

# TRANSFORMATIVE SOLUTIONS FOR 2015 AND BEYOND

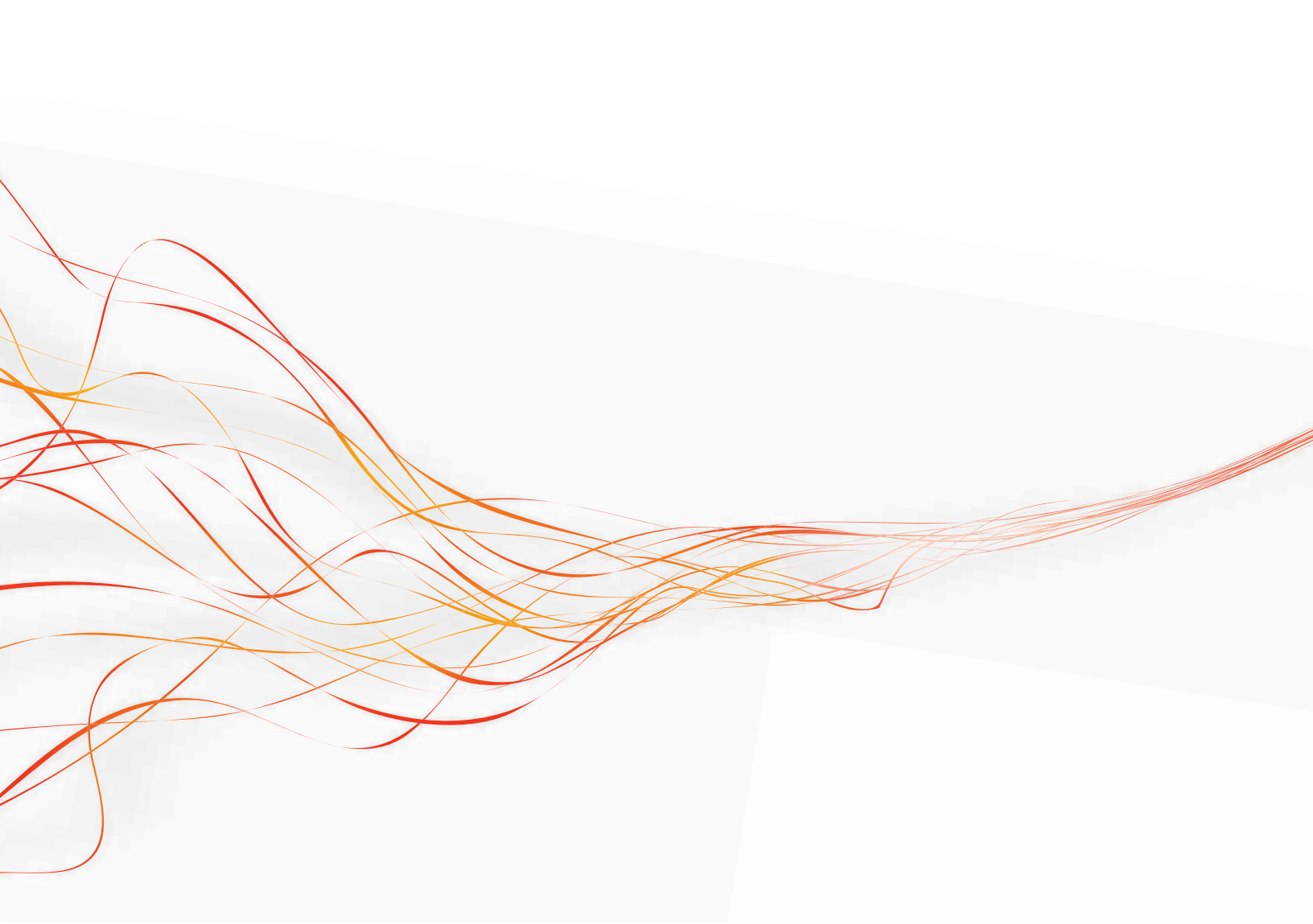
**A REPORT OF THE BROADBAND COMMISSION  
TASK FORCE ON SUSTAINABLE DEVELOPMENT**

In collaboration with:

**ERICSSON** 







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TASK FORCE ON SUSTAINABLE DEVELOPMENT**

# 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 roll-out 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](http://www.broadbandcommission.org).

## Disclaimer

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The views of the Broadband Commissioners reflected in this publication are personal and do not entail any responsibility for their respective governments, or for the organizations to which the Commissioners are elected, with which they are associated, or by which they are employed.

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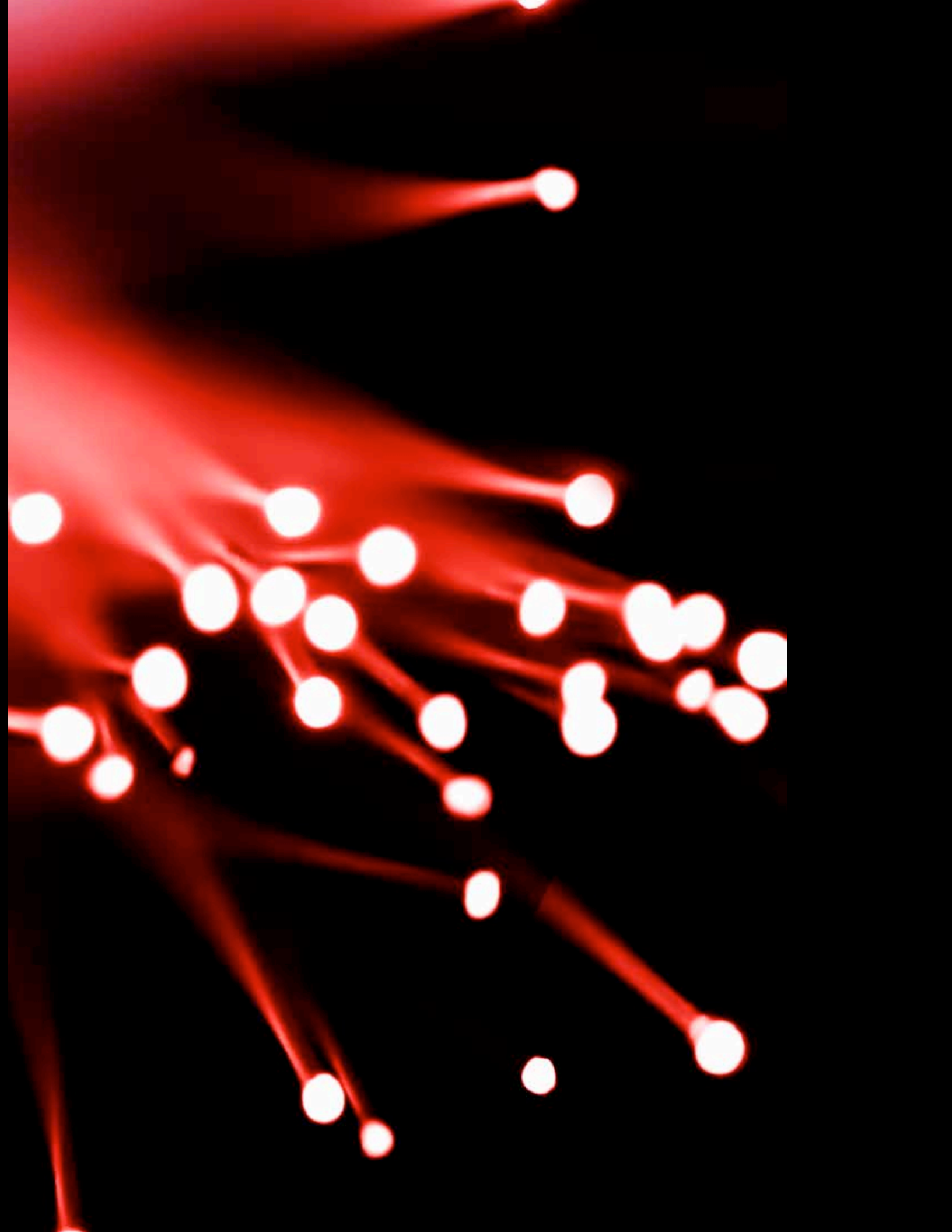
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For additional information on the initiatives presented in this report, please visit the Broadband Commission's online repository of information: [www.broadbandcommission.org/sharehouse](http://www.broadbandcommission.org/sharehouse)

All are welcome to access its content, and to submit further contributions.

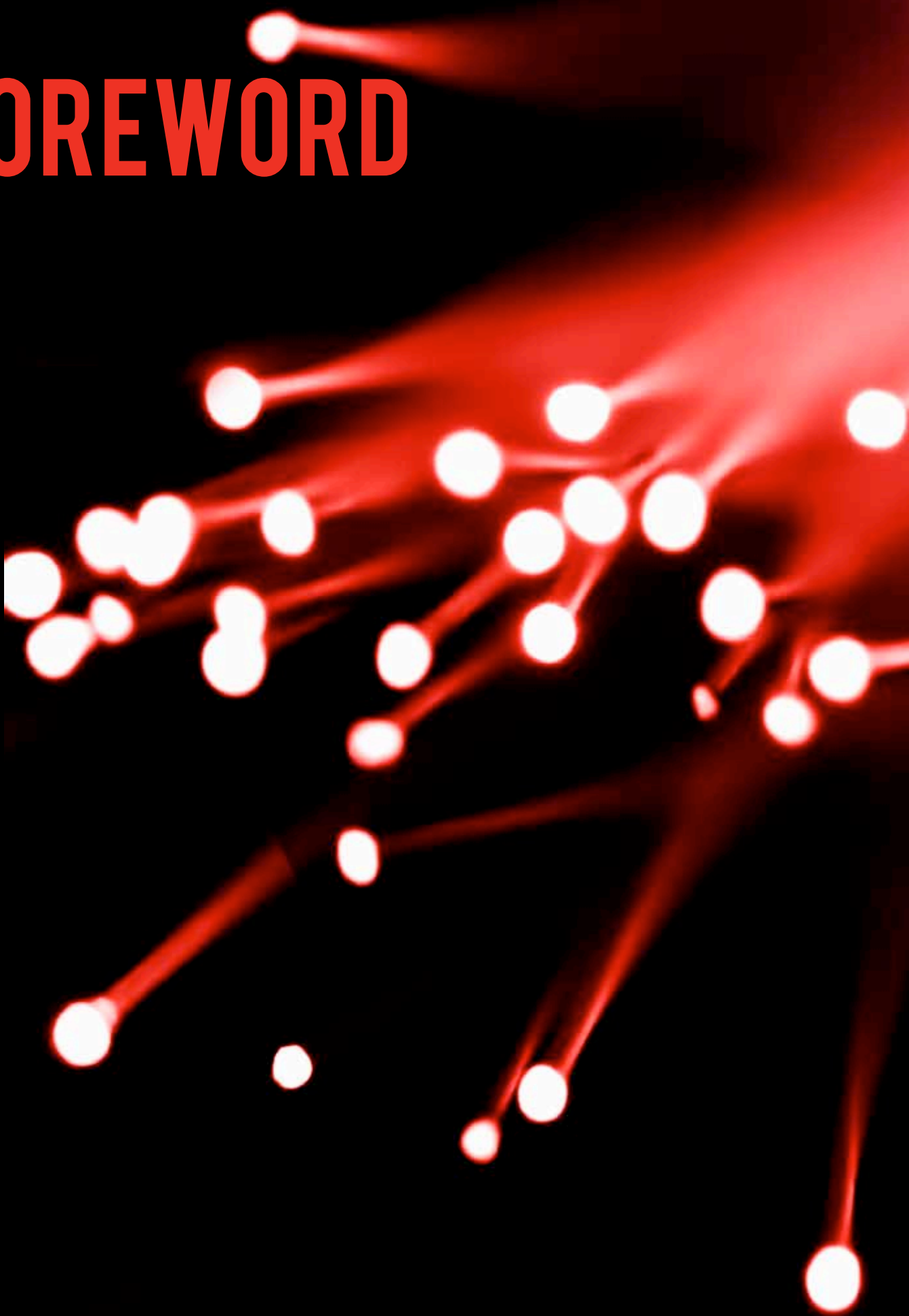


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# FOREWORD





## Dear fellow leaders and stakeholders,

As we approach 2015, a new global partnership is being forged to carry on the work of the Millennium Development Goals (MDGs) and shape a new sustainable development agenda involving all sectors of society. We, the members of the Broadband Commission for Digital Development, consider broadband to be a vital part of that discussion, as it is one of the strongest and most effective tools in bringing about transformative solutions for sustainable development. From governance to health to education to gender equality to enabling the low-carbon economy, broadband is already advancing a more equitable, inclusive and environmentally healthy world—but there is more work still to be done.

In 2013, the Broadband Commission issued an Open Letter to the UN Secretary General's High-Level Panel of Eminent Persons, calling for broadband to be prominently recognized in the Post-2015 framework for sustainable development, in recognition of the key role broadband will play in our connected future. In March, the Broadband Commission established a Task Force on Sustainable Development and the Post-2015 Development Agenda to explore some of the issues of how broadband can best contribute to development goals. This report represents the outcome of our discussions to date.

Through this work the Broadband Commission would like to encourage the international community to recognize the need for transformative solutions in the Post-2015 development agenda; and this report makes the case. The report presents for the first time new research showing how countries around the world use their national broadband plans as key policy instruments to leverage the full potential of broadband as an enabling infrastructure to accelerate sustainable development; yet there are also many missed opportunities, not least within poverty reduction and food security.

The report also examines best practices from five countries – Japan, Mexico, the Philippines, Rwanda, and Sweden – that have successfully integrated a wide range of development goals into their national broadband plans, primarily by recognizing the importance of collaborating across all sectors to realize shared aims.

The multiple problems that need to be tackled and their interlinked nature demand this type of coordinated and effective cross-sector collaboration, in which governments, civil society, business, academia and individual citizens pool their skills, resources and know-how. Stakeholders expect industry to play its part in driving the necessary investment and innovation, and that scalable solutions will be brought to market that address sustainable development challenges. This is both a responsibility and a business opportunity.

For this to happen, a strong enabling framework is required. Governments can accelerate the pace of transformation by linking their development policies to make universal broadband accessible and affordable to all, in order to meet their national development and poverty reduction goals. Policymakers are urged to take timely action to create this framework by acting on the report's ten recommendations.

The members of the Commission hope this Report will be a valuable contribution to the important global discussions underway today to carry on the work of the MDGs and formulate a new set of goals and targets going forward. The report is based on interviews and supporting material from leaders and experts spanning a broad stakeholder group of industry, government, academia and international organizations. This includes several members of the Broadband Commission for Digital Development, representatives from several national governments, and other experts. The interviews were complemented by relevant reports and data.

*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  
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Sustainable Development and  
the Post-2015 Development  
Agenda

The background of the slide is a black field filled with a network of glowing red lines and white dots. The lines radiate from various points, creating a sense of dynamic movement and connectivity. The white dots are scattered throughout, some appearing as isolated points and others as part of the network structure. The overall effect is a high-tech, futuristic aesthetic.

# **EXECUTIVE SUMMARY**

# Transformative Solutions for 2015 and Beyond

## The Sustainable Development Challenge

The world has changed significantly since 2000, when the Millennium Development Goals (MDGs) were adopted (Millennium Declaration, 2000). While strong economic growth in the developing world has helped lift millions out of poverty, global population growth, modern lifestyles and consumption are now stretching the limits of the planet's resources. During this time, technological advances in information and communication technologies (ICT) have radically transformed the way people communicate and lead their lives; now ICT can play a vital, transformative role in helping to put the world on a more sustainable path.

Recent crises in the financial, global food and energy sectors have highlighted fragility in global systems, as well as weaknesses in governance and persistent inequalities among vulnerable or disadvantaged populations. In addition, constraints to development have become apparent, such as climate change, increasing environmental degradation and population growth. Together with complex societal issues like rising inequality, ageing, infrastructure, gender equality, childhood development and education, as well as a lack of decent jobs for youth, these challenges point to an urgent need for an integrated, single sustainable Post-2015 development agenda.

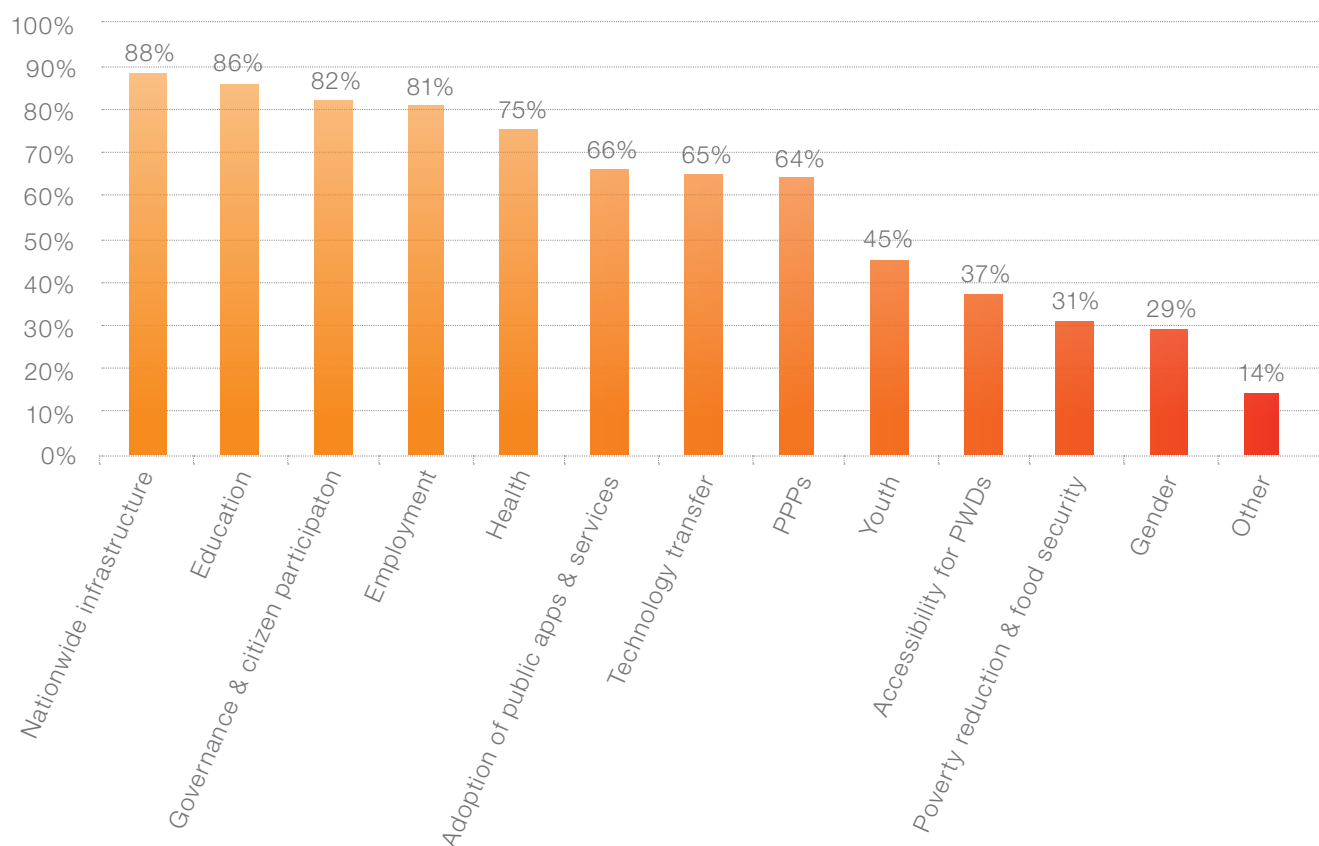
As well as continuing to drive progress against the MDGs to 2015 and beyond, the Post-2015 sustainable development agenda needs to refocus efforts on reaching vulnerable or marginalized groups and tackling the interrelated root causes of poverty, inequality and environmental degradation. It must shift technology and behaviour towards sustainable consumption and production patterns to decouple continued growth and improved living standards from the unsustainable use of resources. Business-as-usual is simply not an option.

Innovative, scalable multi-stakeholder solutions are needed to deliver inclusive economic growth and a shift to sustainable patterns of consumption and production. The world needs to adopt a more integrated and comprehensive approach to development – and in this, ICT and broadband can make a major contribution. This report examines the role broadband and ICT can play as transformative solutions to achieving sustainable development for all.

## Broadband Plans in Action

New research conducted by the secretariat of the Broadband Commission shows that while national broadband plans increasingly recognize broadband's role in socio-economic development, much more needs to be done to support this 'invisible technology' transforming our world. A regulatory environment that encourages widely accessible and affordable broadband deployment is the only way to realize its potential to advance sustainable development – for example through proactive policy on spectrum and the protection of inventions.

Figur: Overview of inclusion of socio-economic elements in national broadband plans, 2013



Source: ITU/UNESCO Broadband Commission for Digital Development.

National broadband plans increasingly do link broadband and ICT explicitly with the achievement of societal goals: 86% refer to its role in improving access to education and educational outcomes; 82% address how ICT can improve governance, although emphasis is mainly on accessibility to services and three-quarters of plans analyzed refer to health. In contrast, however, child and maternal health (MDGs 4 and 5) were barely mentioned, indicating a need to raise awareness of

the considerable potential for broadband and ICT to enhance such healthcare systems, strengthen primary health systems and build foundations for addressing non-communicable diseases, including mental health. Only 31% of plans refer to poverty reduction and food security, with fewer than 20% linking broadband and ICT with agriculture, and only 6% considering the use of these technologies ICT to monitor food safety.

## Overview of Best Practices

As well as raising awareness and providing incentives for consumers to take up more sustainable products and services, governments can play an important role in piloting, experimenting and disseminating best practices. Broadband plans offer a rich opportunity to advance socio-economic development in a wide range of areas including education, healthcare, and poverty. Chapter 3 presents a selection of best practices from five world regions with diverse economic circumstances, demonstrating integration of sustainable development and broadband strategies, and successful fusion of broadband usage with inter-Ministry collaboration to achieve development aims.

The national broadband plans of Mexico, Japan, the Philippines, and Sweden demonstrate advanced integration of socio-economic elements, tackling all issues covered in the analysis conducted by the secretariat of the Broadband Commission (see Chapter 2). Rwanda was selected to showcase a developing country that is proactively using broadband to support its sustainable development needs, particularly in the area of health. The plans of all these countries build on existing knowledge systems, aim to use appropriate technologies to reach communities, and benefit from strong institutions to guide policy integration.

## Transformative Solutions

The transformative potential of broadband ICT lies in the synergies, transparency and inclusion that broadband-enabled technologies can create. It can be seen in their capacity to dematerialize and drive efficiency, and in the speed with which they can globally and cost-effectively scale sustainable solutions. Chapter 4 examines the transformative potential of broadband and ICT for sustainable development across the goals proposed by the Sustainable Development Solutions Network (SDSN).

## Recommendations

To harness the potential of ICT as a catalyst for sustainable development, this chapter presents ten recommendations on the measures and commitments needed from governments and other stakeholders to fully leverage the potential of broadband and ICT to enable a sustainable future:

## Recommendations for multi-stakeholder action

1. Make ICT and high speed broadband universally available at affordable cost for all.
2. 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. 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. Create a streamlined and enabling regulatory environment for the broadband era that accelerates removal of barriers to market entry for broadband ICT uptake.
5. Provide consumer incentives and harness government procurement to drive demand and stimulate private sector innovation and investment.
6. Twin broadband innovation and investment with sustainable multi-stakeholder business models to capitalize on the transformative potential of universal ICT
7. Drive the game-changing potential of mobile broadband through the optimized use of radio-electrical frequency spectrum for universal ICT for development penetration
8. 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. 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. Develop appropriate solutions to maximize resource mobilization, innovation and investment in broadband for both developed and developing countries.

The background is a dark, almost black, space filled with vibrant red and white light effects. Several bright white circular bokeh lights are scattered across the frame, each with a soft, out-of-focus glow. From these lights, thin, elongated red streaks or 'comets' of light extend outwards, creating a sense of motion and depth. The overall composition is abstract and futuristic, with a strong emphasis on the contrast between the dark background and the bright, energetic light trails.

# INTRODUCTION



The world faces a crucial juncture as the fifteen-year period dedicated to confronting the world's persistent problems of poverty, malnutrition, chronic disease and lack of education through the Millennium Development Goals (MDGs) nears its completion in 2015. The Rio+20 Summit in June 2012 resolved to finish the job of ending extreme poverty and hunger as a matter of urgency. In addition, it set poverty reduction within the broader context of sustainable development. As a follow up to this conference the UN is now carrying out global consultations with diverse stakeholders to help define the post-2015 development framework, potentially including a new set of Sustainable Development Goals to be established after 2015.

The global challenges we face today require urgent action and a broader vision. Ending extreme poverty remains a central challenge, as do improving the areas of health, education, social inclusion and gender equality. Equally critical is improving people's lives within planetary resource limitations; ensuring food security by improving agriculture systems and raising rural prosperity; empowering inclusive, productive and resilient cities; supporting and securing the natural ecosystem and biodiversity; curbing human-induced climate change; and transforming governance. All sectors of society, and all levels of government, will have to work together to ensure that the most effective solutions to these challenges are applied in the best, possible way.

Transformative solutions to these challenges enabled by broadband and information and communication technologies (ICT) are already being deployed on the ground, having an enormous impact across lives and livelihoods, shaping education, healthcare, business efficiency, food security and more. Connectivity is improving access and social inclusion for more vulnerable, disadvantaged populations. Mobile

technology is now enabling real-time monitoring and management of progress towards development goals. Since ICT and broadband cut across other industrial sectors as supporting infrastructure, they enable improvements in speed and scale in implementing solutions that can improve living standards, social fairness, and environmental sustainability, as well as drive down costs and improve service delivery. Broadband is uniquely positioned to deliver the integrated solutions leveraged across sectors that UN Secretary-General Ban Ki-moon has called for. In addition, the Rio+20 Summit emphasized that a change in mindset is needed for sustainable development, and the development community is working hard to change outlooks and improve self-reliance, as well as implementing innovative new solutions.

Yet more needs to be done to realize the full potential of broadband and ICT—not least to reach people in marginalized or disadvantaged groups, or more remote locations, who are too often left behind. The next fifteen years and beyond will see complex changes to societies and economies, such as shifting the energy system from fossil fuels to renewable energy. This transition necessitates the practical integration of economics, science, technology, and finance and a new kind of problem-solving.

By actively leveraging these technologies to address global challenges, better solutions can be delivered more rapidly, where they are needed, provided there is a concerted effort from all sectors and a supportive policy framework. The post-2015 development framework is a perfect opportunity to step up broadband and ICT's contribution to delivering cross-sector efficiencies and to the global partnership, and make sustainable development, in all its dimensions, a real possibility for this generation and beyond.

## Perspective

Hans Vestberg, CEO Ericsson and Chair of Task Force

**“As the Post-2015 sustainable development agenda process evolved, we felt an urgent need to see action. We see so many opportunities for broadband to transform all aspects of society. Technology evolves faster than policy, and we wanted to make a concerted effort to do everything we could to raise awareness of the potential.”**





# THE SUSTAINABLE DEVELOPMENT CHALLENGE

## 1.1. Confronting the challenge of sustainable development

Since 2000, when the Millennium Declaration and the Millennium Development Goals (MDGs) were adopted, the world has changed significantly. Strong economic growth, especially in the developing world, has enabled millions to be lifted out of poverty, while technological advancements have radically changed the way people communicate, organize, network, learn and participate, as both national and global citizens. Two billion people now enjoy middle-class lifestyles, with another three billion set to join them by 2030, while low- and middle-income countries are experiencing faster economic growth than high-income ones.

Despite these successes, progress has been uneven both between and within countries, leaving many behind and exacerbating inequalities, particularly among the most vulnerable or disadvantaged populations. Recent crises in the financial, global food and energy sectors have highlighted fragility in food supply systems, and exposed systemic failures in the workings of financial and commodity markets, as well as weaknesses in global governance. Furthermore, a number of relevant experts and personalities have raised a wide range of new development concerns and constraints such as climate change, increasing environmental degradation, population growth, rising inequalities, ageing, infrastructure, gender equality, early childhood development and secondary education, and a lack of decent jobs for youth were not adequately considered in the design of the MDGs<sup>1</sup>. These remaining and emerging challenges point to a pressing need for a more integrated, streamlined approach, framed by a single sustainable development agenda.

As well as continuing to drive progress towards the MDGs to 2015 and beyond, the integrated sustainable development agenda needs to refocus efforts to reach vulnerable or marginalized groups and tackle in a cohesive way the interrelated root causes of poverty, inequality and environmental degradation. It must also shift technology and behaviour towards sustainable consumption and production patterns to decouple continued growth and improved living standards from the unsustainable use of resources and build resilience, transparency and accountability into global food, financial and governance systems.

In the face of such pervasive, interconnected challenges, business-as-usual is not an option. Inclusive economic growth and a shift to sustainable patterns of consumption and production call for transformative, multi-stakeholder solutions, as a change in mindset, to sustainable development challenges. The world needs to adopt a more integrated and comprehensive approach to development, based on shared responsibility, partnership and transformative solutions – and in this, ICT and broadband can make a major contribution.

## 1.2. Growing connectivity

In the year 2000, when the MDGs were established, broadband was in its infancy and there was little evidence as to how it would impact social and economic development. Today, the reach and impact of ICT and mobile broadband in particular have soared, people are increasingly connected, and broadband is proving to be a valuable tool in improving people's lives, delivering opportunity and accelerating progress towards the MDGs.

By the end of 2013, for the first time, the number of broadband subscriptions in the developing world is expected to exceed subscriptions in the developed world in both fixed and mobile<sup>2</sup>. Over the last two years, the industry has added one billion mobile cellular subscriptions to the global mobile market. By 2014, the number of mobile subscriptions is set to exceed 7 billion<sup>3</sup>, overtaking total world population – a nearly tenfold increase over six years, from 268 million in 2007 to 2.1 billion in 2013. Developing countries account for over half (1.16 billion) of these subscriptions, although connectivity remains uneven across countries, regions, user groups and generations<sup>4</sup>.

Connectivity on this scale is a game-changer and nowhere more so than in the developing world. By 2016, over 80% of broadband is expected to be mobile and many people's first and only access to the Internet will be via a mobile device. Such connectivity, combined with advanced, low-cost devices, provides unprecedented opportunities to empower people and improve livelihoods. Already, mobile broadband is delivering far-reaching social and economic benefits in the form of healthcare, education, retail, payments, banking, public services and improved productivity.

Data, monitoring and accountability will be key to the Post-2015 development agenda; in this, ICT and broadband play another essential role. The MDGs have highlighted the importance of well-defined indicators and the need for better statistical data systems to track progress towards international goals, and to support management efforts at achieving the goals. Thanks to our advanced information society, potential Sustainable Development Goals can be supported by online, real-time, place-based and highly disaggregated data<sup>5</sup>.

In fact, the High-Level Panel of Eminent Persons advising UN Secretary-General Ban Ki-moon on the Post-2015 Development Agenda calls for a "data revolution for sustainable development, with a new international initiative to improve the quality of statistics and information available to people and governments. We should actively take advantage of new technology, crowd sourcing and improved connectivity to empower people with information on the progress towards the targets."<sup>6</sup>

## 1.3. Enabling sustainable development

The connection between broadband and rising GDP is well-established. Chapter 4 discusses the many ways in which mobile broadband and ICT are impacting and transforming social and economic development. In both developed and developing countries, mobile broadband services are generating significant economic benefits through investment in infrastructure deployment, as well as starting new businesses, improving efficiency and productivity, accessing news and information, developing IT literacy, and enabling links and access to new markets.

However, today, there is much better understanding of the role of ICT and broadband as key enablers of sustainable development. In addition to GDP growth, mobile broadband services provide significant social and development opportunities and ICT-enabled solutions exist in a wide range of areas, including education, health, energy, transportation, food security, agriculture, and m-banking (see Chapter 4).

Over and above economic growth, broadband, and mobile broadband in particular, can improve people's lives through applications in education, health and rural development. Previous work of the Broadband Commission has already highlighted some of the transformative solutions which broadband makes possible through broadband in reports such as **The Broadband Bridge: Linking ICT with Climate Action** and **Technology, Broadband and Education**. Broadband, for example, is enabling improved medical care in rural villages; more accurate weather information and sales prices for farmers; greater access to banking for women entrepreneurs, and 24/7 connectivity that opens up educational possibilities and a global exchange of ideas for students around the world.

In the environmental domain, ICT also has a central role to play in delivering tomorrow's resource-efficient, low-carbon economy. Although ICT contributes approximately 2% to total global carbon emissions, they play an important role in providing solutions that enable other industry sectors to reduce the remaining 98% of global carbon emissions<sup>7</sup>. Studies clearly show that more effective use of ICT can deliver tremendous savings in carbon dioxide emissions (CO<sub>2</sub>e) savings. Collaborative efforts by the public and private sectors are essential to realize this potential.

However, there is still much awareness-raising to be done about the full potential of broadband to accelerate sustainable development. The Sustainable Development Solutions Network (SDSN), comprising global leaders in business, science, technology, and civil society was tasked by the UN Secretary-General with contributing ideas for the Post-2015 development agenda, including potential Sustainable Development Goals, is calling for transformative solutions – broadband is one such transformative industry. Over the next fifteen years, broadband's contribution to socio-economic development will only increase, in line with the pace of growth of broadband globally. Through sustainable business models and a supportive policy framework, broadband connectivity can be leveraged to enable development and improve people's livelihoods. Broadband is certainly not a panacea, but integrated with appropriate policies, frameworks and systems; it can accelerate achievement of the MDGs and serve as a key tool in delivering Post-2015 sustainable development solutions.

## 1.4. Partnering to integrate ICT and broadband into the Post-2015 agenda

The Post-2015 process aims to evaluate progress towards the MDGs, scale up their success, expand their scope and address new challenges by putting sustainability at the core of the development agenda. A huge body of work by the UN and others aims to tackle priority areas such as ending poverty; promoting gender equality, universal education and human rights; ensuring decent work for all; and enabling social inclusion. These challenges are being debated and discussed in a number of forums and several major reports (including the Report of the High-Level Panel of Eminent Persons on the Post-2015 Development Agenda<sup>8</sup>, charged by the UN Secretary-General to make recommendations on the development agenda beyond 2015, and “An Action Agenda for Sustainable Development”, a Report for the UN Secretary General prepared by the SDSN).

Engagement on these issues by all sectors of society is crucial. The global economy is exploiting and pushing the limits of planetary resources, necessitating profound transformations to governance and patterns of production and consumption. These complex societal changes demand new mindsets and a new kind of problem-solving – one that integrates economics, science, technology, finance and the public good.

Finding solutions to complex, long-term challenges of this scale is beyond the capacity of any single actor. As the UN Secretary-General explained in his address to the UN General Assembly in July 2013<sup>9</sup>, meeting the challenges ahead requires renewed global partnership twinned with effective means of implementation. In this, business is a vital player, along with governments, international organizations and civil society.

The private sector is a significant contributor of the research, technology, skills, investment and new business models necessary to scale innovative solutions. Public-private partnerships (PPPs) are widely recognized as a key tool in tackling sustainable development issues from clean energy to resilient cities and sustainable food systems. Business must be encouraged to help deliver on the potential Sustainable Development Goals by anchoring technological change and new business models in sustainable development<sup>10</sup>.

The challenges are huge, but so are the opportunities. The private sector has emerged as an effective partner in addressing global development challenges, delivering many of the solutions needed for sustainable development beyond 2015. As noted in the SDSN's report<sup>11</sup>, business “deserves special note as a principal engine for economic growth and job creation...if businesses embrace a future set of sustainable development goals and are supported by clear government policies and rules that align private incentives with sustainable development, then rapid positive change will become possible”. Strong sustainable development partnerships can ensure the value companies create is sustainable and inclusive.

## 1.5. Beyond 2015: Bridging the gap

Breakthroughs in ICT offer unprecedented opportunities to improve connectivity, social inclusion, decision-making and productivity. The mobile phone in particular represents one of the largest technological platforms in history, with immense potential to significantly improve people's lives<sup>12</sup>.

Capitalizing on this opportunity starts with ensuring good-quality broadband for all. This means addressing each country's specific challenges, building the necessary physical infrastructure in a cost-efficient manner, introducing interoperable international standards, as well as flexible spectrum management policies, developing new business models for services, and making available affordable devices and services for consumers to use<sup>13</sup>. Governments have an essential role to play in creating a stable and appropriate framework for universal broadband to succeed, by fostering investments, creating a level playing-field, ensuring sustainable competition and reasonable spectrum policy<sup>14</sup>.

Over and above this, to capitalize on the transformative potential of broadband in helping promote development, countries need to actively promote the use and integration of digital technology across their full policy spectrum. Appropriate strategies and vision must be put in place, underpinned with strong regulatory, policy, fiscal and financial frameworks, and accompanied by the necessary social and cultural shifts to enable effective coordination across different sectors to find integrated solutions.

Achieving fundamental transformation of energy, industrial and agriculture systems over coming decades is among the greatest sustainability challenges – broadband can act as an 'accelerator,' driving change across all four major pillars of innovation – people, ideas, finance, and markets – provided the right conditions are in place<sup>15</sup>.

By formally acknowledging the powerful role ICT and broadband can play in development in the Post-2015 development framework, the foundations for effective PPPs to leverage broadband technologies will be strengthened. Multi-stakeholder partnerships can serve as a vehicle for the transfer of skills, capabilities and technologies, help share burdens, catalyze action, increase available resources and bring all relevant actors to bear in addressing specific problems too complex for any one actor to solve.<sup>16</sup>.

There are a number of actions governments can take to boost the impact of ICT on sustainable development goals. These range from articulating a vision and setting clear, long-term strategic plans; to designing and reviewing sound policies (including spectrum policy), removing regulatory barriers, and introducing new regulation that encourages competition, innovation and investment. As well as raising awareness and providing incentives for consumers to take up more sustainable products and services, governments can play an important role in piloting, experimenting and disseminating best practices (Chapter 3). The full range of government measures needed to truly harness broadband as a catalyst for sustainability is presented in Chapter 5, Recommendations.

In the next chapter, new research conducted by the secretariat of the Broadband Commission shows that while national broadband plans increasingly recognize broadband's role in improving development, much more can and needs to be done. A regulatory environment that supports and encourages widely accessible and affordable broadband deployment is the only way to fully realize the potential of broadband technologies to advance sustainable development.

## Perspective

Amina J. Mohamed, Special Advisor to UN General-Secretary on Post 2015 Development Planning

**“We believe broadband is a fundamental technology to achieve sustainable development, and should be recognized as such. Broadband has the potential to offer invaluable contributions to the post-2015 development agenda across the board, but it must be supported by other factors and enablers. Benefits include improvements in health care delivery, access to education, energy efficiency, civic participation, and public safety. Fast and effective exchange of information is key to address the many interlinked challenges of sustainable development. As also highlighted by UNESCO, knowledge societies must be built on four pillars: freedom of expression; universal access to information and knowledge; respect for cultural and linguistic diversity; and quality education for all”.**

**“There is wide acknowledgement that broadband facilitates transformative change in a wide range of key sectors and has already had impact on the MDGs. There is also broad acknowledgement of the need to expand access and improve connectivity. Inequality in access and opportunity is not only an issue among regions, but within regions and countries as well. Productive partnerships between public and private sector and academia can help fill such gaps”.**

## Perspective

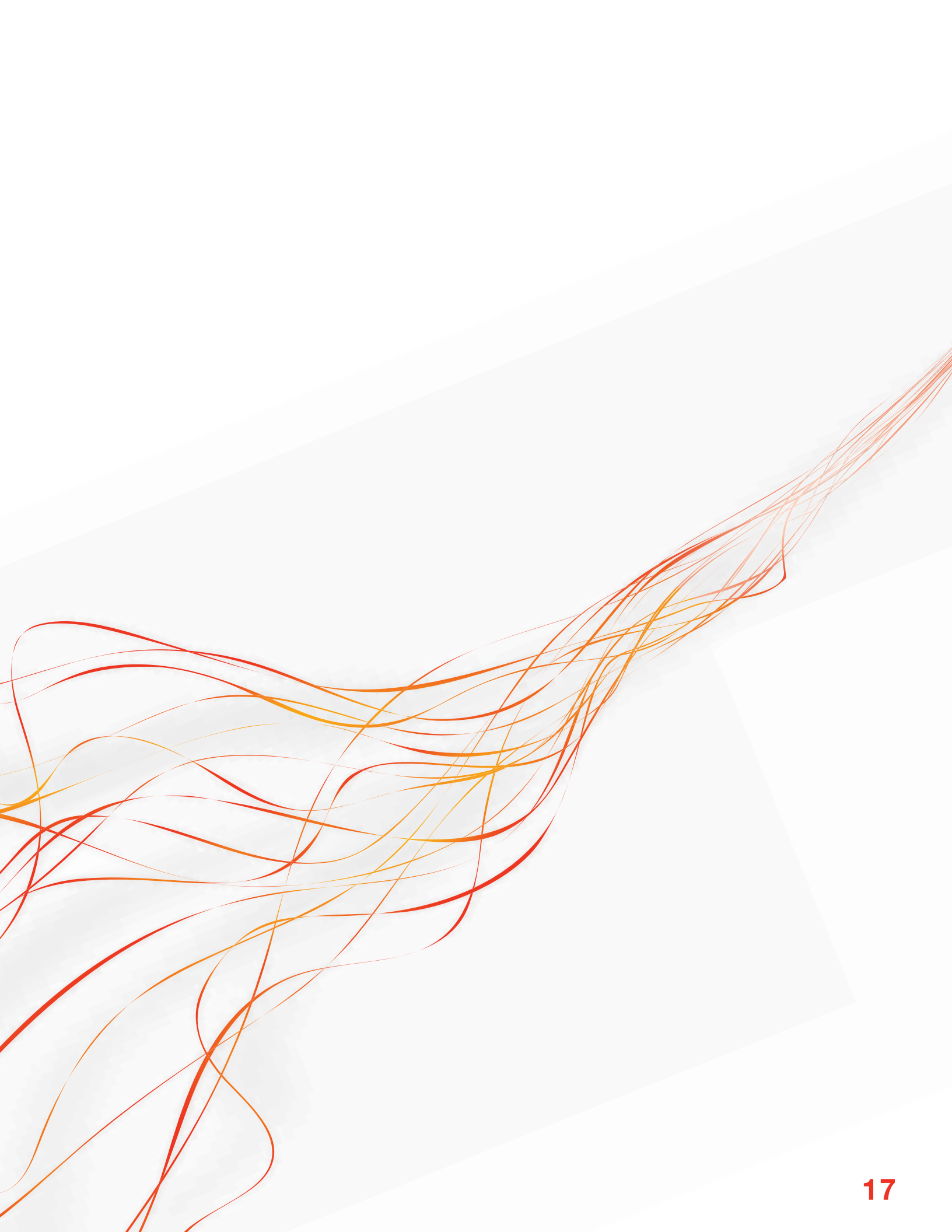
Professor Jeffrey Sachs: Broadband Commissioner, Director of the Earth Institute, Quetelet Professor of Sustainable Development, and Professor of Health Policy and Management at Columbia University; Special Advisor to UN Secretary General Ban Ki-moon

**“The private sector is the most powerful societal actor these days, even more so than governments in many cases. Multinational companies control a remarkable share of global finances, technology, and trade. Their role as leaders of sustainable development is therefore crucial”.**

**“The information technology revolution is fundamentally reshaping global society. Moore’s Law has produced a roughly billion-fold improvement in our capacity to process, store, and transmit data. This will remake energy systems, transport, education, health care, construction, agriculture, and much more. There is huge institutional change ahead. I see it in my own core field of higher education, but the changes underway are pervasive, and very promising if we think ahead and help steer technological change in the direction of sustainable development”.**

**“Any issue in sustainable development – clean energy, resilient cities, sustainable agriculture – will require public-private partnerships. PPPs are needed for 21st century infrastructure, R&D, and social fairness. They will become a key tool of sustainable development”.**







# 2

## **BROADBAND PLANS IN ACTION**

## 2.1. Making broadband policy universal

The benefits of broadband for sustainable development are most likely to reach all sectors of the population, when supported by clear policy leadership and a strategic framework that integrates ICT policies with policies from other government sectors. The first broadband advocacy target **Broadband Commission for Digital Development** calls for “making broadband policy universal” as one of the **Broadband Advocacy Targets for 2015** agreed at the 2011 Broadband Leadership Summit<sup>17</sup>.

Over the past few years, international ICT regulators and policy-makers have begun to recognize broadband as a policy imperative. Since 2012, ITU and the Broadband Commission have been raising awareness on the importance of meeting these four targets, notably in the Commission’s reports, **The Broadband Bridge: Linking ICTs with Climate Change for a Low-Carbon Economy**, the Commission’s annual report: **The State of Broadband 2012: Achieving Digital Inclusion for All**<sup>18</sup>, as well as **Planning for Progress: Why national broadband plans matter**<sup>19</sup>.

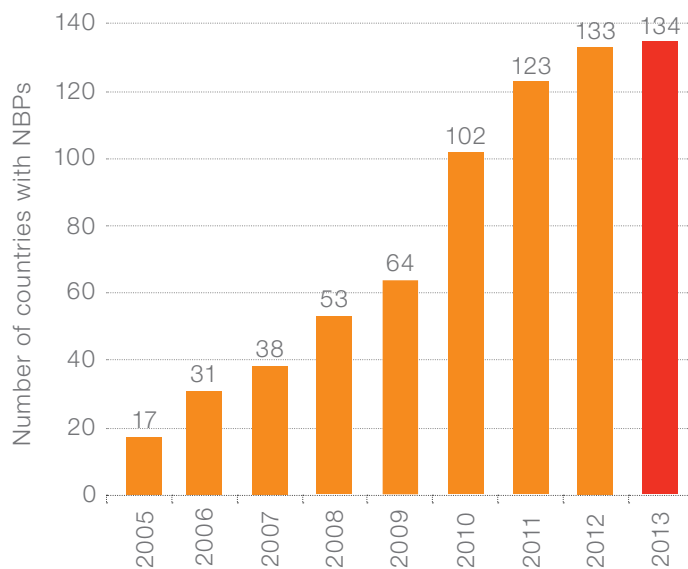
The number of countries adopting national broadband plans has more than doubled since December 2009 (see Figure 2.1), mainly due to investments in broadband forming part of the fiscal stimulus measures introduced by many economies in 2009-2010<sup>20</sup>.

### Perspective

Carlos Slim Domit, Chairman, Grupo Carso SA de CV, Mexico, co-chair, B20 Task force on Information and Communication Technologies and Innovation

**“The ICT is a sector that grows in double digits every year. That is the reason why it requires updated and accurate information to take the right decisions. It is one of the fastest growing sectors, has the most investment, it is inclusive. When you have investment, inclusion gets more inclusive.”**

**Figure 2.1: Growth in the number of countries with national broadband plans, 2005-2013**



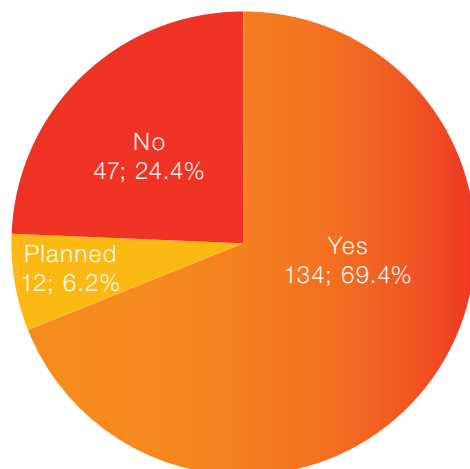
Source: Planning for Progress: Why national broadband plans matter, July 2013.

By the start of 2013, some 134 countries (69%) had a national plan, strategy, or policy in place to promote broadband, while 12 countries (6%) were planning to introduce such measures in the near future (Figure 2.2).

National broadband plans often define objectives for rolling out broadband infrastructure to the entire population, priority groups or specific communities, as well as objectives for closing gaps in regional broadband infrastructure coverage. In addition, policies often refer to specific speed targets for broadband, as well as potential technology options (fixed or wireless broadband).

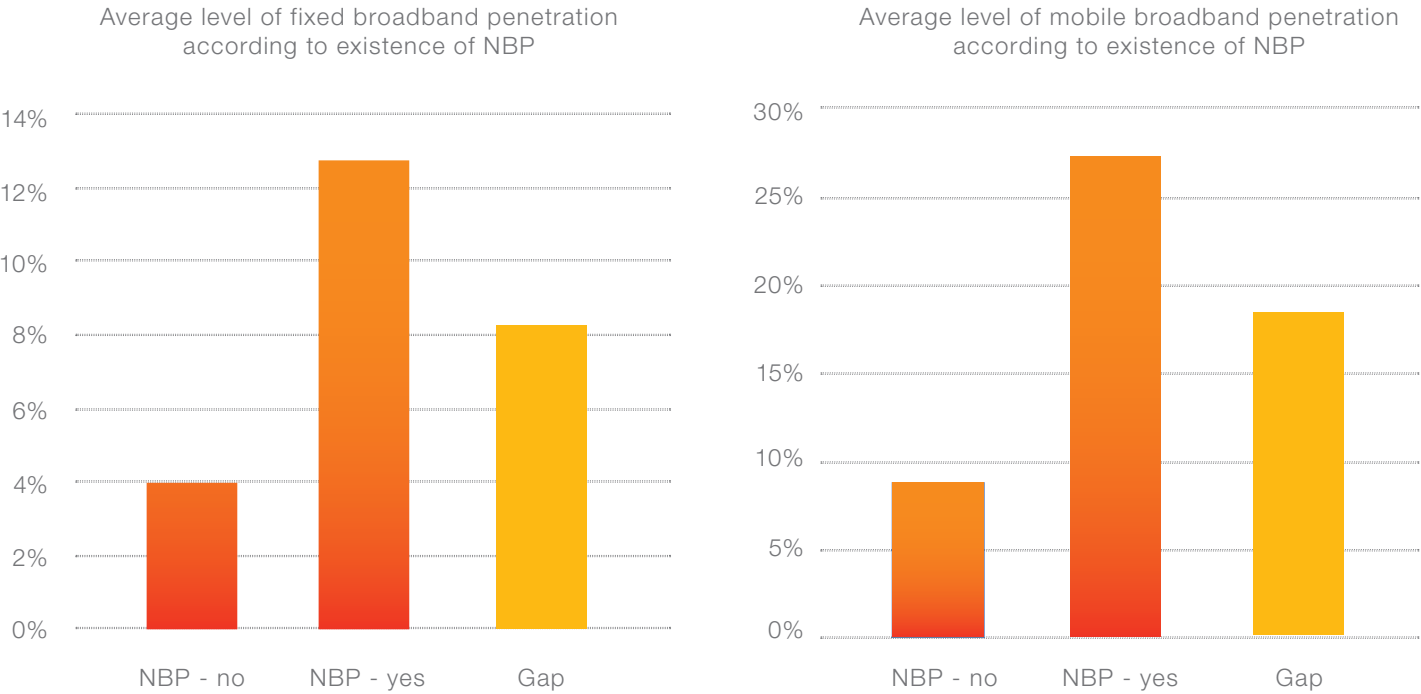
ITU/CISCO research has found that, on a global basis, countries with National Broadband Plans benefit from fixed broadband penetration some 8.7% higher on average than countries without National Broadband Plans, and mobile broadband penetration some 18.6% higher on average (Figure 2.3). However, differences in these blunt global averages are partly attributable to levels of income, urbanization, private sector participation and regulatory differences, inter alia. After factoring out the effects of these other drivers, countries with national broadband plans enjoy increased penetration of fixed and mobile broadband than countries without a national broadband plan of 2.5% and 7.4% higher on average, respectively. By emphasizing broadband roll-out as a national priority, national broadband plans may help provide focus to efforts by industry and policy-makers (ITU, CISCO, 2013).

**Figure 2.2: Status of countries/NBPs, 2013**



Source: Planning for Progress: Why national broadband plans matter, July 2013.

Figure 2.3: Differences in Broadband Penetration According to the presence of a NBP, 2012

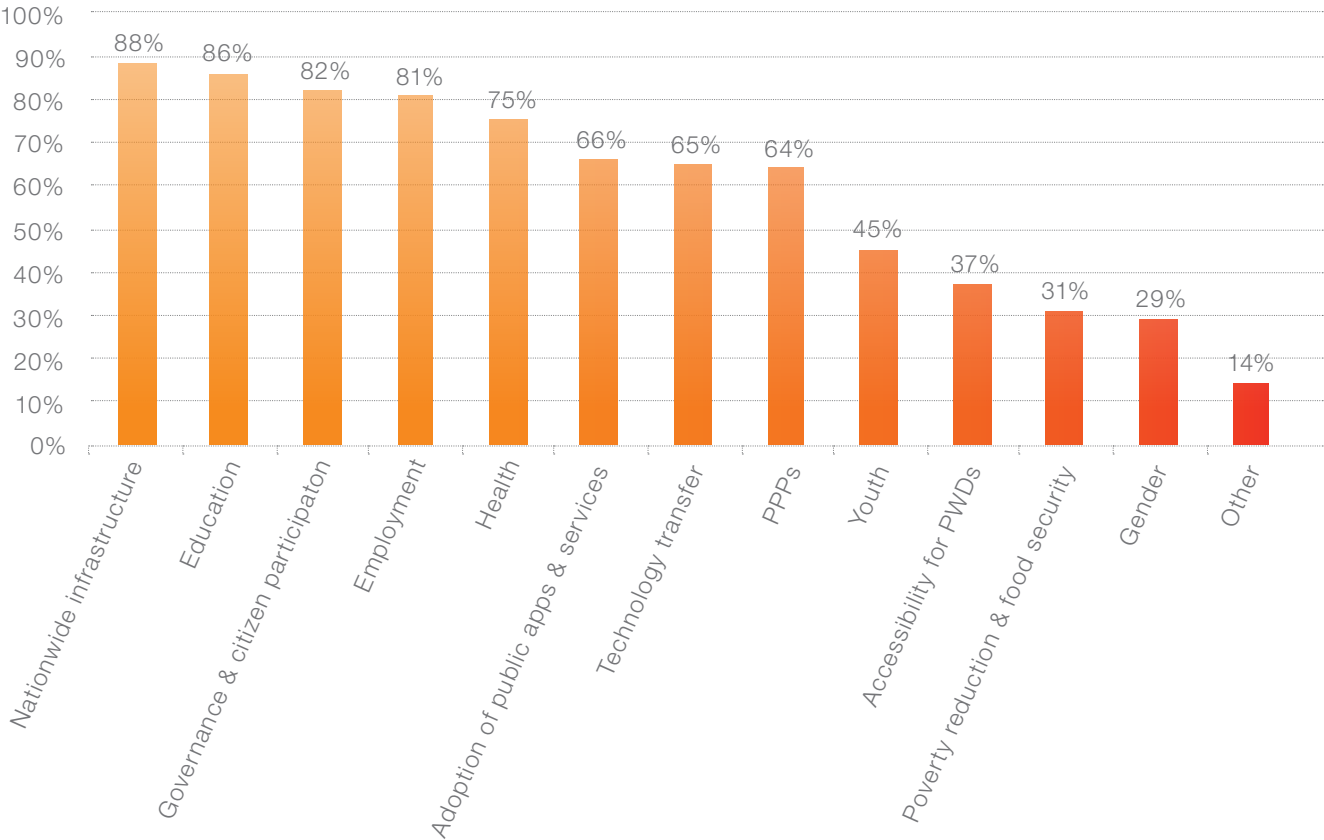


Source: Planning for Progress: Why national broadband plans matter, July 2013.

The contribution made by national broadband plans may extend far beyond simply increasing access to broadband networks, services and applications, however. When integrated effectively with policy-making from other sectors, such plans can become key policy instruments for leveraging broadband as an enabling infrastructure to accelerate social and economic development.

Between November 2012 and May 2013, the secretariat of the Broadband Commission conducted a review of the social and economic development content of national broadband plans. Preliminary results highlight that key social issues, such as health, governance, education and employment, are included in around 80% of these Plans (see Figure 2.4).

Figure 2.4: Overview of inclusion of socio economic elements in NBP, 2013



Source: Planning for Progress: Why national broadband plans matter, July 2013.

However, while most plans address one or more of these issues, very few plans (only 12, in fact) cut across multiple policy areas. Moreover, poverty reduction, food security, gender equality and the social and digital inclusion of persons with disabilities are currently not

widely addressed by not widely addressed by these plans. Importantly, the review highlights best practices which can be taken into account by policymakers currently shaping the Post-2015 global development agenda.

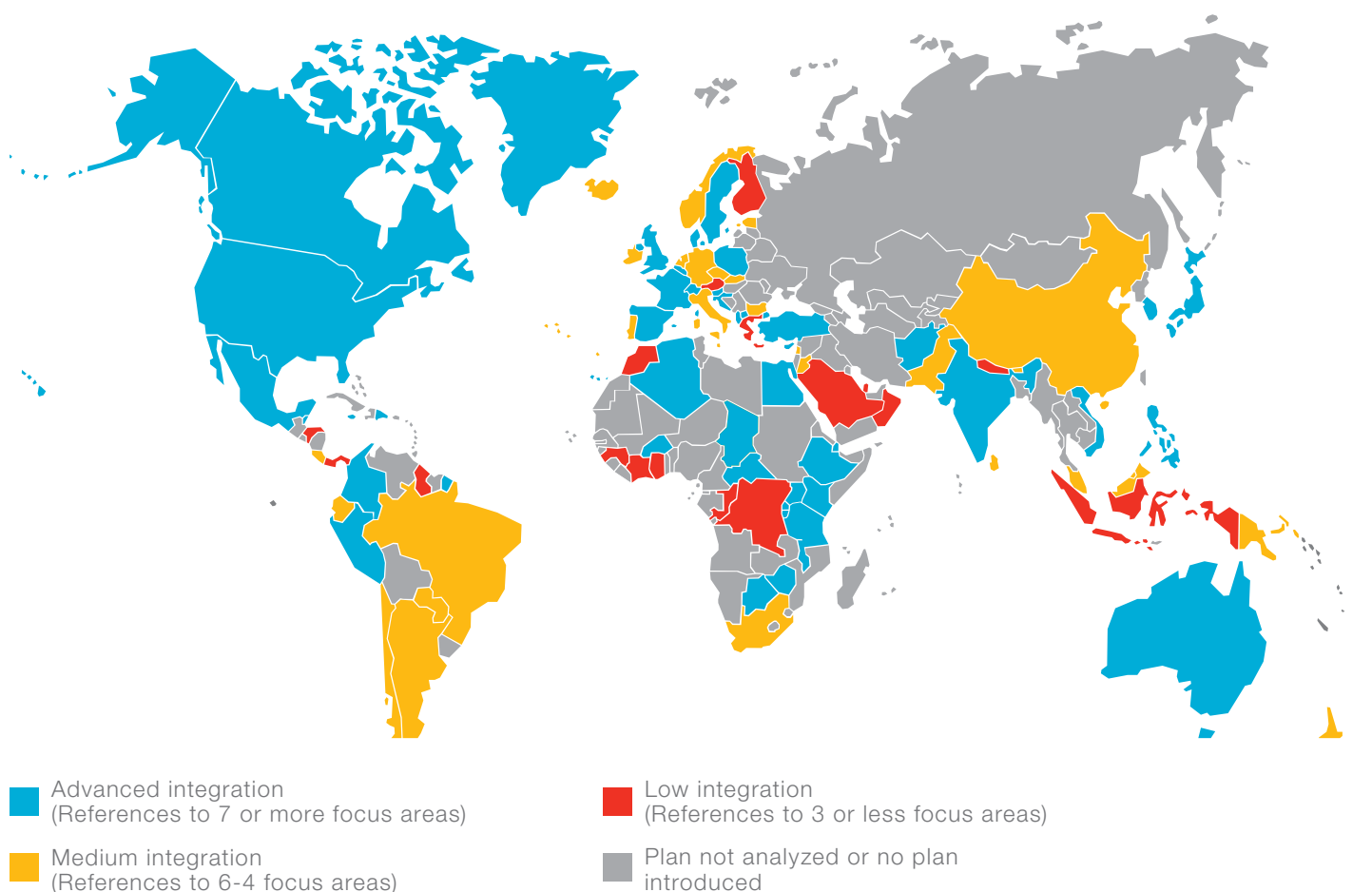
## 2.2. Highlighting best practices

Embracing a wide range of topics in national broadband plans is one way to underline the significant contribution broadband and ICT can make to accelerating social development, reinforcing environmental protection and promoting economic sustainability.

The review undertaken by the secretariat of the Broadband Commission mapped the inclusion of the

following MDG or Post-2015 development agenda focus areas: accessibility for persons with disabilities, education, employment, environmental sustainability, gender, governance, health, technology transfer, poverty reduction, food security and youth. This work showed that national broadband plans can be classified into four groups, according to their integration of social and economic development aspects (see Figure 2.5).

Figure 2.5. Global overview of integration of integration of issues related with social and economic development in NBP



Source: Broadband Commission for Digital Development Secretariat, 2013.

The Plans of nearly half of the countries analyzed included advanced integration of socio-economic elements – with Belize, Egypt, Grenada, Japan, Mexico, Philippines, Sweden, Tanzania, the US and Zimbabwe

addressing all issues covered in the analysis. Table 2.1 presents examples of how these elements are being integrated.



Table 2.1. Examples of actions mapped during the analysis

Focus area	Example of actions mapped
<b>Accessibility for persons with disabilities</b>	<ul style="list-style-type: none"> <li>• Create a Broadband Accessibility Working Group (or maximize broadband adoption by people with disabilities)</li> <li>• Coordinate policies and funding</li> <li>• Deploy telecentres to increase access to ICTs for persons with disabilities</li> </ul> <p><i>Examples: USA, Colombia, France</i></p>
<b>Education</b>	<ul style="list-style-type: none"> <li>• Improve the efficiency and effectiveness of educational administration by promoting use of appropriate school management information systems.</li> <li>• Set up management systems to provide easy access to relevant, up-to-date data on students, staff, schools, local school administrative authorities and resources.</li> </ul> <p><i>Examples: Cyprus, Egypt, Gambia, Macedonia; Saint Kitts and Nevis</i></p>
<b>Employment</b>	<ul style="list-style-type: none"> <li>• Accelerate the adoption of e-commerce by creating portals to provide assistance, tools and resources to entrepreneurs. Tools provided include support in setting up company portals, organizing content and providing a secure payment engine.</li> </ul> <p><i>Example: Portugal</i></p>
<b>Environmental sustainability</b>	<ul style="list-style-type: none"> <li>• Highlight how ICTs can be used to enable other economic sectors to optimize resource utilization through smart buildings and smart grids.</li> <li>• Identify investments to fund ICT infrastructure that supports efficient energy generation, distribution and consumption.</li> <li>• Request electric utilities to provide consumers access to, and control of, digital energy information from smart meters.</li> </ul> <p><i>Examples: USA, Ecuador, Singapore</i></p>
<b>Gender</b>	<ul style="list-style-type: none"> <li>• Set up a Task Force to develop a Gender-Sensitive Curriculum to build ICT skills for women and girls within a two-year timeframe.</li> </ul> <p><i>Example: Gambia</i></p>
<b>Governance</b>	<ul style="list-style-type: none"> <li>• Build a next generation e-Government environment, which will depart from the current vertical service-based approach and move towards establishment of a platform delivering ‘just- in- time’ services at source from the public service provider in a streamlined, open environment.</li> <li>• Simplify user experience, making it user-centric and speeding up processes to meet citizen and business requirements.</li> </ul> <p><i>Example: Malta</i></p>
<b>Health</b>	<ul style="list-style-type: none"> <li>• Set targets to stimulate e-health to provide remote access to healthcare for patients in rural, remote and outer metropolitan areas.</li> <li>• Set-up trials to address outstanding barriers to the wider adoption of e-health.</li> </ul> <p><i>Examples: Australia, Colombia, Djibouti</i></p>

Focus area	Example of actions mapped
Poverty reduction and food security	<ul style="list-style-type: none"> <li>• Increase monitoring of food production and distribution systems to manage supply and demand</li> <li>• Use ICT to increase literacy and engagement of people living in poverty</li> </ul> <i>Examples: Burundi, Philippines, Tanzania, Kenya</i>
Technology transfer	<ul style="list-style-type: none"> <li>• Develop strategies to encourage private sector investment in research activities, such as Centers for Technology Transfer and Innovation.</li> <li>• Develop ICT innovation centers to transfer knowledge to local engineers and scientists</li> </ul> <i>Example: Algeria</i>
Youth	<ul style="list-style-type: none"> <li>• Address ICT literacy and competency needs of youth through skills development and content development programs.</li> <li>• Create Community e-Learning Centers for out-of-school youth to provide alternative educational opportunities, notably high school equivalency status.</li> </ul> <i>Example: Philippines</i>

Source: Broadband Commission for Digital Development Secretariat, 2013.

To see how broadband is being leveraged to help deliver on sustainability objectives, the next Section takes a closer look below at four issues central to the MDGs and Post-2015 global development agenda: education, governance, health, and food security.

## 2.3. Key Issues

### 2.3.1. Education

Recognized as a foundation and building block for development, fully 86% of plans make reference to the role of ICT and broadband in improving access to education and educational outcomes. It is broadly acknowledged that ICT and broadband access increase both the quality of education and ease of access – for example, through remote learning. Since technology changes rapidly and access to ICT remains low in developing countries, there is a strong emphasis on development of ICT skills to enable people to engage in today's knowledge economy.

### 2.3.2. Governance

Good governance is a recognized prerequisite for long-term peace and stability, while greater accountability is a central aim of the Post-2015 development agenda. Fully 82% of plans address how ICT can improve governance, although the emphasis is mainly on accessibility to services. Less common are references to improving transparency and civil participation, although the rise of social media and alternative media sources is also dependent on accessible broadband.

Government accountability has become a higher priority as more nations democratize and independent media becomes more accessible for citizens. Acknowledging the role ICT can play in ensuring transparency through monitoring and clear stakeholder interactions may help build long-term societal stability.

### 2.3.3. Health

Provision of universal health services is broadly identified as a priority for poverty reduction by many countries. With global concern over rising demand for health services due to both growing populations, as well as ageing populations, together with the growing cost of providing such services, governments are seeking new ways to deliver high-quality health services at lower cost through the use of ICT and broadband technologies.

Overall, three-quarters or 75% of the plans analyzed refer to health. Accessibility, efficiency and information sharing are most commonly cited, due to the strong linkages of ICT with online monitoring and consultation. In contrast, child and maternal health or MDGs 4 and 5, were barely mentioned, indicating a need to raise awareness of the considerable potential for ICT to enhance child and maternal healthcare systems and as means of strengthening primary health systems and building the foundation to support non-communicable diseases, including mental health.

Broadband can be leveraged to achieve higher capacity and quality in healthcare services. This is not just about advanced e-health applications, requiring high-definition video-based applications and high-bandwidth networks. Integrating broadband or even simple applications (such as Short Message System or SMS functionality) into existing health systems could deliver important breakthroughs in locating and tracking outbreaks of disease, improving access to medical databases and electronic health records (EHRs) and the monitoring and treatment of patients (e.g. in SMS reminders for appointments or medical treatment). Developing such applications, improving infrastructure and ensuring the necessary bandwidth is available nationwide are among the major challenges ahead. The introduction and wide adoption of videoconferencing standards, such as the H.320 series developed within ITU-T will enable the use of tele-presence in telemedicine initiatives<sup>21</sup>.

### 2.3.4. Food security

As access to food is fundamental to reducing or avoiding poverty, these two factors are addressed jointly. Much of the literature points to key problems of distribution, as well as uncertain and vulnerable food supply. The link between food security and ICT is currently weak in all plans. ICT can also play a significant role in improving the resilience of food supply chains. Only 31% referred to poverty reduction and food security, with fewer than 20% of Plans linking ICT with agriculture, and only 6% considering ICT to monitor food safety. ICT should be more actively promoted in this area, notably with the aim of improving the long-term wellbeing of people in countries struggling with food security – an issue highlighted in discussions around the Post-2015 development agenda.

ICT's role in food security is two-fold: data collection and public information. There is also significant potential for ICT applications in monitoring supply chain quality and improved agricultural systems.

### 2.3.5. Conclusions

The inclusion of social and economic elements within national broadband policies reflects greater understanding of the impact broadband networks, services and applications are having on society. This understanding is already embedded in areas such as health, education or improved government services.

As discussions on how to achieve sustainable development progress, new focus areas and priorities are emerging, such as gender equality, accessibility for persons with disabilities, and food security. To fully exploit the potential of broadband to enhance socio-economic development, social priorities also need to be incorporated into future revisions of national broadband plans. Such plans must be cross-sectorial, involving relevant governmental agencies, and other stakeholders involved in social and economic development.

In addition, non-ICT sector policies need to acknowledge the role of broadband and ICT in expanding access to and improving basic public services. High-speed broadband access can help countries engage in the global economy, accelerate better access to healthcare and education, and provide new opportunities for innovation and expansion. Access to broadband helps accelerate the development process and communities that connect their residents create wealth and attract business investment. Importantly, the introduction of government e-services can promote critical mass, achieve economies of scale and by increasing demand, decrease the overall cost of services.

The following chapter explores transformative solutions enabled at the country level by ICT and broadband, in the context of the global Post-2015 development agenda.

## Perspective

Dr. Hamadoun I. Touré, Secretary-General International Telecommunication Union (ITU), Vice Co-Chair of the Broadband Commission

**“Broadband affects every sector of human activity and digitiza, and is already a key driver for development – both in the developed and the developing world. Broadband delivers access to the sum of human knowledge. It opens doors to the future. It helps lift the world’s poorest people out of poverty; brings the benefits of education and healthcare closer to rural and remote populations, and delivers social and economic benefits to all. Broadband builds bridges between individuals, communities and nations. And by leveraging the power of broadband, we can accelerate progress towards meeting the Millennium Development Goals and future sustainable development goals. We need to ensure that all the world’s people have access to broadband, and can afford to communicate and participate in the digital information society of today and the digital knowledge society of tomorrow”.**



# 3

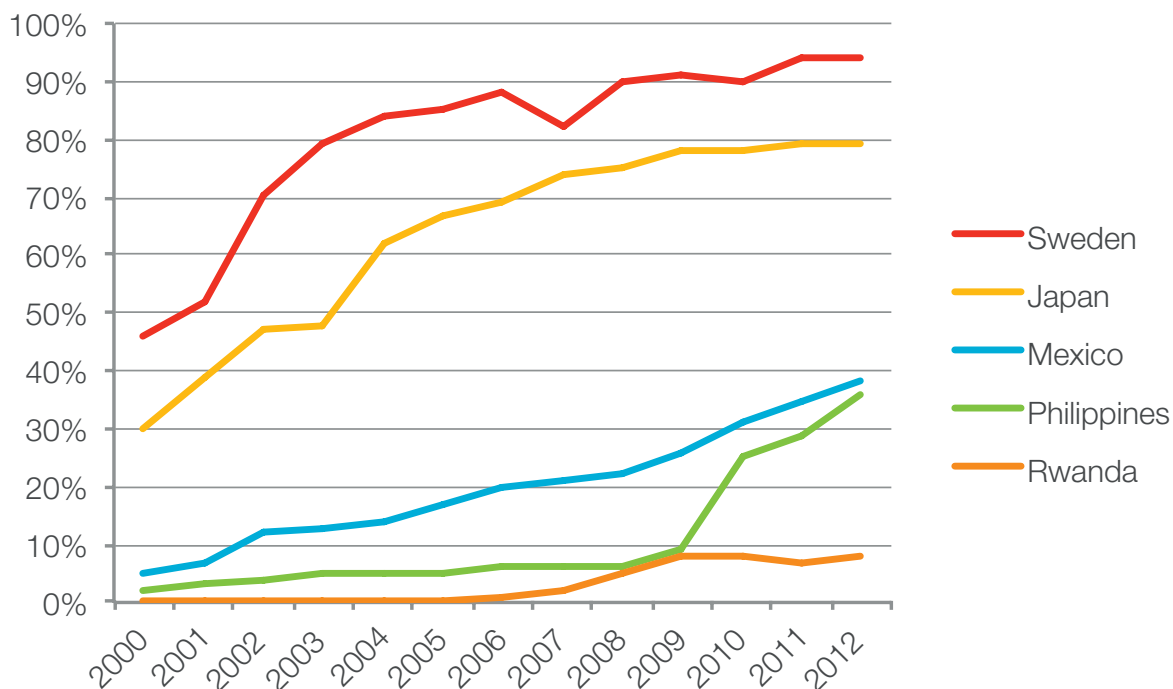
**OVERVIEW OF  
BEST PRACTICES**

## 3.1. Introduction

Broadband plans offer countries the opportunity to advance socio-economic development and address a wide range of areas including education, healthcare, and poverty. As mentioned in the previous chapter, the number of countries with broadband plans now in place is at an unprecedented high, boosting potential for socio-economic development through community development, monitoring and evaluation, and innovative ICT programs. This chapter presents a selection of best practices from five world regions with diverse economic circumstances, demonstrating integration of sustainable development and broadband strategies, and successful fusion of broadband usage with inter-Ministry collaboration to achieve development aims. The examples highlighted in this section were selected from the group of countries that featured prominently in the review of national broadband plans conducted by the secretariat of the Broadband Commission (see Section 2).

The national broadband plans of Mexico, Japan, the Philippines, Rwanda and Sweden demonstrate advanced integration of socio-economic elements, tackling all issues covered in the analysis conducted by ITU (see Section 2). All have built on existing knowledge systems, used appropriate technologies to reach communities, and established strong institutions to guide policy integration. As shown in Figure 3.1, there is a significant difference in levels of connectivity between the case studies but from 2000 to 2012, increased access to the Internet at lower cost mobile broadband occurred worldwide.

Figure 3.1: Percentage of individuals with Internet access



Source: ITU

## 3.2 MEXICO: Connecting the gaps<sup>22</sup>

Mexico has used broadband and ICT policies proactively to foster development across the country, in particular to narrow the digital divide in rural areas. The country's **National Digital Agenda**, launched in 2012, is a government-run program created to boost the ICT sector growth and throughout the country, and demonstrates best practice in its successful rural outreach programs. It is part of a ten-action plan aimed at generating positive impact on the telecommunications markets in Mexico.

Mexico's Digital Agenda also enables the impact of connectivity to be analyzed, particularly in terms of how ICT have been used to advance development. Using this best practice, the Government hopes that the ICT sector will contribute to the country's national growth, while creating high-quality jobs and making local companies more competitive. This is particularly evident in Mexico's ICT strategy plan which recognizes the technology's enabling role in helping people with disabilities, making online government services accessible, and in helping unemployed youth by generating jobs.

By 2015, Mexico aims to expand use of broadband and ICT as a tool to promote social and economic inclusion for rural and other vulnerable groups by ensuring universal access to internet, increasing digital literacy in schools, public health centers, and public offices. Under the plan, new programs and strategies will be created to provide citizens with better, more efficient access to broadband technology.



### 3.3. JAPAN: Articulating a broadband vision<sup>23</sup>

Japan's broad, cross-sectorial national broadband policy envisions a society that maximises the potential social good facilitated by digital technologies. A new plan for 2009-2015 incorporates the e-Japan Strategy and e-Japan Strategy II and incorporates broad cross-sectorial aims centre on ease of use, accessibility, security and diffusion of digital technologies.

In its broadband plans, Japan has a long-established principle of universal access and individual empowerment in support of national development goals. An assessment procedures system allows priorities to be continually reviewed and improved as necessary. Secure, reliable and accessible data is essential to plan relevance, and the success and uptake of broadband technologies, especially as cloud-based storage presents new challenges in cyber-security. Changes to organizational structures allow for more innovative and entrenched changes to public service provision, when combined with public education on the uses and risks of information network systems; professionals and students alike are trained in IT security methods.

Japan emphasises universality and empowering individual contributions to national goals. This is facilitated by committees, such as Chief Information Officers and the Expert Evaluation Committee, and initiatives linking individuals with the private and public sector services. In order to achieve universality in digital technology access, Japan promotes Business Process Reengineering (BPR) to encourage all businesses and public services to reiterate management procedures to include technological change. To complement BPR, a reiterative planning approach, the PDCA Cycle (Plan, Do, Check, Act), is being standardised in policy.

Strong cross-sectorial collaboration between public and private sector institutions has contributed to implementing broadband policy in Japan. The government hopes to establish a Digital Global Vision as a model for other countries to address shared development challenges.

### 3.4. THE PHILIPPINES: Digitally empowered nation<sup>24</sup>

According to the UNDP Human Development Index, 18% of the Philippine population lives in poverty. To reduce the digital divide, new technologies must therefore be affordable. To tackle this, the Philippines developed **The Philippine Digital Strategy**, which envisions affordable and secure information systems to empower a competitive knowledge economy and inclusive society, supported by an accountable and responsive government.

All national broadband policies are embedded among various Ministries, addressing gender and environmental aspects of ICT, and ICT awareness as cross-sectorial themes. The Digital Strategy aligns with the Philippine Development Plan 2011-2016 and the ASEAN ICT Master Plan 2015, both building on the Philippine Strategic Roadmap for the ICT Sector 2006-2010 and progress is benchmarked against MDG indicators.

Education is an important part of the Philippines broadband plan. Most students in the country lack access to ICT due to a lack of infrastructure supporting broadband connectivity. Funding plans are critical: the Universal Access and Service Fund has had some success in connecting schools, however, long-term challenges persist such as inadequate in-school maintenance. Community e-centers have been established under Public-private partnerships and these introduce users to ICT, increase access for low-income remote communities, and provide skills training.

The Philippine Digital Strategy (PDS) identifies increased broadband integration as a means to improve and sustain national competitiveness, equip a new generation with ICT skills for the global workforce, and improve workplace participation of women, minorities, indigenous peoples, people with disabilities, and foreign workers by 50% by 2016. Considering these groups are at the highest risk of living in poverty, it is important they are not excluded from broadband skills training and access to education through ICT.

The plan also features a national indicator on digital literacy (i.e. digital literacy rate), the implementation of an incentive-based professional development program for teachers, educators and trainers to strengthen and standardize teacher training, integrate ICT into education and the launch the National ICT Competency Development and Certification Program, a 5 year training program for civil servants in use of ICT.

### 3.5. RWANDA: Leaping into the 21st century<sup>25</sup>

Rwanda is using its ICT strategy plan to coordinate widespread economic and social transformation. Developing three comprehensive ICT strategy plans known as the **National Information Communication Infrastructure** (NICI), **ICT for development** (ICT4D), and **Vision2020**, all government developmental programs, Rwanda aims to progressively transform the country from a predominantly agricultural economy to a predominantly knowledge-based economy. It has committed itself to implement the envisaged four-staged NICI/ICT4D Plans over the next 20-year life-span of Vision2020 and the ICT4D Policy, as complementary policies.

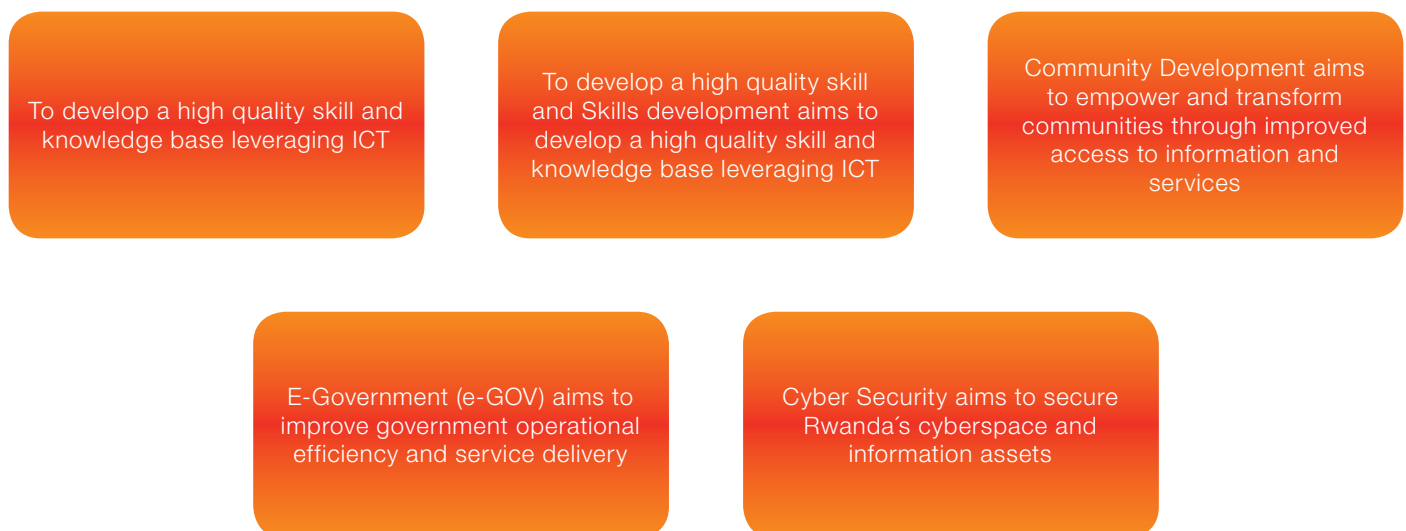
To foster ICT development, Rwanda has proposed six targets (See figure 3.2)<sup>26</sup>. These targets aim to show a variety of improvements that can be achieved through access to ICTs and broadband creating an ICT-led socio-economic development process with the potential to transform Rwanda into a middle-income, information-rich, knowledge-based and technology-driven economy and society.

Distinctively incorporating and expanding their ICT development into the future, Rwanda success has most notably come from the continuous progression of their policies building upon each other creating effective strategies for implementation. An example of this is ITU's research (see Section 2) indicating that Rwanda's government continues to strengthen and transform its public health system, serving as a national district model in child and maternal health. The National ICT strategy and Plan-2015 includes several actions aimed at improving access to healthcare and improving the efficiency of health services.

Currently under preparation Rwanda envisions their fourth NICI Plan to begin from 2016 to 2020 (NICI-2020) with the goal of consolidating progress towards achieving middle-income status and an information-rich, knowledge-based society and economy. The government envisages that the contribution of the ICT sub-sectors of the service sector and the industrial sector (i.e. the ICT-production sub-sector) will increase dramatically over the implementation period of the four NICI plans spanning the ICT-2020 time frame.

Figure 3.2: Rwanda's targets for ICT development

#### A Review of Environmental Sustainability in National Broadband Policies: A Global Overview and Case Studies on Australia and Rwanda



Source: Broadband Commission (2012)

### 3.6. SWEDEN: Continued improvement through collaboration<sup>27</sup>

Ranked by the World Economic Forum (WEF) as the world's most connected economy<sup>28</sup>, Sweden enjoys almost full connectivity<sup>29</sup> and approximately 53% of the population are connected to high speed Internet. The Government's aspiration is that "Sweden will be the best in the world at exploiting the opportunities afforded by digitisation"<sup>30</sup>, with excellence in ICT seen as a key way to boost Swedish competitiveness, growth and innovation while ensuring sustainable development and respecting human rights<sup>31</sup>.

Launched in 2011, **Sweden's Digital Agenda** focuses on the end-user with four strategic goals that aim to deliver an effective infrastructure using safe and easy services that benefit the role of ICT for societal development<sup>32</sup>. A central pillar of the strategy is cross-sectoral and trans-ministry coordination, with oversight from the Minister for Information Technology and Energy. Secretaries of state representing each of the Government's ministries meet regularly to review progress against the Digital Agenda strategy and a Digitization Commission promotes digital goals. This collaborative, high-level approach and engagement has kept digitization at the top of the political agenda and resulted in unprecedented levels of dialogue, openness, transparency – and integration – across Government offices<sup>33</sup>.

Another hallmark of the Swedish approach has been to get buy-in and build ownership of the digital agenda at local and regional levels. So far, 18 out of 21 regions have signed a letter of intent committing to help achieve goals and targets under the Digital Agenda strategy, allowing for a coordinated approach at all levels of government. Key digital inclusion achievements to date have been translation services for the hearing- and sight-impaired, and hosting competitions that spur technological innovation to increase access among the disabled<sup>34</sup>. Developments in schools, e-health and smart grids have also been impressive, although there is a need to boost soft IT skills across the education sector to fully capitalise on the knowledge economy and leverage ICT in transportation infrastructures.<sup>35</sup>

Going forward, the government acknowledges that special consideration needs to be given to how women and girls access new technology, as well as to strengthening freedom of expression and respect for human rights around the use of ICT<sup>36</sup>. The Ministry of Foreign Affairs is actively involved in increasing international support around key principles of ICT and human rights. In May 2013, the Ministry hosted the Stockholm Internet Forum, an international conference discussing how freedom and openness on the Internet can promote economic and social development worldwide<sup>37</sup>.

Sweden is also aware of the importance of the public sector in driving changes in procurement and standardisation to create test beds that support the digital agenda and encourage innovation<sup>38</sup>. Through this experience in rolling out its Digital Agenda, Sweden is well placed to leverage its learning to apply ICT for development.

## Perspective

Christina Henryson, Director at Ministry of Enterprise, Energy and Communication, Government of Sweden

**“Broadband brings people closer. Our strategy has been focused on getting the infrastructure rolled out. People will get online with the right tools. What you can do as a government is put the pieces of the puzzle in place and show, through our own actions, where the potential lies.”<sup>39</sup>**

## Perspective

Carlos Slim Domit, Chairman, Grupo Carso SA de CV, Mexico, co-chair, B20 Task force on Information and Communication Technologies and Innovation

**“To ensure that broadband is accessible to all, you need sufficient investment, mostly from the private sector; and the public sector must create the conditions to generate coverage and access.**

**Innovation can transform health, education, small business and many other aspects of a strong economy. With that investment, you get ripple effects that bring huge benefits in terms of jobs, employment, better education and healthcare. Employment is basically what will help to solve poverty in the long run. “**



**TRANSFORMATIVE  
SOLUTIONS**

Putting the world on a more sustainable track is a hugely ambitious task. Achieving sustainable development means redoubling efforts to end poverty, exclusion and inequality, while reinforcing governance, peace and stability. It will require fundamental transformation of food, energy, transport, production and consumption systems to stay within natural resource limits and manage climate change. And it will depend on strong partnerships, shared vision and firm commitment to pool the necessary skills, knowledge and resources to make it happen.

Broadband and ICT can make a major contribution to achieving sustainable development. Harnessed as an integral part of the solution, broadband technologies can be transformative, delivering the low-carbon connectivity, access, inclusion, efficiency, speed, innovation, cost-effectiveness, accountability and scalability necessary in the transition to sustainable development.

In this chapter, ten sustainable development challenges are presented, along with key opportunities for transformation and examples of how ICT and broadband are already helping to deliver positive change around the world. As part of the Post-2015 agenda discussions, valuable input to potential Sustainable Development Goals and targets is being put forward by various thought-leaders, including the UN Secretary-General's High-Level Panel of Eminent Persons, which has proposed a set of 12 goals and 54 targets. While the Post-2015 development framework is still very much under discussion, this report takes inspiration from the ten goals proposed in **An Action Agenda for Sustainable Development**<sup>40</sup> from the UN Sustainable Development Solutions Network (SDSN), directed by Broadband Commissioner Professor Jeffrey Sachs, which contributed to the Report of the UN Secretary-General on the Post-2015 Development Agenda<sup>41</sup>. As the only global network of its kind mobilizing the world's universities, think tanks, and technology-oriented businesses in all aspects of the sustainable development challenge, these ten goals provide a strong framework for presenting the game-changing sustainability solutions ICT and broadband can bring.



## 4.1. Goal 1: End extreme poverty and hunger

As agreed in **The Future we want**<sup>42</sup>, the outcome of the Rio+20 conference, poverty eradication is the greatest global challenge facing the world today and an indispensable requirement for sustainable development. Certainly, there has been remarkable progress since the adoption of the MDGs; the past 13 years have seen the fastest reduction in poverty in human history, with half a billion fewer people living below an international poverty line of USD1.25 a day<sup>43</sup>. In its report **A New Global Partnership**, the High-Level Panel of Eminent Persons on the Post-2015 Development Agenda<sup>44</sup> underlines the urgency of building on this success to eradicate extreme poverty in all its forms by 2030<sup>45</sup>.

### **The transformative opportunity:**

There is a growing body of evidence that broadband can boost GDP, and create jobs and incomes, helping to combat poverty and hunger. Broadband availability and speed are emerging as key drivers in achieving broad economic goals, although among the poor, particularly in remote rural areas, even simple mobile technologies can help by reducing market information gaps, comparing prices in distant markets, increasing the speed of trade and reducing travel expenses<sup>46</sup>.

On average for every 10 percentage point increase in broadband penetration, GDP may increase by 1 percent<sup>47</sup>. In some countries such as Myanmar, this impact can be even higher; one study found that the total economic impact of the mobile sector in Myanmar is estimated to be 1.5-7.4 percent of GDP over the first three years after licenses are issued<sup>48</sup>.

Employment levels can also be impacted: in the Dominican Republic, a 10% increase in broadband penetration could reduce unemployment by 2.9%<sup>49</sup>, while in the US, studies show that for every 1000 broadband lines, 80 new jobs are created<sup>50</sup>.

Broadband speeds are significant as well. A recent study in 2013 by Ericsson, Arthur D. Little and Chalmers University of Technology found that doubling the broadband speed for an economy increases national GDP by 0.3% on average<sup>51</sup>. In OECD countries, the average increase in household income for a broadband speed upgrade of 4-8 Mbps was US\$120 per month,

while BRIC households benefited from an additional US\$46 per month by upgrading from 0.5 to 4 Mbps<sup>52</sup>.

### **Mobile banking, mobile money and insurance**

For the 2.5 billion people estimated to be unbanked worldwide, mobile phones can enable access to credit and banking services, such as M-Pesa, launched in Kenya in 2007, MTN MobileMoney in Central Africa, Tigo in Latin America and Africa and easypaisa in Pakistan<sup>53</sup>. By making small transactions possible at low cost, they provide financial inclusion for the poor. Following the 2010 earthquake in Haiti, where there are fewer than two bank branches per 100,000 people, various electronic distribution solutions were trialled to reach those in most need. Mobile money solutions were successful and since 2010, some US\$6 million in transfers have been disbursed to 24,000 beneficiaries via mobile money by six NGO programmes<sup>54</sup>.

Through its infrastructure provision, Ericsson's Open Money aims to connect banks, money transfer organizations, payment service providers and ISPs to form a flexible, interoperable ecosystem, enabling mobile operators to offer money transfers and other mobile financial services<sup>55</sup>. The aim is to reach and make financial services accessible to millions of mobile phone users, whether or not they already have a bank account<sup>56</sup>.

## 4.2. Goal 2: Achieve development within planetary boundaries

The world population now stands at 7.2 billion people and with annual GDP of nearly US\$90 trillion, the world economy is already exceeding at least three of the nine planetary limitations identified by the Stockholm Resilience Centre – climate change, the nitrogen cycle and biodiversity loss. Ocean acidification, ozone depletion, the phosphorous cycle, and freshwater and land use are also under threat<sup>57</sup>. While the population of developed countries is projected to remain relatively unchanged at around 1.3 billion, the population of developing countries is projected to increase from 5.9 billion in 2013 to 8.2 billion in 2050<sup>58</sup>. All countries, rich and poor, should adopt sustainable production and consumption patterns. As stated in **An Action Agenda for Sustainable Development**, Report for the UN Secretary-General, Sustainable Development Solutions Network, 2013, the key question is not the level of “consumption” or “production” per se, but their primary resource, pollution, and ecosystem implications. Consumption and production in an economic sense (i.e. improvement of material conditions) can grow provided they are decoupled from pollution and unsustainable natural resource use<sup>59</sup>.

### **The transformative opportunity:**

Broadband technologies can help countries quantify their contributions towards each planetary boundary and identify opportunities to reduce environmental impacts. They support data-gathering platforms for developing the science-based evidence on which sustainable development policy is built<sup>60</sup>. The Report of the UN High-Level Panel of Eminent Persons<sup>61</sup> calls for a “data revolution” to improve measuring and monitoring mechanisms to keep better track of progress on sustainable development goals

Specifically in relation to climate change, broadband and ICT will play a central role in helping to keep humanity within this boundary through the shift to a low-carbon economy based on dematerialized services instead of products. While the carbon footprint of ICT is projected to rise to 1.27 GtCO<sub>2</sub>e by 2020, the total abatement potential of ICT is seven times higher<sup>62</sup>.

### **Reducing transport-related emissions**

Emissions reductions in personal transportation and logistics could reach 1.9 GtCO<sub>2</sub>e<sup>63</sup> by 2020 through the adoption of ICT technologies such as telecommuting and video-conferencing. Increased efficiency in cargo transit through improved logistics networks and fleet management also represents a significant abatement opportunity. By means of eco-driving, real-time traffic alerts, and the proliferation of ICT-enabled logistics systems, meanwhile, ICT stands to reduce total mileage and the amount of fuel required to transport people and goods. Synthesizing maps with real-time online traffic data and making this available on mobile devices enables optimized routing decisions, reducing fuel consumption, and lowering emissions<sup>64</sup>.

## EDUCATION

### 4.3. Goal 3: Ensure effective learning for all children and youth for life and livelihood

All girls, boys and youth have a right to education, giving them the opportunity to realize their full potential and contribute to a healthy and productive society in the next generation. High-quality education can improve job prospects, raise economic growth, improve health outcomes, and promote safer and more stable communities. It is also critical for creating equal opportunities for all children, notably gender equality<sup>65</sup>.

#### **The transformative opportunity:**

In education, along with access and affordability, quality and relevance are gaining in importance<sup>66</sup>. The report, **An Action Agenda on Sustainable Development**, explains the core role for ICT and broadband: “Countries need to look beyond traditional models of formal schools and explore how new approaches, including through ICT, can enhance these models, and expand access to knowledge and skills at all levels of education, particularly for vulnerable groups. For example, online curricula, e-books and journals, school-to-school programmes, online teacher training, and other ICT tools can improve access to quality education and expand school curricula to cover the needed skills.”<sup>67</sup>

According to the Broadband Commission’s Report, **Technology, Broadband and Education: Advancing the Education for All Agenda**, “...education specialists have begun investigating how governments and other stakeholders can best leverage increasingly ubiquitous mobile technologies to advance Education For All goals. The widespread availability of ICT has sparked important societal changes, and these changes are beginning to ripple into education.”<sup>68</sup> The following examples show how this is being put into practice:

## 4.4. Goal 4: Achieve gender equality, social inclusion and human rights for all

Despite major progress, gender inequality persists in many societies and violence against women and girls remains widespread. Lack of access to secondary education and to sexual and reproductive health services for girls and women is a key driver of gender inequality. In addition, discrimination against ethnic minority groups, indigenous peoples, people with disabilities and geographically isolated populations can be found throughout the world<sup>69</sup>.

A report by Intel looking at the gender gap for Internet access for women in low- and middle-income countries, shows that 23% fewer women than men are online in these regions. In places like Sub-Saharan Africa, that number grows to nearly 45%, demonstrating the importance of a concerted focus on gender and digital access<sup>70</sup>. ITU estimates that there are currently 200 million fewer women online than men<sup>71</sup>. The report of the Broadband Commission's Working Group on Broadband and Gender finds that the current ICT gender gaps holds grave consequences for women in their ability to develop ICT skills and compete in the digital economy<sup>72</sup>.

### **The transformative opportunity:**

Broadband and ICT can be a mechanism for digital and social inclusion for all, particularly the most vulnerable, disadvantaged and remote populations. This includes indigenous communities, ethnic minorities and those with disabilities, who represent 15% of the world population, the vast majority in developing countries<sup>73</sup>. Given the strong links between social exclusion and poverty, by increasing ICT accessibility, social inclusion and livelihoods can be improved, poverty and inequality reduced, and transparency and accountability around human rights enhanced. Measures can be as simple as providing mobile banking for those with little or no access to credit and no credit history, so they can start a business, or enabling mobile birth registration so people can become part of the social system, where previously they were not recognized citizens.

### **Including women in the mobile community**

In May 2013, the Broadband Commission agreed an ambitious new target designed to spur female access to ICT, calling for gender equality in broadband access by the year 2020. Access to ICT could transform the lives of millions of women by giving them access to life-enhancing health, education, financial and entrepreneurial support.

Even in the developed world, women have less access to technology than men and this gap widens in developing economies. Recent research by GSMA, concludes that women want phones to be useful, and buy them, when they see value for their business, health or personal security. In India, for instance, an operator offering an inventory management tool for women running small businesses saw a strong take-up<sup>74</sup>.

### **Human rights and ICT**

Broadband and ICT can empower people to realize their human rights – from freedom of expression and assembly, to economic, social and cultural rights that enable greater financial inclusion or improved access to health and education – contributing to more transparent, safer societies. The ICT sector is engaged in multi-stakeholder dialogue to ensure that technology is used as a force for good and safeguard against unmitigated, unintended use of ICT that can result in repression of human rights<sup>75</sup>.

## 4.5. Goal 5: Achieve health and wellbeing at all ages

Health enables people to reach their potential. Healthy children learn and grow better. Healthy adults work longer and more regularly, earning higher, more regular wages. Each year, millions of people die unnecessarily from preventable or treatable illness such as malaria, maternal death or under-five child mortality. Achieving wellbeing requires universal access to basic healthcare<sup>76</sup> and the knowledge to make responsible personal choices.

### **The transformative opportunity:**

Mobile healthcare in developing countries in sub-Saharan Africa could help save a million lives over the next five years, according to a new report from GSMA and PwC<sup>77</sup>. In developing countries, harnessing mobile connectivity in the fight against malaria, tuberculosis, AIDS/HIV and perinatal conditions which account for 3 million deaths annually and increased adoption of mHealth solutions could save lives across the entire healthcare delivery chain. In the developed world, mobile technologies can drive productivity gains and improve quality of care<sup>78</sup>.

### **One Million Community Health Worker (1mCHW) Campaign**

Across the central belt of sub-Saharan Africa, community health workers are using mobile phones and broadband access to sophisticated medical resources to deliver better healthcare to the rural poor. The Community Health Worker Campaign, a Solutions Initiative of the SDSN, works closely with national Governments in Africa and other NGOs, bilateral aid organizations and UN agencies to train, equip and deploy community health workers. Broadband access and smartphones can link community health workers to the national health system and allow for real-time disease surveillance, child and maternal health monitoring, mobile training, supply chain management and capturing of vital events. The goal is to reach 1 million Community Health Workers by 2015.<sup>79</sup>

### **Reducing healthcare costs in the United States**

Mobile technology will transform the US healthcare industry, driving increased productivity gains saving US\$305 billion over the next 10 years, according to new research by the Brookings Institution<sup>80</sup>. The savings will come from reduced travel time, better logistics, faster decision-making and improved communications, among other improvements. The study predicts that remote monitoring technologies will save nearly US\$200 billion by managing chronic diseases in the US over the next 25 years. Remote monitoring can reduce costs of caring for the elderly and improve quality of life in rural areas by allowing seniors to live independently and spend more time at home, while reducing the need for face-to-face medical consultations by 25%.

## 4.6. Goal 6: Improve agriculture systems and raise rural prosperity

The food system remains one of the greatest challenges for sustainable development and must be addressed if hunger and extreme poverty are to be ended, especially in the face of the rising global population and environmental degradation<sup>81</sup>.

### **The transformative opportunity:**

The transformative opportunity: An estimated 1.5 to 2 billion people worldwide are dependent on smallholder agriculture and these include half of the world's under-nourished people<sup>82</sup>. Smallholder farmer incomes can be raised through better land security and market access – and mobile phones can amplify this by providing access to credit, electronic banking and market information such as price fluctuations and weather forecasts. If global food markets can be made more transparent and stable, ICT-enabled smallholder farmers will have better information on what to plant to get the most value from their farms<sup>83</sup>.

### **Connected Agriculture<sup>84</sup>**

Connected agriculture, a report by Vodafone, Accenture and Oxfam, describes twelve opportunities that can have multiplier effects on the lives and livelihoods of many smallholders in developing countries, including mobile finance (such as payment systems, micro-insurance and micro-lending); mobile information and farmer helplines; smart logistics, tracking and management systems; and trading, tendering and bartering platforms. In the 26 countries where Vodafone is present, these multiplier effects could together increase agricultural income by US\$ 138 billion by 2020 – an increase of 11% from 2012. Lower greenhouse gas emissions and reduced water withdrawals are additional benefits.

## 4.7. Goal 7: Empower inclusive, productive and resilient cities

More than half of the world population is now urban, with seven out of 10 people living in developing countries<sup>85</sup>. While they can be home to extreme deprivation and environmental degradation, with one billion people living in slums<sup>86</sup>, cities are also economic engines, with more than half of global GDP emanating from urban areas<sup>87</sup>. As more people move to cities, there will be growing pressures on public transportation, clean water and air, employment, urban planning, growing income gaps, and more. These challenges vary, depending on local and national governmental structures, the business climate and level of development. For urban residents, many studies show that quality of life is increasingly tied to sustainable development.

Between 2010 and 2050, the urban population will grow significantly, perhaps to nine billion people, increasing the urban share to two-thirds of the world's population<sup>88</sup>. For this evolution to be sustainable it must tap the inherent power of cities as a major source of innovation, to tackle challenges in an integrated way and turn them into opportunities—in this, broadband and ICT will continue to play an important role as a driver.

### **The transformative opportunity:**

Unlike many technologies for sustainability that are still under development – such as next-generation biofuels – broadband solutions already exist and are being implemented around the world. This includes smart buildings that utilize connectivity for security, energy and climate monitoring, and are net-producers of renewable energy; integrated transportation and communication solutions to substitute and optimize travel; e-government services that may reduce paper use, and digital health and remote monitoring solutions that can support healthier lifestyles and reduce travel

Broadband and ICT enable cities to grow in a way that is economically, socially and environmentally sustainable—meeting the goals of the triple bottom line. ICT infrastructure has its foundation in a flexible and scalable network that serves as a backbone between all kinds of data, services, application and subscribers. Cloud technology and services enabled by such a network are opening up new opportunities for value creation; for example, lowering barriers to innovation. On an individual level, ICT can actively meet people's needs, while supporting more sustainable urban lifestyles. Real transformation will demand radically different solutions to city challenges and will require that the basic urban infrastructure has ICT at its core.



## 4.8. Goal 8: Curb human-induced climate change and ensure clean energy for all

Climate change is an existential threat to human development in all countries. Despite having signed the UN Framework Convention on Climate Change more than 20 years ago, the world remains dangerously off-course in mitigating human-induced climate change<sup>89</sup>. Indeed, the situation is far more perilous today than in 1992. Global emissions of greenhouse gases (GHGs) continue to rise sharply as the global economy expands, dependence on fossil fuels remains very high and progress in decarbonizing the world's energy systems remains slow<sup>90</sup>.

### **The transformative opportunity:**

In its SMARTer 2020 report, GeSI claims ICT-enabled solutions have the potential to reduce the annual carbon dioxide emissions of six sectors – transport, agriculture and land use, buildings, manufacturing, power, and consumer and service – by an estimated 9.1 GtCO<sub>2</sub>e by 2020, representing 16.5% of the projected total for those sectors in that year<sup>91</sup>. Transformative broadband-enabled solutions reinvent business models or allow countries to ‘leapfrog’ from high GHG-emitting technologies to low-carbon development. Such innovations include smart buildings, electric cars with zero emission driving economy, and e-services such as e-health, e-education, e-commerce, e-governance and teleworking<sup>92</sup>. It is estimated that mobile technology alone could lower GHGs by 2% by 2020<sup>93</sup>.

### **Smart grids in Australia**

The power sector emits over 21% of the world's GHG emissions, according to the SMARTer2020 report. By facilitating the integration of renewables and enabling the smart grid, ICT can significantly reduce inefficiencies in the power sector and dependence on fossil fuels – with an estimated abatement potential by 2020 of 2.0 Gt CO<sub>2</sub>e. Smart grids use ICT to gather and act on information about the behavior of suppliers and consumers using the grid. This information can be used to improve efficiency, reliability and sustainability of electricity production and consumption in the grid.

4.9. Goal 9: Ensure ecosystem services and biodiversity and ensure good management of water and other natural resources.

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Ecosystems such as rainforests, mangroves, coral reefs, wetlands, dry-lands and grasslands underpin human life, providing us with food, clean water, energy and medicines, and helping to regulate our environment, climate, air quality, pollination and coastal storm protection. Yet many ecosystems have been or are suffering heavy degradation, and the world is facing an unprecedented mass extinction of species and loss in biodiversity<sup>94</sup>.

### **The transformative opportunity:**

Satellite broadband offers sophisticated earth observation, essential in the monitoring, protection and management of ecosystems. The resulting data enables meaningful indicators to be identified, yielding better understanding and greater transparency in national performance against planetary boundaries, paving the way for international partnerships to prevent degradation and sustain essential ecosystem services. Increasingly, it offers the opportunity to transform services now accessible only by Internet into mobile monitoring services, in addition to m-Health, m-Education, m-Government and m-Commerce, even in remote areas<sup>95</sup>.

### **ICTS for environmental monitoring**

ICT in general, and radio-based remote sensors in particular, are critical for environmental observation, climate monitoring and climate change prediction and adaptation. These technologies make available information on the changing environment which is important for helping sustain basic needs such as food and water<sup>96</sup>.

Other possible applications of these systems include improving water catchment management or access to energy management at community level, storm warnings, or helping farmers know when to plant seeds.

Satellite monitoring contributes to effective management of biodiversity and the environment by providing accurate, up-to-date information on land cover and changes happening over extensive areas that are otherwise difficult to study. For example, ITU members use satellite to monitor deforestation, the ozone layer and fishing activities, functions which the ITU Radiocommunication Bureau supports through its satellite orbital allocations and technical studies. There are many successful examples using simple mobile technologies, which could be amplified through high-speed broadband networks. The importance of ICT is such that several countries have explicitly recognized the importance of creating robust and resilient telecommunication networks to support mitigation of natural and manmade disasters.

## 4.10. Goal 10: Transform governance for sustainable development

Sustainable development requires good governance in every country, at local, national and global levels, and by all sectors of society including government, business and civil society organizations. Good governance is not only an end in itself, but an important means to achieve the three other dimensions of sustainable development – economic, social and environmental<sup>97</sup>.

The UN Secretary General's Panel of High-Level Eminent Persons has renewed calls "to recognize peace and good governance as a core element of wellbeing, not an optional extra" as part of Post-2015 development<sup>98</sup>.

### **The transformative opportunity:**

The use of ICT in e- or m-governance provides people with accessible tools to better engage with public institutions, fostering broader transparency, civic responsibility and accountability. M-governance complements more mainstream e-governance initiatives by potentially providing greater inclusion and fostering broader participation. Broadband, and mobile broadband in particular, have shown promise in advancing development goals grounded in international principles, such as transparency and accountability, human rights and gender equality. Mobiles are instrumental in promoting more democratic governance because they help citizens take a more active role in fostering accountable governing institutions.

According to Transparency International<sup>99</sup>, illicit financial flows, including corruption, bribery, theft and tax evasion, cost developing countries US\$1.26 trillion per year – equivalent to the economies of Switzerland, South Africa and Belgium combined<sup>100</sup>. ICT can also have major impacts helping to expose bribery and corruption through m-finance and open reporting practices.

During elections, mobile phones and innovative mobile platforms are essential tools in monitoring fraud and engaging citizens. Mobile platforms are being created and refined daily to help improve electoral processes around the world, whether through systematic, organized monitoring carried out by trained volunteers, or informal, citizen-generated data collection.

### **The Transformative Potential of ICTs for Sustainable Development**

The transformative potential of ICTs lies in the synergies, transparency and inclusion it creates, in its capacity to dematerialize and drive efficiency, and in the speed with which it can globally and cost-effectively scale sustainable solutions. This Table sets out how ICT can help achieve 10 sustainable development goals proposed by the SDSN, supported by examples from around the world.

Proposed SDG	The challenge	Transformative opportunity	ICT-enabled solution
<b>Goal 1: End extreme poverty &amp; hunger</b>	To end extreme poverty in all its forms, including hunger, child stunting, malnutrition, and food insecurity, and support highly vulnerable countries (MDGs 1-7).	<p><b>Achieve global social and economic inclusion:</b> by providing – and enhancing – access to services, affordable connectivity can boost productivity, GDP, jobs, skills and livelihoods, reducing inequality and breaking the cycle of poverty, exclusion and disadvantage.</p> <p><b>Ensure effective intervention and emergency prevention:</b> access to high quality, real-time data can ensure vulnerable states receive the support they need, when it's needed.</p>	<p>Mobile banking: M-Pesa (Kenya), MTN MobileMoney (Central Africa), Tigo (Latin America) and Easypaisa (Pakistan), Ericsson's Open Money</p> <p>Mobile money: Mobile Money 'Sprinters' like Telesom Saad (Somaliland), Telenor Easypaisa (Pakistan), UBL Omni (Pakistan, Orange Money (Madagascar), Ooredoo Mobile Money/QNB/ MoneyGram (Qatar), Tunisiana/Tunisian Post MobiFlouss (Tunisia)</p> <p>M-insurance: Bima (global microinsurance company, based in Sweden)</p> <p>Disaster/emergency relief: InSTEDD/GeoChat (Cambodia, Thailand, Haiti)</p>
<b>Goal 2: Achieve development within planetary boundaries</b>	All countries have the right to development that respects planetary boundaries, ensures sustainable production and consumption patterns, and helps to stabilize the global population by mid-century	<p><b>Make the shift to sustainable development:</b> by decoupling production and consumption from pollution and unsustainable natural resource use, innovative ICT solutions can support the transition to sustainable, low-carbon consumption systems.</p> <p><b>Improve information flows:</b> the 'data revolution' will transform our capacity for data gathering, measuring and monitoring, enhancing decision-making and management through better indicators, GDP measures and national accounts.</p>	<p>Tele-commuting Video conferencing Eco-driving Real-time traffic alerts ICT-enabled logistics systems Environmental monitoring Satellite monitoring.</p>

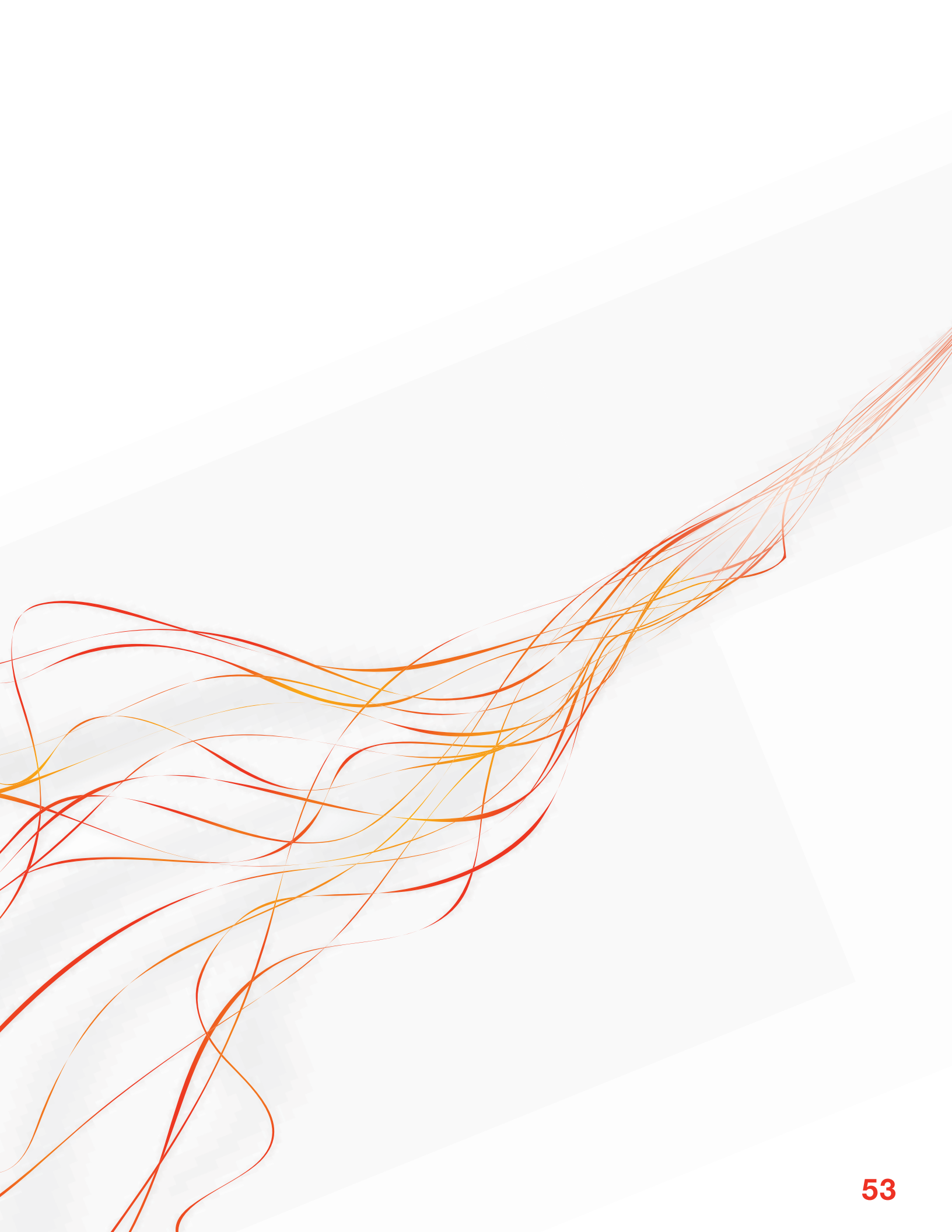
<b>Goal 3: Ensure effective learning for all children and youth for life and livelihood</b>	<p>All girls and boys complete affordable and high-quality early childhood development programs, primary and secondary education to prepare them for the challenges of modern life and decent livelihoods. All youth and adults have access to continuous lifelong learning to acquire functional literacy, numeracy, and skills to earn a living through decent employment or self-employment</p>	<p><b>Provide universal access to education:</b> ICT and broadband offer an affordable mechanism for delivering high quality, appropriate educational content, helping people secure decent livelihoods and fulfill their potential, regardless of location.</p> <p><b>Share best practice:</b> cloud-based digital content can be rapidly, continuously and cost-effectively updated to ensure relevant, personalized, life-long learning worldwide, boosting leadership, productivity, innovation and engagement.</p>	<p>Connect To Learn. a partnership founded by the Earth Institute, Ericsson and Millennium Promise (Ghana, Tanzania, Kenya, Uganda, Chile, Brazil, South Sudan, Djibouti, India and Malawi)</p> <p>Increase literacy rates of rural females: The Islamabad Polytechnic Institute for Women and jointly implemented by UNESCO, Mobilink Pakistan and the Bunyad Foundation (Pakistan).</p> <p>English lesson service on mobile phones: BBC Janala (Bangladesh)</p> <p>National digital literacy mission in India initiated by Intel, NASSCOM and others (India) Intel® Teach Program; Millennium@eduinitiative (global)</p>
<b>Goal 4: Achieve gender equality, social inclusion and human rights for all</b>	<p>Ensure gender equality, human rights, the rule of law and universal access to public services. Reduce relative poverty and other inequalities that cause social exclusion. Prevent and eliminate violence and exploitation, especially for women and children.</p>	<p><b>End inequality; respect, protect and remedy human rights:</b> Affordable, universal connectivity can drive social inclusion of women and vulnerable or marginalized groups by raising awareness and empowerment, providing access to justice and improving transparency, accountability and governance.</p>	<p>Mobile phone marketing for women: Almas,Asiacell (Iraq)</p> <p>Mobile justice initiative: (Kenya)</p> <p>Intel Learn case study - impact on girls by ICRW (global).</p>

<p><b>Goal 5: Achieve health and wellbeing at all ages</b></p>	<p>Achieve universal health coverage at every stage of life, with particular emphasis on primary health services, including reproductive health, to ensure that all people receive quality health services without suffering financial hardship. All countries promote policies to help individuals make healthy and sustainable decisions regarding diet, physical activity, and other individual or social dimensions of health.</p>	<p><b>Enable universal access to affordable, high quality healthcare:</b> ICT and broadband can drive down cost of delivery, improve access, and raise quality of care in health services worldwide through innovative approaches like e- or m-health, healthcare worker training and support, and better monitoring and communication.</p> <p><b>Empower individuals to make healthy choices:</b> broadband can be a tool to empower and educate people to change behavior and take responsibility for their wellbeing, reducing mortality, boosting productivity and lowering the disease burden.</p>	<p>Millennium Villages Childcount (Kenya and other Sub-Saharan African countries)</p> <p>One Million Community Health Worker Campaign, SDSN, Earth Institute, Columbia University (sub-Saharan Africa)</p> <p>Remote monitoring technologies: Chronic care aimed at elderly (United States)</p> <p>mTikka for vaccines, Johns Hopkins University (Bangladesh) Child vaccination program: GSK (GlaxoSmithKline), Vodafone, Save the Children and the Ministry of Health (Mozambique) Dematerialization: E-health for Primary healthcare (Croatia)</p>
<p><b>Goal 6: Improve agriculture systems and raise rural prosperity</b></p>	<p>To improve farming practices, rural infrastructure, and access to resources for food production to increase productivity of agriculture, livestock and fisheries, raise smallholder incomes, reduce environmental impacts, promote rural prosperity and ensure resilience to climate change.</p>	<p><b>Increase productivity and sustainability of food production:</b> by linking rural communities with services, markets, knowledge and information, ICT can boost efficiency and resource management, raise rural livelihoods and increase food security.</p> <p><b>Apply monitoring to better manage natural resources:</b> wide-scale, high quality data collection can improve monitoring and management of natural resources, biodiversity and ecosystems, helping to shape effective adaptation and resilience strategies.</p>	<p>mFarmer initiative: the Bill and Melinda Gates foundation and USAID (India).</p> <p>Payment systems, micro insurance and micro-lending; mobile information and farmer helplines; smart logistics, tracking and management systems; and trading, tendering and bartering platforms: Vodafone, Accenture and Oxfam (global)</p>

<b>Goal 7: Empower inclusive, productive and resilient cities</b>	To make all cities socially inclusive, economically productive, environmentally sustainable, secure and resilient to climate change and other risks. Develop participatory, accountable and effective city governance to support rapid and equitable urban transformation.	<b>Build inclusive, resilient cities:</b> ICT can help rewire urban communities to be more inclusive and have better quality of life while being climate-smart and resource-efficient.	Green City Index, Siemens and partners (US, Canada, Europe, Asia, Africa, Latin America)  Urban sustainable development: Stockholm Royal Seaport (Sweden)
<b>Goal 8: Curb human-induced climate change and ensure clean energy for all</b>	Curb greenhouse gas emissions from energy, industry, agriculture, built environment, and land-use change to ensure a peak of global CO2 emissions by 2020 and to head off the rapidly growing dangers of climate change. Promote sustainable energy for all.	<b>Reduce greenhouse gas emissions:</b> innovation in ICT is opening up many options for dematerialization and efficiency gains through smarter energy management and shifting to intelligent, low-carbon, sustainable, closed-loop systems.	Life-cycle assessment of smart grids, Ericsson (Australia)  Smart buildings (Spain) Vijay Modi's Energy for all, solar power micro grids
<b>Goal 9: Ensure ecosystem services and biodiversity and ensure good management of water and other natural resources</b>	Biodiversity, marine and terrestrial ecosystems of local, regional and global significance are inventoried, managed and monitored to ensure the continuation of resilient and adaptive life support systems and to support sustainable development. Water and other natural resources are managed sustainably and transparently to support inclusive economic and human development.	<b>Sustain through inventory, management and monitoring of life support systems:</b> ICT can help identify drivers of ecosystem harm and degradation and opportunities for protecting and improving environmental services, as well as facilitating regional and global cooperation around sustainable use.	Early warning system (China, global)  SMS alerts on water supply: local government, Grameenphone, AusAid and DANIDA (Bangladesh)  Mobile marketing & m-payments for safe-water filters: A RAND project, with USAID funding (Kenya)



<p><b>Goal 10: Transform governance for sustainable development</b></p>	<p>To ensure the public sector, business and other stakeholders commit to good governance, including transparency, accountability, access to information, participation, an end to tax and secrecy havens, and efforts to stamp out corruption. Also, to ensure that the international rules governing international finance, trade, corporate reporting, technology, and intellectual property are consistent with achieving potential SDGs. The financing of poverty reduction and global public goods, including efforts to head off climate change are strengthened and based on a graduated set of global rights and responsibilities.</p>	<p><b>Partner successfully for good governance:</b> ICT is an enabling technology with great potential to create synergies between different sectors, groups and issues, as well as helping to scale knowledge and solutions. Used effectively as an integral strategy and policy component, it can be a powerful tool for improved transparency, cooperation and governance in support of sustainable development goals.</p>	<p>M-governance (Kerala, India)</p> <p>Mobile monitoring of elections, human rights abuses: Ushahidi: (Kenya)</p> <p>Corruption prevention: m-Paisa, operator Roshan (Afghanistan)</p>
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# 5

# RECOMMENDATIONS

When the MDGs were launched in 2000, relatively limited tangible evidence existed as to how broadband would impact economic and social development. As 2015 approaches, and as world leaders gather at the UN General Assembly for the first time to discuss the Post-2015 development framework, the ICT revolution is dramatically affecting people's lives and livelihoods in developed and developing countries alike. In the emerging broadband era, major opportunities exist for transformative change across the entire development spectrum: from greater equity in healthcare and education to enhanced economic growth and from job creation to mitigation of environmental impact. To harness the potential of ICT and broadband to deliver sustainable development, all stakeholders are encouraged to consider the following actions:

### **RECOMMENDATIONS FOR MULTI-STAKEHOLDER ACTION:**

1. Make ICT and high speed broadband universally available at affordable cost for all.
2. 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. 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. Create a streamlined and enabling regulatory environment for the broadband era that accelerates removal of barriers to market entry for broadband ICT uptake.
5. Provide consumer incentives and harness government procurement to drive demand and stimulate private sector innovation and investment.
6. Twin broadband innovation and investment with sustainable multi-stakeholder business models to capitalize on the transformative potential of universal ICT
7. Drive the game-changing potential of mobile broadband through the optimized use of radio-electrical frequency spectrum for universal ICT for development penetration
8. 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. 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. Develop appropriate solutions to maximize resource mobilization, innovation and investment in broadband for both developed and developing countries.

## **Perspective**

Carlos Slim Domit, Chairman, Grupo Carso SA de CV, Mexico, co-chair, B20 Task force on Information and Communication Technologies and Innovation

**"Innovation in ICT is happening all the time ON a progressive scale. It gets done in formal ways or through personal development. But the most important baseline criteria is access."**

## 1. Affordability and Accessibility

**Make ICT and high speed broadband universally available at affordable cost for all**

Making broadband affordable and accessible to all is key to eradication of extreme poverty, a central sustainable development goal. Broadband opens up opportunities for poor, vulnerable, remote or marginalized people to improve their livelihoods and access services such as healthcare, education and banking. For this to happen, the technology, services and content must be accessible, affordable and appropriate to local needs and culture. As well as developing awareness of the value of ICT and promoting digital literacy, education, telecom and other ministries should disseminate best practice and encourage leapfrogging and technology transfer to ensure that the best solutions are available where they are needed most.

## 2. Sustainable Development Strategy and 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.**

Broadband technology enables transformative solutions in all areas being discussed as part of the Post-2015 development agenda: End Poverty; Empower Girls and Women and Achieve Gender Equality; Provide Quality Education and Lifelong Learning; Ensure Healthy Lives; Ensure Food Security and Good Nutrition; Achieve Universal Access to Water and Sanitation; Secure Sustainable Energy; Create Jobs, Sustainable Livelihoods, and Equitable Growth; Manage Natural Resource Assets Sustainably; Ensure Good Governance and Effective Institutions; Ensure Stable and Peaceful Societies; Create a Global Enabling Environment and Catalyze Long-Term Finance. Introducing a specific broadband target or incorporating elements related with the use of broadband in each of these areas would bring together all the efforts conducted by different stakeholders to maximize the ICT opportunity to enable a sustainable development future.

## 3. Cross-sector Integration of Policy and Plans

**Deploy national development policies and plans to actively drive the cross-sector integration of economic and social outcomes deliverable and scalable through ICT and broadband.**

ICT and broadband create links and synergies between sectors. To ensure that broadband can play a strong enabling role in sustainable development, ICT and broadband should be an integral component in all policy-making spheres – from the economy to education, health, transportation, energy and governance. Introducing a comprehensive national broadband plan that integrates the principles of sustainable development and establishing a National Broadband Council can be possible ways to achieve the cross-ministry collaboration necessary to ensure policy integration and convergence across departments.

## 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.**

So broadband-enabled sustainable solutions can be rapidly and efficiently road-tested and scaled up, regulation needs to be harmonized, market-focused, encourage competition, and deliver long-term investment certainty for innovation. As well as adapting regulatory frameworks to encourage development of new content and services and protect innovation and personal data, governments need to identify – and remove – regulatory barriers, for example revising financial regulations to allow mobile banking.

## 5. Market Incentives

**Provide consumer incentives and harness government procurement to drive demand and stimulate private sector innovation and investment**

Through their own procurement programs, governments can drive uptake of emerging ICT technology and demonstrate feasibility of broadband-enabled sustainability solutions such as e-learning and m-health. This, together with targeted consumer incentive schemes will help raise awareness and build the market for emerging technology platforms, content and applications, such as mobile phone services benefiting women, or those in rural communities.

## 6. Partnership and Multi-stakeholder Collaboration

**Twin broadband innovation and investment with sustainable multi-stakeholder business models to capitalize on the transformative potential of universal ICT**

Work closely with NGOs, the private sector and others to leverage the transformative potential of ICT. Public-private cooperation is a key tool for sustainable development: achieving potential SDGs depends on “renewed global partnership” that pools expertise and resources in support of shared goals. Likewise, successfully bridging the digital divide through universally accessible, affordable and fast ICT networks also depends on effective multi-stakeholder collaboration to deliver effective regulatory and market frameworks, the necessary infrastructure investment and the R&D to ensure content and services meet people’s needs effectively and efficiently.

## 7. Spectrum optimization

**Drive the game-changing potential of mobile broadband through the optimized use of radio-electrical frequency spectrum for universal ICT for development penetration**

To ensure universal broadband access requires sound and supportive spectrum policy which includes assigning spectrum in a technology- and service-neutral manner. National Governments need to assess and review the needs and conditions in their country and enact policy frameworks which enable efficient usage of spectrum through a range of different frameworks to enable greater rural coverage, boost digital inclusion and serve as a springboard to future economic growth in remote areas. Global harmonization of spectrum allocation, where possible, will also assist in ensuring worldwide device compatibility.

## 8. Harmonization and 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.**

Harmonized metrics and common technical standards are required to calculate ICT’s socio-economic and environmental impacts, as well as the positive environmental contribution it can make to other sectors—both at the level of individual products and households, and at system, city and national levels. A database that allows comparability of ICT-related indicators across countries and over time would provide a baseline for tracking progress in the Post-2015 development framework. In addition, global standardization of devices and harmonized operating arrangements would help improve interoperability, affordability and accessibility. Voluntary industry-led technical standards for ICT and broadband technologies which are globally harmonized can enable optimal solutions, create economies of scale lowering costs and facilitate interoperable solutions for worldwide markets.

## 9. Monitoring and Evaluation

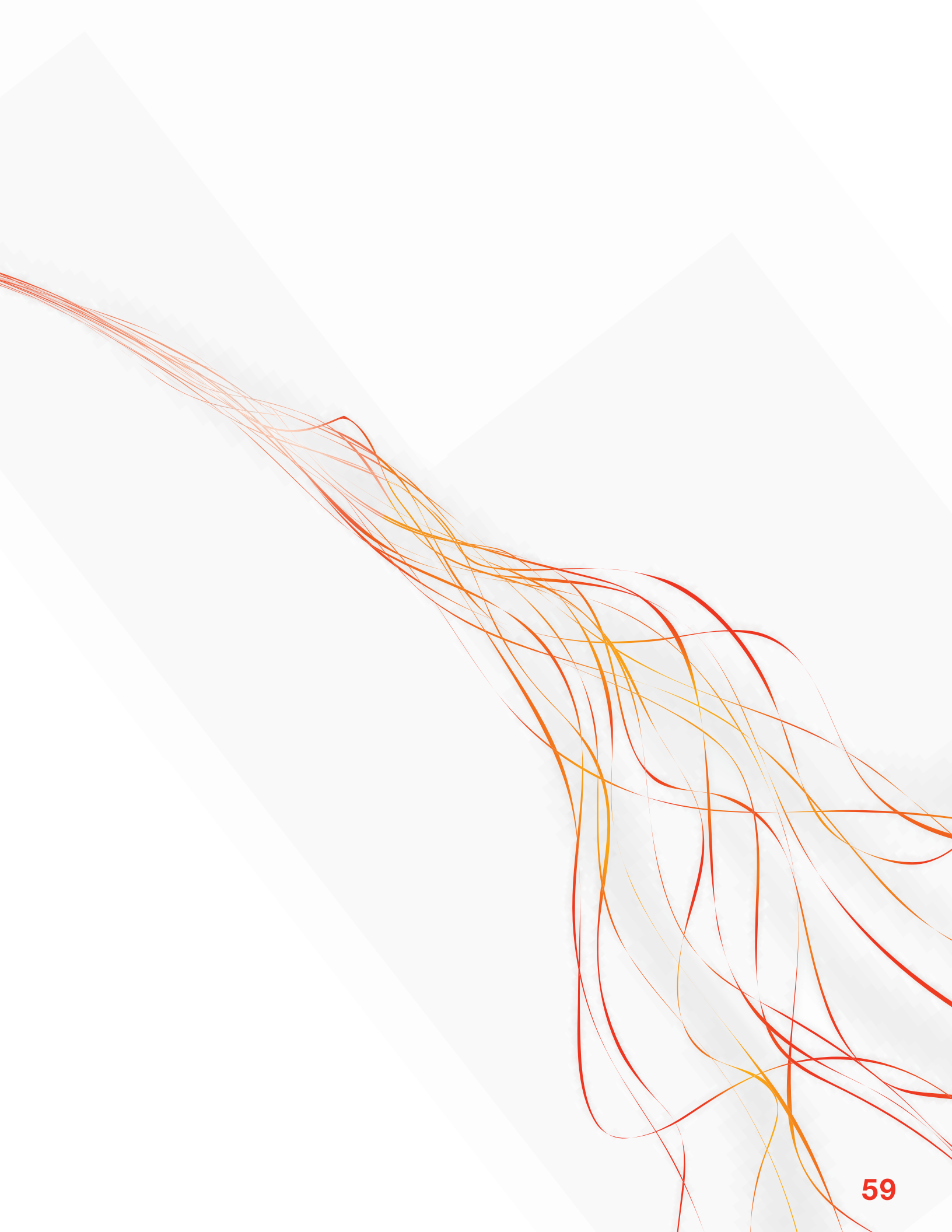
**Establish a comprehensive monitoring framework for broadband deployment and robust accountability mechanisms to track development progress via industry-wide broadband ICT metrics and indicators**

Strong monitoring and accountability are a cornerstone of the Post-2015 development agenda. Advances in ICT provide the opportunity for a “data revolution” that can help countries strengthen existing data sources and develop new, more participatory sources of information. New technologies can be used to expand coverage, disaggregate data and reduce costs. With the right technical and financial support, developing countries can build solid statistical systems and capacity to take advantage of these new opportunities.

## 10. Resource Mobilization, Innovation and Investment

**Develop appropriate solutions to maximize resource mobilization, innovation and investment in broadband for both developed and developing countries.**

To be sustainable, broadband access must be viable over the long term. To build the market, all actors have to work together to maximize the investment to help connect the underserved and develop high-speed broadband infrastructure. Possible ways of achieving this is by promoting the use of universal service funds, factoring ICT costs into health and education policies and encouraging investment via public-private partnerships. Telecom and finance ministries should work with the private sector on financial incentives for investment in the full broadband ecosystem: technology platforms, applications, services and local content in local languages.







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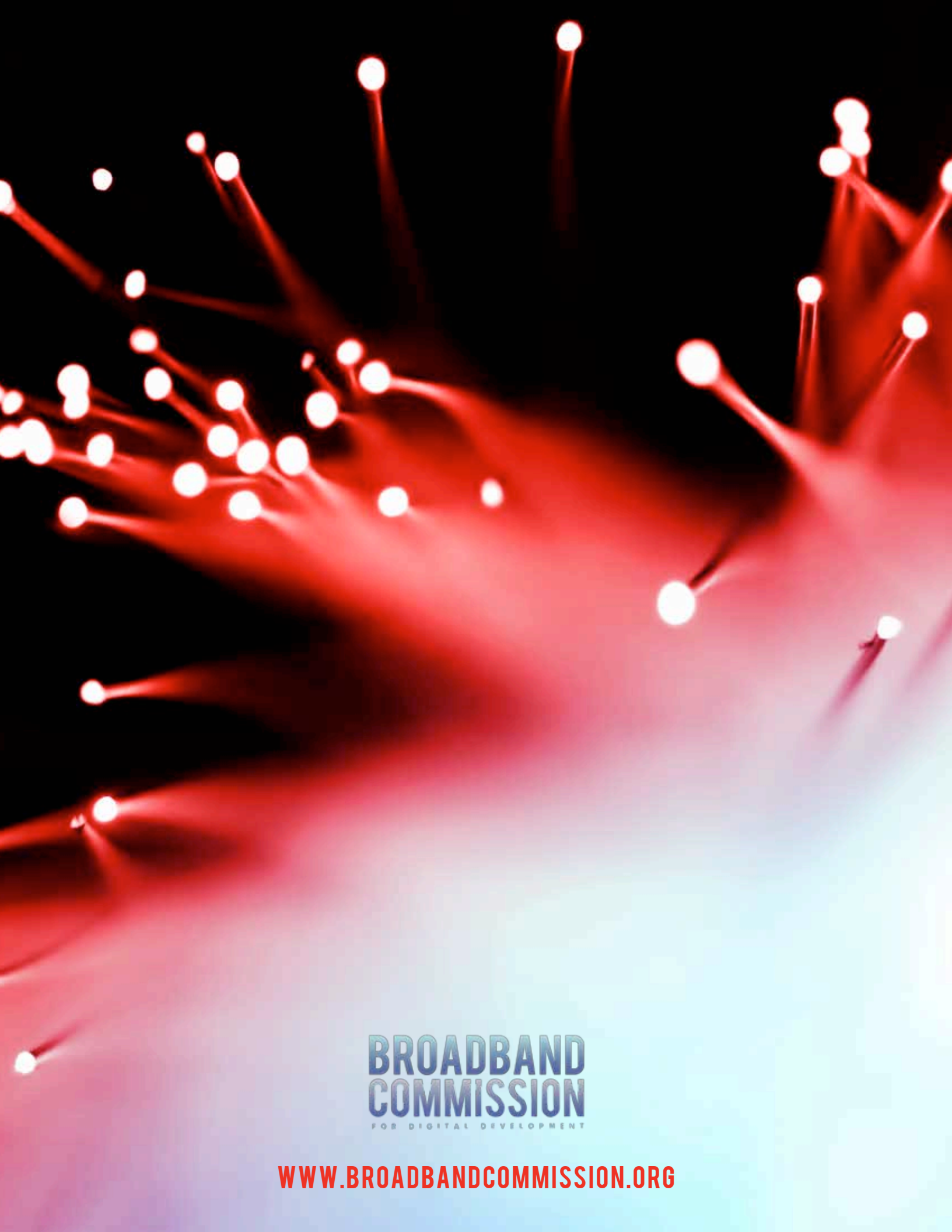












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