economic and health outcomes. ICT and broadband can help the global community to manage these inherently complex and interconnected challenges in a sustainable way, create multiplier effects and synergies, and amplify the speed and scale of transformation, especially in the world's least developed and most vulnerable regions.

But for ICT to play its part effectively, more needs to be done to realize its full potential. This was the focus of the Broadband Commission's 2013 report, *Transformative Solutions for 2015 and Beyond*, which proposed 10 recommendations to stakeholders to realize ICT's potential in sustainable development. The same recommendations apply in relation to the proposed SDGs, starting with the need for every nation to introduce a comprehensive National Broadband Plan (NBP) that integrates the principles of sustainable development and explicitly recognizes ICT and broadband's role in socio-economic development (as many countries have already done).

Beyond this, governments need to create a policy environment and market conditions that encourage widely accessible and affordable broadband deployment by, for example, identifying regulatory gaps and barriers; streamlining planning processes and building cross-ministerial synergies; raising awareness and incentives for uptake; and sharing knowledge and best practice. Finally, in cases where different entities are in charge of inter-related broadband aspects, an overall coordinating framework should be put in place to share information and coordinate initiatives for the supply and use of broadband. Some broadband plans assign the coordinating role to a particular ministry, agency or set up a dedicated council.

The following recommendations build on industry suggestions for government action and internationally recognized best practices with the aim of helping policymakers create the right enabling frameworks for ICT and broadband to be rolled out universally and play a significant, transformative role in society. For ICT and broadband to fulfill their potential as a powerful means of implementation in achieving the proposed SDGs, actions are needed from governments across three key areas: policy, markets and monitoring.

Policy-focused Actions

1. **Accountability:** designate particular ministry, agency or set up a National Broadband Council to achieve cross-ministry collaboration and broadband policy integration. Include explicit environmental and socioeconomic development goals in NBPs.
2. **Regulation:** identify where regulatory gaps, barriers or overlap could stall development or increase time to market of emerging, cross-sector ICT applications. Establish a pro-investment environment through best practice regulatory policy, fair and transparent regulation, and constructive dialogue with stakeholders. Encourage network and facility sharing through "soft" measures such as cross-sector infrastructure mapping that enables the coordination of civil works. Adopt a "light-touch" regulatory approach, intervening only when necessary, while ensuring that market forces work without constraints and in favor of innovation.
3. **Consistency:** define clear, nationally consistent planning approval processes for base-stations and align exposure guidelines with World Health Organisation (WHO) and ITU-R recommendations.
4. **Trust:** in consultation with stakeholders, develop clear guidelines on privacy and human rights to build public trust in ICT and incorporate secure identity authentication into e-government services to boost consumer adoption and awareness.

Market-based Actions

1. **Spectrum:** allocate sufficient spectrum. License spectrum in regionally harmonized bands to build economies of scale and bring down end-user device costs. Design spectrum allocation mechanisms (e.g. auctions, beauty contests, etc.) to maximize long-term socio-economic benefits, not maximize short-term revenue. Complete the digital switch-over in television broadcasting to release 'digital dividend' spectrum for mobile broadband. Assign spectrum for a license term that allows for a reasonable rate of return, e.g. 15-20 years.
2. **Investment:** use existing universal service funds to accelerate rollout of broadband. Provide investment incentives to the private sector and harness market dynamics and competition to create good consumer outcomes, especially where ICT applications generate proven positive outcomes. Where sustainable business models are not possible, consider alternative investment models. Invest in and liberalize international gateways. Invest in smart city solutions to reap municipal and environmental benefits and spur innovation. Support knowledge- and capacity-building on regulatory principles and best practice. Subsidize broadband-enabled educational tools for young people to boost learning and ICT skills while supporting sector growth. Incentivize uptake of e-applications by funding or facilitating scalable pilots.
3. **Partnership:** facilitate partnerships between the private sector, government agencies and development communities. In particular, because of trends of increasing mobile-enabled technology uptake, facilitate partnerships among mobile operator members, the wider mobile industry and development communities to drive commercial mobile services in mobile money, mobile health and mobile education and share findings. Work actively across ministries to find synergies and policy approaches that simultaneously achieve multiple goals.
4. **Neutrality:** establish a level playing field for new market entrants. Let the market decide which technology to use by adopting a technology-neutral approach.

Monitoring, Measurement & Standardization Actions

1. **Goals and targets:** in addition to fiber deployment targets, include ambitious, achievable targets for mobile broadband coverage. Set measurable goals for broadband-enabled development initiatives to spur progress in ICT for development initiatives, for example using the SDSN's proposed indicators (Box 2). Set successful delivery of NBPs as a cross-ministry KPI (key performance indicator) to prioritize adoption and build ownership.
2. **Monitoring:** task the telecoms regulatory authority with robust monitoring and auditing of broadband penetration and use. Contribute actively to international and intergovernmental monitoring initiatives.
3. **Standardization:** encourage the development of standardized methodologies for measuring the impact and effectiveness of broadband and sector-specific metrics based on empirical research.
4. **Knowledge-sharing:** harness the 'data revolution' to build shared global understanding of sustainable development challenges. Promote the sharing and dissemination of ICT innovation and lessons learned from sustainable development pilot projects so they can be scaled. Raise public awareness of the transformative potential of ICT to build demand for broadband-based, sustainable solutions.

Box 2: ICT-related indicators included in the proposed SDSN indicator framework

The Sustainable Development Solutions Network (SDSN)[45] is proposing indicators and a monitoring framework aligned with the proposed SDGs to serve both as a management tool to help countries develop implementation and monitoring strategies, and as a report card to ensure accountability and measure progress towards targets in achieving the proposed SDGs. In recognition of the vital role broadband and ICT can play as a critical means of implementation, two ICT-related indicators, still under development, are included in the proposed SDSN indicator framework[46]:

Indicator 65: Mobile broadband subscriptions per 100 inhabitants by urban/rural

Indicator 66: Index on ICT infrastructure performance
ICT and other advanced technologies are critical for economic development and achieving the other SDGs. To properly measure implementation, an index is needed to track both the quality and performance of countries' ICT infrastructure. This proposed index would measure three equally weighted dimensions of ICT infrastructure performance:

- **Fixed broadband quality:** measured as mean download speed (in kilobits per second), as established through user speed tests;
- **Mobile broadband quality:** measured as the proportion of download speed test measurements with download throughput of [1 megabit per second] or greater; and
- **International bandwidth capacity:** measured as bandwidth connected across international borders to metropolitan areas as of mid-year (expressed in megabit per second (mbps).

Transformative Solutions for 2015 and Beyond:

10 recommendations for multi-stakeholder action from the Broadband Commission:

1. **Affordability & Accessibility:** Make ICT and high-speed broadband universally available at affordable cost for all.

2. **Sustainable Development Strategy & Vision:** Ensure that ICT and broadband are embedded in all of the universal goals and national targets to be defined as part of the Post-2015 global development agenda to fully capture transformative, sustainable solutions.

3. **Cross-Sector Integration of Policy & Plans:** Deploy national development policies and plans to actively drive cross-sector integration of economic and social outcomes deliverable and scalable through ICT and broadband.

4. **Enabling Regulatory Environment:** Create a streamlined and enabling regulatory environment for the broadband era that accelerates removal of barriers to market entry for broadband ICT uptake.

5. **Market Incentives:** Provide consumer incentives and harness government procurement to drive demand and stimulate private sector innovation and investment.

6. **Partnership & Multi-stakeholder Collaboration:** Twin broadband innovation and investment with sustainable multi-stakeholder business models to capitalize on the transformative potential of universal ICT.

7. **Spectrum Optimization:** Drive the game-changing potential of mobile broadband through the optimized use of radioelectrical frequency spectrum for universal ICT for development penetration.

8. **Harmonization & Standardization:** Promote the utilization of global standards to enable the harmonization and interoperability of ICT and broadband-enabled services and applications, putting special emphasis on affordability and accessibility.

9. **Monitoring & Evaluation:** Establish a comprehensive monitoring framework for broadband deployment and robust accountability mechanisms to track development progress via industry-wide broadband ICT metrics and indicators.

10. **Resource Mobilization, Innovation & Investment:** Develop appropriate solutions to maximize resource mobilization, innovation and investment in broadband for both developed and developing countries.

REFERENCES

1. UN Member States mandated the Open Working Group with this task at the Rio+20 conference in 2012, through the Future We Want outcome document (full text available at https://rio20.un.org/sites/rio20.un.org/files/a-conf.216l-1_english.pdf.pdf). The Open Working Group (OWG) was established in January 2013 and includes a total of 70 Member States in 30 multi-constituency seats representing the regional groups. Between March 2013 and July 2014, the OWG held thirteen sessions in an effort to develop an SDG proposal for consideration by the UN General Assembly. Further information available at **http://sustainabledevelopment.un.org/owg.html**
2. Full text available at **http://sustainabledevelopment.un.org/focussdgs.html**
3. Means of implementation are important systemic factors and enabling mechanisms such as finance, technology, capacity-building and trade, on the one hand, and sound policy and institutional frameworks, multi-stakeholder collaboration and data, monitoring and accountability, on the other.
4. See **www.broadbandcommission.org**
5. A variety of examples were chosen (public policy actions, government-led initiatives, multi-stakeholder initiatives, etc.) to highlight the different ways in which governments can leverage broadband to achieve sustainable development objectives. These best practices are taken from a series of reports, interviews as well as a cross-country analysis of 119 national broadband plans conducted by the Broadband Commission Secretariat. This analysis reveals several examples of how governments are already implementing ICT/Broadband to advance social development, economic growth and environmental protection. For the purposes of this report, countries that featured the most comprehensive best practice in one sector (e.g. broadband for health) were selected
6. Ericsson. "New Study Quantifies the Impact of Broadband Speed on GDP." Press Release, 27 September 2011. Available at **http://www.ericsson.com/news/1550083**
7. United Nations. The Millennium Development Goals Report 2014. New York, 2014. Available at **http://www.un.org/millenniumgoals/2014%20MDG%20report/MDG%202014%20English%20web.pdf**
8. Further information available at **http://www.gsma.com/mobilefordevelopment/programmes/mobile-money-for-the-unbanked**
9. Warner, Bernhard. "What Africa Can Teach Us About the Future of Banking," Bloomberg Business Week, 6 March 2013. Available at: **http://www.businessweek.com/articles/2013-03-06/what-africa-can-teach-us-about-the-future-of-banking**
10. Broadband in Vietnam, Forging Its Own Path. InfoDev, 2011. Available at **http://www.infodev.org/infodev-files/resource/InfodevDocuments_1127.pdf**
11. ICT National Strategy. Belize Ministry of Public Service, Governance Improvement, Elections & Boundaries and Sports, 2011. Available at **http://www.caribbeanelections.com/eDocs/strategy/bz_strategy/bz_national_ict_strategy.pdf**
12. "Business Processing Outsourcing Revolutionizing in Belize," BelizeInvest.net, 14 June 2012. Available at **http://belizeinvest.net/2012/06/14/business-processing-outsourcing-revolutionizing-in-belize/**
13. PwC. "Connected Life: the Impact of the Connected Life Over the Next Five Years," 2013. Available at **http://www.gsma.com/connectedliving/wp-content/uploads/2013/02/GSMA-Connected-Life-PwC_Feb-2013.pdf**
14. See **http://1millionhealthworkers.org/about-us/**
15. See **http://www.mobilemamaalliance.org/**
16. See **http://nmis.mdgs.gov.ng/**
17. Telecom Regulatory Authority of India. Recommendations on National Broadband Plan. New Dheli, 2010. Available at **http://www.trai.gov.in/WriteReadData/Recommendation/Documents/Rcommendation81210.pdf**
18. GSMA. "The Mobile Economy India," 2013. Available at **http://www.gsmamobileeconomyindia.com/GSMA_Mobile_Economy_India_Report_2013.pdf**
19. Lalmalsawma, David. "Telemedicine in India might be just what the doctor ordered," Reuters Blog, 4 June 2014. Available at **http://blogs.reuters.com/india/2014/06/04/telemedicine-in-india-might-be-just-what-the-doctor-ordered/**
20. United Nations. The Millennium Development Goals Report 2014. New York, 2014. Available at **http://www.un.org/millenniumgoals/2014%20MDG%20report/MDG%202014%20English%20web.pdf**
21. UNESCO. 11th Education for All Global Monitoring Report "Teaching and learning: Achieving quality for all," Paris, 2014. Available at **http://unesdoc.unesco.org/images/0022/002256/225660e.pdf**

22. See **http://connecttolearn.org/**
23. See **http://moocs.com/**
24. Egypt National Broadband Plan. 2011. Available at **http://www.ntra.gov.eg/emisr/Presentations/Plan_En.pdf**
25. See **http://www.gatesfoundation.org/What-We-Do/Global-Development/Global-Libraries**
26. The Climate Group (on behalf of GeSI). SMART 2020: Enabling the low carbon economy in the information age. 2008. Available at **http://www.smart2020.org/publications/**
27. Momentum for Change is an initiative to raise awareness of innovative, transformative solutions that address climate change along with wider economic, social and environmental challenges. Further information available at **http://unfccc.int/secretariat/momentum_for_change/items/7861.php**
28. Sustainable Development Solutions Network. An Action Agenda for Sustainable Development, Report for the UN Secretary-General. 6 June 2013. Available at **http://unsdsn.org/resources/publications/an-action-agenda-for-sustainable-development/**
29. US Federal Communications Commission. Connecting America, the National Broadband Plan. 2010. Available at **http://download.broadband.gov/plan/national-broadband-plan.pdf**
30. WHO. Global Health Observatory: Urban Population Growth. Accessed 11 September 2014. Available at **http://www.who.int/gho/urban_health/situation_trends/urban_population_growth_text/en/**
31. UN-Habitat. State of the World's Cities 2012/2013: Prosperity of Cities. 2013. Available at mirror. unhabitat.org/pmss/getElectronicVersion.aspx?nr=3387&alt=1
32. Ericsson and UN-Habitat, "The role of ICT in the new urban agenda," September 2014. **www.ericsson/sustainability.com**
33. Ibid
34. Ibid
35. Stockholm Royal Seaport. "Sustainability gains through shared ICT infrastructure". 22 April 2014. Available at **http://stockholmroyalseaport.com/en/news-and-events/sustainability-gains-through-shared-ict-infrastructure/#.VBEeB1aRLwI**
36. National ICT Strategy and Plan NICI – 2015. Rwanda, 2011. Available at **http://www.rdb.rw/uploads/tx_sbdownloader/NICI_III.pdf**
37. See **http://www.itu.int/wsis/stocktaking/scripts/documents.asp?project=1115033513&lang=en**
38. KFW. "Mauritania: Fishery Monitoring and Surveillance I and II, Ex-Post Evaluation Report. 2008. Available at **https://www.kfw-entwicklungsbank.de/migration/Entwicklungsbank-Startseite/Development-Finance/Evaluation/Results-and-Publications/PDF-Dokumente-L-P/Mauritania_Fishery_Monitoring_Surveillance_2008.pdf**
39. See **http://www.itu.int/wsis/stocktaking/plugin/documents.asp?project=1302979807&lang=en**
40. See **http://www.post2015hlp.org/wp-content/uploads/2013/08/What-is-the-Data-Revolution.pdf**
41. See **http://wpdi.org/**
42. Republic of Macedonia Ministry of Information society and Administration. "Information Society Development in the Republic of Macedonia," May 2014.
43. 37 Telecommunication Market and Regulatory Developments. Denmark, 2011. Available at **http://ec.europa.eu/digital-agenda/sites/digital-agenda/files/DK_Country_Chapter_17th_Report_0.pdf**
44. Further information on GSR Best Practice Guidelines 2013 on the evolving roles of both regulation and the regulators in a digital environment is available at **www.itu.int/bestpractices**
45. See **http://unsdsn.org/**
46. Sustainable Development Solutions Network. "Launching a data revolution for the SDGs: A report by the Leadership Council of the Sustainable Development Solutions Network," 25 July 2014. Available at **http://unsdsn.org/resources/publications/indicators/**

BROADBAND
COMMISSION
FOR DIGITAL DEVELOPMENT

WWW.BROADBANDCOMMISSION.ORG