# Conclusions and way forward

## Executive summary

The appearance of information and communication technologies (ICTs) in the high-level political agenda includes statements by the United Nations (UN) Administrative Committee on Coordination in 1997, the UN Economic and Social Council in 2000 and the G8 group in 2000, recognizing the importance of ICTs to sustainable development and the development of a global knowledge-based society and economy. These paved the way for the UN *Millennium Declaration* stating that the benefits of ICTs should be available to all, and to the endorsement of the World Summit on the Information Society (WSIS) by the UN General Assembly in 2002. Subsequent to the Geneva and Tunis phases of WSIS, and agreement on the Geneva vision "… to build a people-centred, inclusive and development-oriented Information Society …", annual WSIS meetings have been conducted to discuss the lessons learnt in pursuing ICT for Development (ICT4D). In particular, the 2013 WSIS Forum issued a statement by the United Nations Group on the Information Society (UNGIS) on the potential of ICTs to support the Post-2015 Development Agenda.

The high rate of failure of ICT4D initiatives and the difficulties in transferring successful initiatives between contexts emphasise the need for ICT4D decision-making to rely more on research and evidence. This has created favourable conditions for the growth of ICT4D as a field of applied research. The field experienced a 39 per cent average annual growth in the volume of publications produced between 1999 and 2008. The research has identified two stages in the development of the ICT4D domain: ICT4D 1.0 focused on replicating off-the-shelf solutions in developing countries and addressing the readiness and availability of ICT, considering the poor as primarily passive consumers. ICT4D 2.0 focused on the uptake and impact created by ICTs, designed around existing needs and capabilities of the poor as producers of digital content and services. While ICT4D research initially attracted criticism for its focus on action over knowledge and insufficient analysis, the quality and rigour of ICT4D research, and therefore its reliability, has improved over the years.

While we still know little about the impact of ICTs on development, there is growing evidence of impact of ICTs in different sectors. In the economy, several studies have linked the introduction of broadband to GDP growth. In education, there is some evidence that the use of specific ICTs has positive impact on student performance, but the relationship is complex. In health, there is evidence for European countries that the average costs versus benefits of electronic health records is distributed in favour of citizens and health practitioners. In the environment, ICTs have been shown to have both positive and negative impacts. Examples of positive impacts include dematerialization, improved energy efficiency of devices and reduction in transport. Negative impacts include energy use in the production of ICT equipment and generation of e-waste.

Concerning the final quantitative assessment review of the WSIS targets carried out in this report, the assessment shows that while extensive growth in ICT networks, services, applications and content has driven the global information society in the decade following the WSIS Summits, ICT access and use is far from equally distributed. Large parts of the world's population have limited access to ICTs (in particular the Internet) and cannot fully benefit from their potential. While the last decade has seen enormous growth in mobile-

cellular penetration (with now nearly one mobile-cellular phone subscription for every person in the world), over 4 billion people in the world (60 per cent of the world's population) are still not using the Internet.

The assessment in this report has also highlighted the lack of data to fully assess progress. It should be noted that the results are possibly distorted by uneven data contributions in favour of more connected countries. In particular, for most indicators, data in respect of least developed countries were lacking.

Concerning specific targets:

- *Target 1:* Significant but unequal progress has been observed for the four indicators defined for this target. Rural mobile coverage is on track and good progress has been made with access to phones in rural households, but rural areas lag in Internet access and use.
- *Target 2:* Good progress has been made on this target, but great variations exist between and among developed and developing countries across all four indicators. The presence of radio and television for educational purposes is mixed due to countries' varying policies. Learner-to-computer ratios are high and Internet penetration levels are generally low in developing countries, while the opposite is true of developed countries.
- *Target 3:* Significant progress has been observed across the three indicators defined for this target: connectivity of scientific and research centres with broadband Internet, number of National Research and Education Networks (NRENs) and connecting NRENs with broadband Internet. However, the target has not been achieved by all countries.
- *Target* 4: Mixed progress has been made in achieving this target, with the lack of data hampering a complete review of the 11 indicators defined for this target. Available data suggest that while an increasing proportion of public libraries and museums have broadband Internet access, the proportion with a web presence is lower. Post offices are more likely to have broadband Internet access, but a relatively small proportion offer public Internet access. National archives tend to have both broadband Internet access and a web presence. However, limited progress has been made in in terms of digitizing cultural heritage and making it available online. A notable finding of Chapter 4 is that public libraries and post offices are underutilized as public Internet access venues.
- *Target 5:* Good progress has been observed for the first indicator defined for this target – connecting hospitals to the Internet, less progress for the second indicator – connecting health centres, and no data were available to assess the third indicator – the level of use of computers and the Internet to manage patient information.
- *Target 6:* For most of the indicators for this target, progress is not uniform, with many countries still not utilizing the full potential of ICT in government. For most of the indicators, lack of data hamper the analysis. However, data for two of the indicators are available for most countries and show that by 2013, all countries had a central government web presence and the provision of information and transactional services on government portals is growing.
- *Target 7:* The review of this target has seen mixed progress across all indicators: the percentage of the national teaching workforce trained to teach basic computer skills is generally low, the proportion of teachers trained to teach using ICT varies substantially between and among developed and developing countries, and computer-assisted instruction and Internet-assisted instruction are common in high-income countries, but uncommon in many developing countries.

- *Target 8:* While this target has not been universally achieved, good progress has been made. Household access to radio and TV is widespread globally, although the target for TV remains unmet in the least developed countries. The adoption of multichannel television has been growing rapidly and slightly more than half of all households had it by 2012.
- *Target 9:* Good progress has been made towards this target, although there are major problems with lack of reliable data. The data that are available show that the proportion of Internet users whose primary language is English has fallen significantly as access to the Internet has become more widespread. There has been particularly strong growth in the number of Chinese speakers online and there is growing linguistic diversity in web content. For instance, there has been a marked decline in the proportion of Widipedia articles in English (from 46 per cent in 2003 to 15 per cent in 2013) and a corresponding increase in the proportion of articles in languages that are not among the ten most-used international languages.
- *Target 10:* Significant progress has been made towards achieving this target across all five indicators: mobile-cellular subscriptions have grown to almost one subscription for every person; more than half of all households have a telephone; at least half of the world's inhabitants use mobile phones in countries where data are available; and almost 40 per cent of the world's population and a similar percentage of households use the Internet, although still slightly below the 50 per cent target.
- *Proposed Target 11:* In countries for which data are available, about half of all businesses use computers. While fixed broadband access has grown for all countries with available data, the level is still unequal. Data for business mobile phone use are not widely available, although anecdotal evidence suggests that mobile phones have become the most commonly used ICT tool among micro and small businesses in low-income countries.

In addition to the mixed results in terms of achieving the WSIS targets, this report points to the difficulties in monitoring them. Defined in 2003, the targets largely focused on bringing connectivity and access to various groups, and reflect the situation of ICT uptake at the time, when relatively few people and organizations were connected. However, no formal monitoring process was put in place to carry out global assessment of the WSIS action lines or targets until 2010. In addition, data availability is low for the majority of indicators that were identified to help track the targets. While the Partnership on Measuring ICT for Development developed a core list of ICT indicators (*Partnership*, 2010) to track and compare international ICT developments and a statistical framework specifically to track the WSIS targets (*Partnership*, 2011), the WSIS targets cover subjects that are challenging to capture in quantitative terms, and to compare at the international level.

A number of lessons can be learnt for identifying and monitoring the targets. A key benefit of identifying targets is to bring global attention to ICT development challenges, and to stimulate ICT investment. These benefits were not fully realized for WSIS due to the low level of awareness amongst policy-makers until 2010. Relatively little attention was paid to the WSIS targets, which remained unmonitored until 2010 (ITU, 2010) and it is not entirely clear how they were set and why they focused on certain policy areas and not others. In particular most of the targets deal with ICT connectivity and access. Concerning methodological criteria, while the WSIS targets were time-bound, the targets were vague, which in turn hampered the identification of indicators. Also, the availability and quality of data remain a challenge, highlighting the lack of coordination between policy-makers and the statistical community, and lack of statistical capacity at the national level.

The review of the WSIS targets and indicators has shown that revisions are necessary: data for some targets are not available, others are less relevant, and there is a need to move from ICT access to use to monitoring the quality and equality of access. In addition, capturing the impact of ICTs is becoming more important than just capturing the rapid development of ICTs. The impact includes the role of ICTs as a development enabler to help achieve other development goals, including MDGs, and future goals of the post-2015 agenda. A number of recommendations were made for future ICT target-setting:

- high-level endorsement and awareness building among policy-makers
- open consultation processes to identify targets
- targets should be time-bound, concrete and measurable to be able to track progress
- they should be ambitious but realistic and achievable, based on the assessment of historical and current trends of progress
- indicators should be clear and easy to understand for policy-makers and other stakeholders, and relevant to policy intervention
- where possible, they should be based on internationally-agreed statistical standards.

In this context, the *Partnership* should continue to take the lead in coordinating measurement of the information society at the international level. In close collaboration with national statistical offices, relevant ministries, regulatory authorities and other relevant stakeholders, the *Partnership* should continue its work on identifying and disseminating statistical standards, concepts and classifications on ICT measurement, in order to produce data needed to assess information society progress and measure the impact of ICTs on development.

Finally, this report highlights that the current debates and processes that are feeding into the development of the post-2015 development agenda do not seem to sufficiently recognize the potential and the importance of ICTs. While the final review of the WSIS outcomes highlights the importance of linking any future ICT monitoring framework to the post-2015 development agenda, none of the key input documents for the post-2015 development agenda focus on ICTs. A number of documents have made reference to ICTs, but there is limited substantive content and no clear or sufficiently strong message on the role of ICTs for achieving future development goals.

## Introduction

As the target year for the achievement of the Millennium Development Goals (MDGs), 2015 represents an important milestone for the United Nations (UN) system and for UN member states. The pursuit of MDGs since 2000 coincides with remarkable progress achieved by the world community in the development and use of information and communication technologies (ICTs) for promoting and enabling socio-economic development (ICT4D) and the MDGs. There is also growing evidence that ICTs have the potential to support all three pillars of sustainable development – economic growth, social inclusion and environmental sustainability and will therefore be important for the future development agenda (UNGIS, 2013). However, despite the progress made, the inequalities in access to ICTs platforms, information, knowledge and technological progress remain vast (UNGIS, 2013). Therefore, in the light of the 2015 milestone, there is a need to take stock of the achievements made and the challenges encountered in the pursuit of the World Summit on the Information Society (WSIS) targets, and to discuss the lessons learnt to prepare for a possible post-2015 monitoring framework.

This chapter pursues three goals:

1. to outline the developments in ICT4D in general, including the international policy context, advances in research and understanding of the ICT4D phenomena, the emerging evidence of impact of ICT4D in different sectors, and how this impact is being measured
2. to summarize the content of this report, including statements of achievement, partial achievement or non-achievement of the WSIS targets, the evidence presented in support of such statements, the challenges and lessons learnt regarding measurement of the WSIS targets, and recommendations for defining future WSIS targets, should monitoring continue after 2015
3. to discuss the way forward with measuring progress of ICT4D in general and WSIS in particular, in order to advance the post-2015 development agenda.

The chapter comprises three sections. The first section focuses on ICT4D in general, the second focuses on WSIS measurement, and the third brings the focus on ICT4D and WSIS together within the post-2015 development context.

## ICT4D – policy, research and impact

This section outlines the international policy framework for pursuing ICT4D development at a global level; describes the achievements of ICT4D research towards better understanding of the ICT4D phenomenon; and presents evidence of impact of ICT4D on the economy, employment, education, health and environment, and how this impact is being measured.

### ICT4D – international policy context

As early as 1997, the UN Administrative Committee on Coordination recognized that ICTs should be at the centre of the efforts undertaken by UN member states to promote and secure sustainable development for all, and requested "establishing universal access to basic communication and information services for all" (UN Administrative Committee on Coordination, 1997).[1] A few years later, the UN Economic and Social Council (ECOSOC) recognized that ICTs are "central to the creation of the emerging global knowledge-based economy and can play an important role in accelerating growth, in promoting sustainable development and eradicating poverty in developing countries as

well as countries with economies in transition, and in facilitating their effective integration into the global economy" (ECOSOC, 2000). In the same year, the G8 summit conducted in Okinawa, Japan, stressed the impact of ICT on how people live, learn and work, and reinforced that "everyone, everywhere should be enabled to participate in and no one should be excluded from the benefits of the global information society" (G8, 2000).

Probably the most important reference to ICT4D was included in the MDG declaration, through which all UN member states committed to "ensure that the benefits of new technologies, especially information and communication technologies … are available to all" (UN General Assembly, 2000). However, the challenge of making ICTs "available to all" was enormous. By 2000, the world's population of a little over 6 billion (UNDESA Population Division, 2014) included fewer than 400 million Internet users,[2] so fewer than one in 15 people were using the Internet. Other data from 2000 showed that one out of three persons had never made a phone call, and most of the information available on the Internet was in English – the language spoken by less than 10 per cent of the world population (UNDP Evaluation Office, 2001).

Faced by the magnitude of the task to make ICTs available to all, and the pressing need to harness the potential of knowledge and technology for promoting the MDGs, the UN General Assembly endorsed the World Summit on the Information Society (WSIS) in 2002, to be conducted in two stages – Geneva in 2003 and Tunis in 2005 (UN General Assembly, 2002):

- The Geneva Summit defined a common vision "… to build a people-centred, inclusive and development-oriented Information Society …" and formulated key principles to achieve this vision: "… improve access to information and communication infrastructure and technologies as well as to information and knowledge; build capacity; increase confidence and security in the use of ICTs; create an enabling environment at all levels; develop and widen ICT applications; foster and respect cultural diversity; recognize the role of the media; address the ethical dimensions of the Information Society; and encourage international and regional cooperation." (ITU, 2005). The Summit also recognized that ICTs should help create a more equitable, developed and sustainable society; that communication is a fundamental social process and a basic need; that education, knowledge, information and communication are at the core of human progress; that the main challenge is to harness the potential of ICTs to promote the MDGs; and that ICTs should be seen as the means (tools) and not as an end. The Summit also defined 11 action lines to translate the vision and principles into concrete programs and projects.
- The Tunis phase of WSIS reaffirmed the vision defined in 2003 in Geneva and the commitments made to pursue this vision. The Summit also raised awareness about the transformative power of ICTs to benefit people's activities, interactions and lives. For example, the Tunis Commitment document highlights the potential of ICTs to expand access to quality education, and to boost literacy and universal primary education; the relevance of well-conceived investments in ICTs for increasing trade and better employment; and the role of ICTs to promote peace and security, and to improve social cohesion, good governance and the rule of law. The Summit called upon major stakeholders including governments, businesses, civil society and international organizations to work together towards the implementation of the commitments. Attention was also brought to the need to follow up on the commitments, and to develop financial mechanisms for bridging inequalities between people in access to, use of and knowledge of ICTs.

Subsequent to the Geneva and Tunis phases, WSIS meetings have been conducted annually since 2006. They have provided opportunities for major stakeholders to renew their commitments to ICT4D in general and to WSIS in particular, to showcase their achievements, and to discuss the lessons learnt. In particular, the 2013 WSIS Forum reviewed the progress made over the past ten years towards the implementation of the WSIS outcomes, and a statement was issued by the United Nations Group on the Information Society (UNGIS) on the potential of ICTs to support the Post-2015 Development Agenda (UNGIS, 2013); see Box 12.1.

**Box 12.1: Joint Statement – UNGIS on Post-2015 Development Agenda**

Submitted by UNGIS to the UN Secretary General and the UN Task Team as a contribution to the dialogue on the Post-2015 Development Agenda, the statement acknowledges that thirteen years since the UN Millennium Summit and ten years after the Geneva Summit, we developed a much better understanding of how ICTs can be utilized to advance development.

In particular, the statement highlighted existing knowledge that:

- ICTs can help "accelerate delivery on all three pillars of sustainable development – economic growth, social inclusion and environmental sustainability".
- ICTs can contribute to rights-based development, especially "freedom of expression and press freedom, which in turn are critical to combating corruption, ensuring gender-sensitivity, deepening accountability, and promoting socially-inclusive development".
- ICTs have become critical drivers for "the creation of jobs and the delivery of basic public services, for improving access to knowledge and education, for empowering women, enhancing transparency, and for giving marginalized populations a voice in decision-making processes".
- "ICTs play a transformative role in governance and institutional development at the global, regional, national and local levels, which are essential for sustainable development."
- "Regional cooperation, through the sharing of best practices, policies and experience" can facilitate the emergence of mutually-beneficial solutions that are relevant to given regions.
- ICTs can enhance the "technical effectiveness of development work, as well as the way in which common objectives are defined, set, monitored and achieved".
- "Affordable access to ICTs will continue to transform people's lives, as this enables people to empower themselves, their communities and their societies."

However, ICTs by themselves cannot ensure that the development goals are achieved but need to be combined with "strategic policies, human capacity, appropriate knowledge management, relevant content development, infrastructure deployment and an enabling environment". In addition, despite the progress made, "inequalities in access to ICT networks/infrastructure, education and technological progress and to innovation systems remain vast, within and between countries", and "important digital and knowledge divides" remain. The statements therefore proposed that:

- "The potential of ICTs as key development enablers, and as critical components of innovative development solutions, is fully recognized in the Post-2015 Development Agenda."
- "The Post-2015 Development Agenda reflects the lessons learned during the past decade in the implementation of the WSIS outcomes."
- "Interaction between the Post-2015 Development Agenda and the WSIS+10 Review processes be established to create synergies."

Source: UNGIS, 2013.

## ICT4D – advancing research and understanding

The recognition that ICTs have the potential to advance the cause of sustainable social and economic development, as reflected in the high-level policy agenda by the United Nations and UN member states, has been supported by anecdotal evidence of how specific ICT initiatives have made a difference and have contributed to development. However, the faith in ICT4D is also being

undermined by ample evidence of large-scale ICT initiatives that have failed to deliver the expected development impact – or even failed to deliver at all. The resulting confusion regarding the exact causes of success or failure of ICT4D initiatives, and the difficulties encountered in replicating successful ICT4D initiatives, has emphasised the importance of relying on analysis and research to inform ICT4D decision-making. These reasons, complemented by high political stakes and the vast amounts of public funds involved, have created favourable conditions for the growth of ICT4D as a vibrant field of applied research (see Box 12.2).

According to (Heeks, 2010), ICT4D research experienced a 39 per cent average annual growth and about a 2 000 per cent increase in the volume of publications produced between 1999 and 2008. One important outcome of this research was to identify two stages in the development of the ICT4D domain as follows:

- ICT4D 1.0 initiatives focused on replicating off-the-shelf solutions in poor communities in developing countries to pursue development, often through telecentre-type projects. They regarded the poor as primarily passive consumers, addressed the readiness and availability of ICT infrastructure, policies and regulations, and were driven largely by donor organizations and non-government organizations (NGOs) (Heeks, 2010).
- ICT4D 2.0 initiatives focused on the uptake of ICTs and the impact created by them. They designed ICTs around existing resources, capabilities and demands of the poor, who were regarded as potential innovators and producers of digital content and services, able to create jobs and generate income for themselves. For ICT4D 1.0, ICT is a tool for development; for ICT4D 2.0, ICT is a platform for development (Heeks, 2009).

ICT4D research also attracted criticism for its focus on action over knowledge, preference to study what can be narrowly described, and insufficient analysis (Heeks, 2009). However, the quality and rigour of ICT4D research, and therefore its reliability, has also improved over the years.

**Box 12.2: Analysis of ICT4D research**

The content analysis of 948 ICT4D research papers published in selected journals and conferences between 2000 and 2010 was documented by Gomez (2013) and found that:

- Most ICT4D research takes a single country (40 per cent), single organization (29 per cent) or multiple countries (24 per cent) context as its unit of analysis, although the neighbourhood- and community-level analyses are emerging, with 16 per cent and 15 per cent respectively. India is by far the largest recipient of single-country ICT4D research.
- ICT in general (48 per cent), information systems (26 per cent) and software (14 per cent) are typical objects for ICT4D research but mobile phones (10 per cent) are fast gaining attention.
- About half of the analysed papers are addressing identifiable research questions, the most common being: descriptive questions, including case studies and comparisons (31 per cent); measurement and improvement questions, including assessment, evaluation and ways to improve project implementation (21 per cent); and social change questions that address empowerment, democratization, sustainability and related issues (21 per cent).
- ICT4D research applies mainly qualitative (37 per cent), mixed (29 per cent) or quantitative (16 per cent) research methods, although the mixed methods are gaining in popularity.
- The common application domains for ICT4D research are: business, including e-commerce, industry and entrepreneurship (36 per cent); empowerment, including participation, social capital and community development (31 per cent); education, including literacy and science (22 per cent); and e-government, including politics and public services (18 per cent). A paper can belong to several domains.
- The most common contributions of ICT4D research are: best practices, including lessons learnt and success factors (31 per cent); field experience, including descriptions and evaluations of projects (30 per cent); as well as policy recommendations (26 per cent) and theory development (24 per cent), with growing contributions to design and policy recommendations. A paper can make multiple types of contributions.
- The most common recommendations issued by ICT4D research concern: infrastructure and resources (26 per cent); participation and collaboration (15 per cent); planning and implementation (13 per cent); and capacity building and training (12 per cent).

Source: Gomez (2013).

## ICT4D – impact and its measurement

Despite political support (because of the presence of ICT4D on the high-level agenda of the UN) and the steady provision of best practices, field experiences and policy recommendations by the growing body of ICT4D literature, there is ample evidence that many ICT4D projects fail or underperform in terms of the benefits and impacts expected from them (Heeks, 2006). Such evidence underscores both the complexity of designing and implementing successful ICT4D initiatives and the difficulty of replicating such initiatives in different contexts. It also emphasizes the importance of measuring the performance and impact of ICT4D initiatives to underpin accurate, context-specific analysis, and enable evidence-based decision-making. In addition, despite increasing policy attention and research, we still know very little about the impact of ICTs on development. In particular, we are missing internationally comparable cross-country data.

As part of the evidence concerning achievement, partial achievement or non-achievement of the WSIS targets, earlier chapters of this report provided some examples of ICT4D initiatives, and how they contribute to such targets. In order to put WSIS targets in a larger ICT4D context, examine the impact of ICT4D beyond WSIS, and possibly contribute to the reformulation of WSIS targets to guide ICT4D in support of post-2015 development, the following list provides examples of efforts undertaken to measure the impact of ICTs in different sectors:

- **Economy:** According to research conducted in 25 Organisation for Economic Cooperation and Development (OECD) countries during 1996-2007 to examine the effect of broadband infrastructure on economic growth (Czernich *et al*., 2009), after introducing broadband, gross domestic product (GDP) per capita would be 2.7 to 3.9 per cent higher on average than before its introduction, and further increases in broadband penetration by 10 percentage points would raise the annual per capita growth between 0.9 and 1.5 percentage points. However, it is unclear to what extent the evidence from OECD countries can be used to predict the outcomes for developing countries, and how far the first adopter experience can be used to predict the late adopter outcomes. According to the World Bank (2009), for developing countries such increases were 1.38, 1.12 and 0.81 percentage points of per capita growth for every 10 per cent increase in broadband, Internet and mobile phone penetration, respectively. However, according to Kenny (2011) and based on available evidence, economic benefits of broadband are overestimated.
- **Education:** Several studies exist to assess the benefits brought by ICTs to education, including positive effects of the use of specific ICTs on student performance, particularly in mathematics, science and English (UIS, 2009). However, ICT can only improve classroom performance if its use matches the pedagogical approach adopted by teachers (UIS, 2009) and if certain pedagogical conditions have been met (OECD, 2010). According to OECD (2005), performance in mathematics by students without home access to computers was significantly below the performance by students with such access; the same but weaker differentiation exists with respect to computers at school. The same study established that the highest performances in reading and mathematics were by students with average computer use, indicating that too much computer use could have a negative effect on student performance in school. However, it is not possible to demonstrate any consistent relationship between the availability and use of ICT at schools and educational attainment (OECD, 2010).
- **Health:** According to a World Health Organization (WHO) study (WHO, 2013), of 64 countries examined, 42 per cent established national e-health strategies but only 36 per cent implemented them (even partly). Typical e-health initiatives included: tele-consultation (47 per cent of the countries examined), health promotion (36 per cent), health call centres (33 per cent), health education (30 per cent) and treatment compliance and appointment reminders (28 per cent each). Nearly half of the countries (45 per cent) provided access to information at point of care to health care professionals, including electronic health records (36 per cent) and decision-support systems (25 per cent). The majority of countries offered ICT training to medical students (75 per cent) and health practitioners (58 per cent). A study of socio-economic impact of electronic health records (European Commission, 2010) identified that the average costs versus benefits of such systems are distributed as follows: citizens (2 per cent of costs and 17 per cent of the benefits), health practitioners (11 per cent costs and 17 per cent benefits) and health care providers (80 per cent costs and 61 per cent benefits).
- **Environment:** ICTs can have positive impacts on the environment through, for example, dematerialization and online delivery, reduction of energy use in transport, and greater energy efficiency of devices. In fact, ICT-enabled solutions offer the potential to reduce greenhouse gas emissions (GHG) by 16.5 per cent (Global eSustainability Initiative, 2012). ICT can also have negative environmental impacts through, for example, energy use in the production of ICT services and equipment (exacerbated by short life-cycles of many ICT products) and consequent issues of e-waste (UNCTAD, 2011) and the growing energy consumption by data centres (Glanz, 2012). Impacts can be related to production, maintenance and disposal of ICT equipment (first

order), to the application of ICTs throughout the economy and society (second order) or to fundamental changes to the economic and social structures and behaviours due to the use of ICT (third order) (Maclean, 2008). For example, electricity use of the office ICT equipment in the United States was estimated in 2000 at 2 per cent of the national electricity use (Williams, 2011). However, for a typical laptop computer, only 36 per cent of energy is used for its operations, while the remaining 64 per cent is used in its manufacture (Williams, 2011). Also, 80 per cent of ICT-generated GHG are not due to direct effects, but indirect ones (Maclean, 2008). A conceptual framework for measuring the relationship between ICTs and the environments is presented in Roberts (2009).

Box 12.3 provides some examples of how ICTs can directly contribute to MDGs.

**Box 12.3: Examples of ICT contributions to MDGs**

ICTs have the potential to, and some cases have shown the actual impact on, directly contributing towards the fulfilment of MDGs. Examples from Broadband Commission for Digital Development (2013) are presented below:

- *Goal 1: Eradicate Extreme Hunger and Poverty* – A growing body of evidence exists to show that broadband can boost GDP and incomes, and that ICTs enable access to new markets, spur innovation, enable the invention and delivery of services, and generate economies of scale, all helping overcome poverty and hunger.
- *Goal 2: Achieve Universal Primary Education* – There are studies showing that high-quality electronic content curricula can improve educational outcomes (Jagger, 2005), and that Short Message Service (SMS) text messaging can be used to practice and reinforce literacy and numeracy skills (Tostan, 2014).
- *Goal 3: Promote Gender Equality and Empower Women* – In India, computers are being used as an inducement to keep children, particularly girls, in schools (Nambiar, 2005). Various studies have also reported that men and women use ICTs differently, for example, to access information (women) or to communicate with friends (men) (Thioune, 2003).
- *Goal 4: Reduce Child Mortality* – A community health reporting and alerts platform called ChildCount+ helps community health extension workers register children under five in order to monitor their health status, including screening for malnutrition every 90 days, as well as monitoring immunizations, malaria, diarrhoea and pneumonia (Lemaire, 2011).
- *Goal 5: Improve Maternal Health* – ChildCount+ also supports maternal health by registering pregnant mothers and providing support for antenatal care, aspiring to reduce mother-to-child transmission of Human Immunodeficiency Virus (HIV). WE CARE Solar provides healthcare workers with mobile phones and reliable lighting using solar electricity to facilitate safer deliveries (WE CARE Solar, 2014).
- *Goal 6: Combat HIV/AIDS, Malaria and Other Diseases* – A content-sharing platform from Africa called Bozza applies mobile services to raise awareness about Acquired Immune Deficiency Syndrome (AIDS) and condom use (Bozza, 2014). In South Africa, an open source SMS system based on electronic health records tracks HIV patients and reminds them about appointments (Lemaire, 2011).
- *Goal 7: Ensure Environmental Sustainability* – Broadband can reduce energy and water consumption through smart transportation and logistics, dematerialization and other technologies. Smart grids can reduce energy consumption through improved heating, cooling and monitoring technologies (Global eSustainability Initiative, 2008).
- *Goal 8: Develop a Global Partnership for Development* – In order to make available the benefits of new technologies, especially ICTs, the private sector, in conjunction with public sector policy leadership has driven expansion in the markets for broadband, moving mobile-cellular subscriptions towards saturation levels in 2013 (UN, 2013).

Source: Broadband Commission for Digital Development (2013).

## Measuring WSIS targets

This section summarizes the conclusions of the previous chapters concerning the achievement, partial achievement or non-achievement of the WSIS targets and recalls the evidence presented in support of such statements. It reflects on the indicators themselves, including the challenges encountered and the lessons learnt.

### Achievements

The final quantitative assessment review of the WSIS targets in this report shows the much faster than anticipated move towards ubiquity in telephony, the fastest growth in any technology in human history. However, while extensive growth in ICT networks, services and applications and content has driven the global information society in the decade following the 2003/2005 World Summits on the Information Society, ICT access and use is far from equally distributed. Large parts of the world's population have limited access to ICTs and cannot fully benefit from their potential. While the last decade has shown much-faster-than-anticipated growth in mobile-cellular services and the move towards ubiquity in telephony, still over 4 billion people in the world (60 per cent of the world's population) are not using the Internet. Subject to the general shortage of data for several targets, an assessment review of each one of the 10 (+1) WSIS targets highlights these mixed results and the need for policy-makers to address a number of remaining challenges. The assessment also highlights the lack of data to fully assess progress and it should be noted that the review is possibly distorted by more connected countries more likely to produce, and to respond to requests for, information than less connected countries.

- *Target 1:* The WSIS Target 1 aims at connecting all villages with ICTs and establishing community access points. Despite the seeming ubiquity of ICTs, their benefits are not uniformly experienced by the 7.1 billion people in the world. The review of this target suggests that significant progress has been made in terms of increasing coverage by a mobile cellular signal for rural populations (Indicator 1.1) and access to phones (Indicator 1.2). By 2015, all rural communities around the world are likely to be covered by a 2G signal, and 3G coverage is likely to increase rapidly. Although Target 1 has not been achieved in respect of telephone connectivity, it must be recognized that the progress in spreading basic telephone access has been unprecedented. For most of the countries for which data are available, over 70 per cent of rural households have phone access of some type. The proportion is likely to be lower for the least developed countries (LDCs), most of which do not collect data on household ICT access. In terms of Internet access (Indicator 1.3) and use (Indicator 1.4), Target 1 is unlikely to be achieved by 2015. Access to the Internet in any form (narrowband or broadband, fixed or wireless) was extremely low for rural households in developing countries for which data are available. Internet user penetration is also low in many developing countries, with people in rural areas trailing those in urban areas.
- *Target 2:* The WSIS Target 2 aims at connecting all primary and secondary schools with ICTs: radio, television, computers and Internet. Only relatively few countries collect and publish data on the proportion of schools with radios (Indicator 2.1) and televisions (Indicator 2.2) used for educational purposes. The penetration levels vary between developed and developing countries, but also among developed and developing countries, suggesting that national policies and objectives vary. Existing data on the learner-to-computer ratio (Indicator 2.3) also show sizeable variations between countries, with relatively low ratios in most developed countries (<10:1) and

less favourable ratios in developing countries, particularly low-income countries. The vast majority of schools in developed countries are connected to the Internet (Indicator 2.4), typically to high-speed broadband networks, and many stopped tracking ICT infrastructure in schools since connectivity is approaching 100 per cent. In contrast, penetration levels vary considerably in developing countries and typically include a combination of both fixed broadband and other types of connectivity. By implementing strong policy initiatives and programmes with high-level governmental support and a sector-wide approach, a number of developing countries have successfully attained a relatively low learner-to-computer ratio and high levels of Internet penetration in schools.

- *Target 3:* The WSIS Target 3 aims at connecting all scientific and research centres with ICTs. While the ICT revolution has not occurred at a uniform pace in all regions, it has to a large extent led to the creation of dynamic networks, cross-border collaborative processes, and internationalization of research and higher education. The review of this target suggests that it has not been achieved but that significant progress has been made in all three indicators. Where data were available, the connectivity of scientific and research centres with broadband Internet (Indicator 3.1) was high, typically 100 per cent, but there were a few countries that have yet to achieve this target. Significant progress has been made in increasing the total number of National Research and Education Networks (NRENs), regional NRENs and countries with a NREN, and their bandwidth has also increased significantly from megabit to gigabit capacity. Progress was particularly noteworthy in Africa, where the number of regional NRENs increased from none before 2006 to three by the end of 2013 (Indicator 3.2). In most countries with existing NREN and available data, the majority of the universities and research centres, but few government departments engaged in research and development, are connected through broadband Internet access to NREN (Indicator 3.3), suggesting that this is one area for greater collaboration between policy-makers, scientists and academics.
- *Target 4:* The WSIS Target 4 aims at connecting all public libraries, museums, post offices and national archives with ICTs. The review of this target was particularly hampered by a shortage of data. In almost half of the (only 30) countries that provided data about public libraries, all (or nearly all) public libraries had broadband Internet access (Indicator 4.1), more than a quarter (7 out of 26 countries) had a web presence (Indicator 4.3), and the use of libraries to provide public Internet access is generally low, in particular in developing countries (Indicator 4.2). In half of the (25) countries that provided data about museums, all (or nearly all) museums had broadband Internet access (Indicator 4.4) but in only one-third of the (21) countries with data all museums had a web presence (Indicator 4.5). In one-fifth of the (74) countries that provided data about post offices, at least 90 per cent of post offices had broadband Internet access (Indicator 4.6) but the provision of public Internet access by post offices remains generally low (Indicator 4.7). In almost all of those 22 countries that provided data about national archives, all archives had broadband access (Indicator 4.8) and a web presence (Indicator 4.9). Among the few (19) countries that provided data about digitization of national archives, in a majority of countries less than 5 per cent of the items were digitized (Indicator 4.10) and only three countries provide all of their digitized items online (Indicator 4.11).
- *Target 5:* The WSIS Target 5 aims at connecting all health centres and hospitals with ICTs. The review of this target was hampered by a severe shortage of data, but results show that almost 80 per cent of responding countries had connected between 75 and 100 per cent of their hospitals (Indicator 5.1). The available connectivity figures are not as high for health centres (Indicator

5.2), with 65 per cent of countries reporting having connected 75 to 100 per cent of health centres. Data about the level of use of computers and the Internet to manage individual patient information (Indicator 5.3) are not available. Alternative data sources for Target 5 from WHO were explored, including the adoption of eHealth strategies by countries and the uptake of an online knowledge services providing scientific journals to health institutions (HINARI). The latter is proposed as a reliable measurement of health facility connectivity as it is only available to health institutions with Internet access in developing countries. Data show solid and linear growth over the period 2003 to 2013; growth of the number of connected institutions is an impressive 600 per cent, from an original baseline in 2003 of 792 connected institutions to 5 584 at the end of 2013. In terms of eHealth strategies, in 2009, 55 countries indicated that they had eHealth strategies; this number had grown to 85 by 2013.

- *Target 6:* The WSIS Target 6 aims at connecting all central government departments and establishing websites. The review of the target, which is based on very limited data for indicators 6.1 to 6.5, shows that whereas the majority of developed countries indicated a high level of routine use of computers (Indicator 6.1) and the Internet (Indicator 6.2) by government employees, the proportions were lower for most developing countries, with some notable exceptions, especially in the Americas. The majority of the developed and developing countries reported close to 100 per cent local area network coverage (Indicator 6.3). Most countries in Europe and Asia had a high intranet presence (Indicator 6.4) among central government organizations but there was limited intranet presence in some developing countries. Most countries had close to 100 per cent Internet access by central government organizations (Indicator 6.5). By 2014, all countries had a central government web presence but only a little over half of them link to the websites run by lower levels of government (Indicator 6.6). Online information and services on government website portals increased threefold in the last decade, with 70 per cent of countries providing a one-stop shop portal in 2012, compared to 26 per cent in 2003. By 2014, almost all of the countries of Europe, and the majority in the Americas and Asia, provided archived information on education, health, finance, social welfare, labour and environment. The proportion was less in other regions, such as countries in Africa, which ranged from 31 per cent in social welfare to 65 per cent in finance. In terms of transactional services in 2014, about half the countries of the world provided for creation of a personal online account and in nearly 40 per cent of countries, income taxes could be paid online (Indicator 6.7).
- *Target 7:* The WSIS Target 7 aims at adapting all primary and secondary school curricula to meet the challenges of the information society, taking into account national circumstances. In the majority of both developed and developing countries representing various regions and income levels, less than 10 per cent of the national teaching workforces is trained to teach basic computer skills (Indicator 7.1). The proportion of teachers trained to teach using ICT varies substantially, with developed countries typically training a higher share of the entire workforce. Nevertheless, the proportion of trained teachers also varies amongst developing countries, for example, from less than 20 per cent in Argentina to about 88 per cent in Jordan (Indicator 7.2). Computer-Assisted Instruction (CAI) is common in high-income countries in Asia and Europe, but rarer in many low-income developing countries (Indicator 7.3). Internet-Assisted Instruction (IAI) typically lags behind CAI but is universal in a number of high-income European and East Asian countries, and less common in many developing countries where, in some cases, the administrative use of the Internet is prioritized over its educational use (Indicator 7.4).

- *Target 8:* The WSIS Target 8 aims at ensuring that all of the world's population has access to television and radio services. A review of this target suggests that household access to radio (Indicator 8.1) and TV (Indicator 8.2) is widespread. While in developed countries, most households are able to access radio and TV, in most developing countries for which data are available, at least 50 per cent of households had access to radio by the end of 2012. About 80 per cent of households globally had a television by the end of 2012, compared to about 72 per cent of households in developing countries. However, the target for television access remains largely unmet in Africa, with only 42 per cent of households in Africa having a television set by the end of 2012. In least developed countries, only 35 per cent of households had a TV in 2012. The adoption of multichannel television (Indicator 8.3) has been growing rapidly and by 2012, slightly more than half of all households (or 71 per cent of households with television) had access to multichannel services, compared to two in five in 2008. The review of this target also showed that most developed countries have completed, or are on track to complete, the transition to digital television, while developing countries have begun or are committed to the transition.
- *Target 9:* The WSIS Target 9 aims at encouraging the development of content and putting in place technical conditions in order to facilitate the presence and use of all world languages on the Internet. No reliable data are available for calculating the proportion of Internet users by language (Indicator 9.1); ITU data on use of the Internet are not dissected by language. The proportion of English speakers among those online has decreased over the past years. It was estimated as 80 per cent in 1996, 35 per cent in 2004 and 27 per cent in 2011. A similar decline can be seen for other European languages, but also for Japanese and Korean. At the same time, other languages – in particular Chinese – have grown in terms of the online presence (Indicator 9.2). There is no satisfactory data source to measure the proportion of webpages by language (Indicator 9.3). Available data suggest that there is growing linguistic diversity in web content, although English remains the most widely used language on websites. However, the nature of online content has evolved rapidly since WSIS as a result of the development of social media and user-generated content, while automated translation is now having impact on linguistic diversity. The Internet is dominated by content providers from Europe and the Americas, with domain registrations from these two continents substantially greater than those from Asia, which has a much higher population. Registrations from Africa remain below 1 per cent although the continent has nearly 15 per cent of the world population (Indicator 9.4). The number of Wikipedia articles rose from 398 000 in 2003 to a little over 30 million in 2013. The proportion of articles written in English declined during this period from 46 to 15 per cent and the articles in languages other than the ten most-used languages rose from 26 per cent in 2003 to 58 per cent in 2013 (Indicator 9.5).
- *Target 10:* The WSIS Target 10 aims at ensuring that more than half the world's inhabitants have access to ICTs within their reach and make use of them. It is clear that significant progress has been made towards achieving Target 10 and the main agent for growth is the mobile cellular telephone, the penetration of which has increased phenomenally. Mobile-cellular subscriptions have grown from one subscription for every five persons in 2003, two subscriptions for every three persons in 2009, to almost one subscription for every person in 2013 (Indicator 10.1). For most countries for which data are available, the target has been reached, with 50 per cent or more households with a telephone, primarily a mobile phone only or both fixed and mobile phones (Indicator 10.2). All countries with available data reported that at least 50 per cent of their inhabitants were using mobile phones, and half of the countries reported at least 90 per

cent of their inhabitants using mobile phones (Indicator 10.3). In 2013, there were almost 40 per cent of the world's population using the Internet, and assuming previous growth rates of 3 per cent per annum, the number should rise to close to the 50 per cent target by the end of 2014 (Indicator 10.4). Globally, household access to the Internet was 41 per cent in 2013, more than double the 16 per cent in 2003, but falling short of the 50 per cent target. (Indicator 10.5).

- *Proposed Target 11:* The WSIS proposed Target 11 aims at connecting all businesses with ICTs. For selected countries for which data are available, the share of businesses using computers was 49 per cent on average (Indicator 11.1). The growth of fixed broadband access by businesses is unequal, ranging from, for example, Uruguay at 43 per cent in 2005, growing to 91 per cent in 2012, compared to Thailand at 2 per cent in 2005, growing to 11 per cent in 2012 (Indicator 11.2). Anecdotally, mobile phones have become the most commonly used ICT tool among micro and small businesses in low-income countries, and in the informal sector. In 2012, about 39 per cent of European business enterprises provided non-computer portable devices to their staff, while mobile connection to the Internet was allowed by 90 per cent of large businesses, 71 per cent of medium-sized businesses and 43 per cent of small businesses (Indicator 11.3).

## Challenges, lessons learnt and recommendations

In addition to the mixed results in terms of achieving the WSIS targets, this report points to the difficulties in monitoring them. Data availability is low for the majority of indicators that were identified to help track the targets. In this context, and to identify some of the lessons learnt that could help improve future target-setting and monitoring, it is important to understand the process through which the targets were identified.

When the WSIS was held in Geneva in 2003 and Tunis in 2005, it brought together governments, civil society and the business sector to discuss a broad range of subjects related to ICT4D. Through its outcome documents, governments agreed on a set of commitments and actions to foster the establishment of an inclusive information society. The Geneva *Plan of Action* (ITU, 2005) identified 11 action lines, and ten targets. The targets largely focused on bringing connectivity and access to various groups, such as rural populations, and institutions, for example, schools, hospitals and libraries. These targets reflect the situation of ICTs uptake at the time, when relatively few people and organizations were connected. In 2003, only about one in eight people were online and mobile-cellular penetration, which is expected to reach close to 100 per cent by 2014, stood at around 22 per cent, and only 14 per cent in developing countries. Only targets 7 and 9, on school curricula, and content and language, respectively, were not focused on connectivity but addressed issues of how and for what purpose ICTs are actually used.

Assessing progress made since 2003 has been a challenging task. Despite several mechanisms and processes that attempted to review the pursuit of the WSIS outcomes and commitments, none of them produced a systematic or regular review of the action lines, or of the progress made in terms of achieving the objectives and targets of the WSIS. Indeed, no formal monitoring process was put in place by the WSIS, and until 2010, no global assessment of the WSIS action lines or targets was made. While the *Partnership* developed a core list of ICT indicators to track and compare international ICT developments, the WSIS targets, which go beyond this core list, cover subjects that are challenging to capture in quantitative terms, and to compare at the international level.

As highlighted in the introduction of this report, the process that has led to this Final WSIS Targets Review report was initiated by ITU in 2009 and 2010, when ITU launched the 2010 ITU World

Telecommunication/ICT Development Report (WTDR), *Monitoring the WSIS Targets, A mid-term review* (ITU, 2010). It was then brought under the umbrella of the *Partnership*, and coordinated through its Task Group on the WSIS Targets. To allow for a more systematic review and assessment of the WSIS targets, in 2011, the *Partnership* published *Measuring the WSIS Targets. A statistical framework*, which included a list of 52 indicators, as well as statistical standards and guidelines on how to collect and harmonize data. In addition, and in preparation for this final quantitative assessment report, the *Partnership* sent out a metadata questionnaire in 2012 and undertook substantial awareness-raising to increase the visibility of the WSIS targets. In 2013, the *Partnership* sent out the WSIS targets questionnaire to collect data for the indicators identified to track the targets. The final assessment report is a joint effort by different members of the *Partnership* as well as other organizations involved in measuring the different areas of the WSIS targets. The process leading to this publication included close cooperation and consultation with member states, particularly through the UN regional commissions. The last years of the WSIS monitoring process have highlighted a number of lessons learnt and allowed the *Partnership* to draw some important conclusions that should be taken into account in the identification of any possible future ICT targets.

A number of lessons can be learnt in terms of the process of identifying and monitoring the targets. In this context, it is also useful to point to the monitoring process that accompanied the Millennium Development Goals (MDGs) and the Post-2015 Development Agenda, which is currently under preparation (see Box 12.4).

**Box 12.4: Learning from the MDGs and the Sustainable Development Agenda**

Contrary to the WSIS targets, the Millennium Development Goal (MDG) framework includes a clear message on the importance of tracking progress and reporting on achievements.

Based on the United Nations *Millennium Declaration*,[3] which was signed in 2000, world leaders committed their nations to a new global partnership to reduce extreme poverty and set out a series of time-bound targets – with a deadline of 2015 – that have become known as the Millennium Development Goals. At the same time, the UN General Assembly highlighted the importance to "assess, on a regular basis, progress towards implementing the Millennium Declaration" and called upon the UN Secretary General to "prepare a comprehensive report every five years, supplemented by an annual report on progress achieved towards implementing the Millennium Declaration …".[4] In response to this call, and under the lead of the UN Statistics Division (UNSD), the Interagency and Expert Group on MDG indicators (IAEG-MDG) was set up. This group includes a number of UN agencies from within the United Nations system and outside, various government agencies and national statisticians, and other organizations concerned with the development of MDG data at the national and international levels, including donors and expert advisers. The group has met regularly since 2002 to coordinate and facilitate the monitoring of progress toward the MDGs by preparing the data and analysis. It also reviews and defines methodologies and technical issues in relation to the indicators, produces guidelines, and helps define priorities and strategies to support countries in data collection, analysis and reporting on MDGs.[5]

In preparation for the post-2015 development agenda and the list of sustainable development goals, a number of efforts are being undertaken to learn from past experiences and to improve the future monitoring process. The IAEG-MDG created a Task Team on Lessons Learned from MDG Monitoring to share its experiences and to provide technical support to guide the formulation of a new development agenda. At the same time, the various processes feeding into the post-2015 development agenda include close cooperation between member states, but also input from the private sector, civil society and the statistical community. In particular, the statistical community has provided input through a number of statistical briefing notes that accompany the thematic issue briefs of the Open Working Group, one of the key groups tasked with preparing the post-2015 sustainable development agenda. These efforts highlight the need to involve the statistical community and could provide an example for other goal- and target-setting exercises, including in the area of ICT development.

Source: ITU.

A key potential benefit of identifying goals and targets is to bring global attention to ICT development challenges, to highlight the link between ICTs and other (broader) development goals, to stimulate ICT development efforts and investments, and to increase resources to implement targeted interventions. In the case of the WSIS targets, these benefits were not fully realized because the level of awareness amongst policy-makers remained relatively low, at least until 2010, when ITU and key partners published the mid-term review (ITU, 2010). Although WSIS highlighted the importance of internationally comparable ICT statistics to benchmark and monitor the progress made on the information society, relatively little attention was paid to the WSIS targets, which remained unmonitored.

Linked to this process, it is not entirely transparent on how the targets were set and why they focused on certain policy areas, such as connecting schools, rural areas, museums etc. but not others, such as businesses. Additionally, the WSIS targets mostly emphasize physical access to ICTs. However, access is only one of the pathways to inclusiveness in the information society.

Relevant lessons were also learnt with regard to the methodological criteria that have to be taken into consideration when goals, targets and indicators are set, which also highlights the important role of the statistical community in the monitoring process. While the WSIS targets were time-bound, which set an appropriate stage for the final quantitative assessment review, the targets were vague and left ample room for interpretation. Their vagueness also hampered the identification of indicators to track targets. Additionally, current data availability and data quality remain a major challenge for WSIS monitoring, and highlight the lack of coordination between policy-makers and the statistical community, which was not involved in the identification of targets and indicators. The review process highlighted that data that are not collected by an international agency, are generally not highly available at the country level. It has also highlighted the lack of statistical capacity at the national level to deliver data to track the WSIS targets.

Finally, recommendations can be made, linked specifically to the nature and potential of ICTs. As demonstrated in this publication, the ICT landscape has changed dramatically over the last ten years and the review of the WSIS targets and indicators selected to track the targets has shown that revisions are necessary. While data for some targets are not available, some targets and indicators are no longer relevant. It makes it very difficult to set targets and indicators that have a life as long as ten years. Rapid changes in technology, services, regulation and applications have had a profound impact on the way people live, work, communicate and interact. At the time of the first phase of the WSIS, only few people would have imagined or predicted the true extent of change due to ICTs. Apart from the rapid changes in ICTs, it is also important to take into account the potential impact of ICTs. The WSIS targets deadline was set in line with the target date of the MDGs. This highlighted the important role of ICTs as a development enabler and their potential to help achieve other development goals, including the MDGs. A similar link would have to be made for a future framework, which should highlight the powerful role of ICTs in the post-2015 development agenda.

In this regard, the following recommendations could be made for future ICT target-setting, and for the identification of indicators:

- The formulation of targets and indicators should be preceded, at the policy level, by the identification of high-level goals.
- For any possible future ICT goals, their identification should be accompanied by a high-level endorsement, including raising awareness among policy-makers.

- Forward-looking ICT targets should be closely linked to the broader post-2015 development agenda and identified based on their potential to help achieve these new goals. For the post-2015 development agenda, the UN Inter-Agency Expert Group on the MDG Indicators (IAEG-MDG) Task Team suggested that the time-span should be 10–15 years,[6] but that intermediate targets could be identified. Since ICTs change rapidly, and long-term target setting may be a challenge, it could be advisable to align ICT targets with short- to mid-term targets, and to revise ICT targets over time, possibly every five years, and to adapt them based on technological developments and policy priorities.
- While some continuity with the existing WSIS targets and indicators could be desirable to allow for long-terms analysis, and while indicators that have worked well and are still relevant should be retained, changes are needed when ICT concepts are no longer relevant, and when new goals and targets are introduced.
- For the formulation of targets and to appropriately reflect national priorities and challenges, an assessment of the most pressing challenges and priority areas must be made. Targets should be identified through a consultation process involving countries, civil society, the private sector and other relevant players. The way that targets are identified and set should be transparent and involve all stakeholders.
- Post-2015 targets should go beyond ICT access and infrastructure, and address inequality and quality issues, such as inequalities between specific population groups (men and women) and quality of access.
- Targets, and the indicators used to monitor them, should focus on the areas where policy interventions can have an impact and where policy-makers have concrete tools to encourage and make changes.
- Any framework on ICT goals and targets should highlight the importance of an international monitoring process and identify stakeholders to take a lead in that process.
- While policy needs and relevance should guide the identification of the broader ICT goals, the statistical community should be more involved and invited to provide technical support to guide the formulation of targets and indicators so as to produce robust and reliable statistics to inform policy development.
- Targets should be time-bound, concrete and measurable to be able to track progress, identify shortcomings and evaluate existing and help identify new policies.
- Targets should be ambitious but realistic and achievable, based on the assessment of historical and current trends of progress.
- Indicators should be:
    - clear and easy to understand for policy-makers and other stakeholders, and relevant to policy intervention
    - based on existing internationally agreed statistical definitions, classifications and standards; metadata on the indicators should be collected and published and methodology, including data sources, method of computation, treatment of missing values, regional estimates, etc. should be well documented and available
    - statistically robust; if indicators are not available, regular data collection mechanisms should be developed within reasonable costs
    - disaggregated by geographical region (urban/rural), sex, income or special population groups (for example, people with disabilities or special needs), where applicable and relevant

- The prime responsibility of an international organization, which should organize their collection, compilation and analysis.

## ICT4D, WSIS and post-2015 development

The aim of this section is to close the final quantitative assessment report on the WSIS targets, with a forward-looking discussion on the role of ICT for post-2015 development and how this role could be measured through a revised set of WSIS+10 targets. The discussion advances the earlier presentation of progress with ICT4D and how this progress has been reflected through the global pursuit of the WSIS targets.

### Post-2015 development agenda

In September 2010, the United Nations General Assembly (UNGA) requested the United Nations Secretary General (UNSG) to make recommendations on how to advance the UN development agenda beyond 2015 (UNGA, 2010). In September 2011, the UNSG called for the process leading towards the post-2015 agenda to be open, transparent and inclusive of various stakeholders (UNGA, 2011). In the same month, the UNSG requested the United Nations Department of Economic and Social Affairs (UNDESA) and the United Nations Development Programme (UNDP) to establish the UN System Task Team on the Post-2015 UN Development Agenda (UNSTT) to develop a vision and road map for the agenda (UN, 2011). In June 2012, the UNSG appointed the Special Advisor on Post-2015 Development Planning and in July 2012 appointed the High Level Panel (HLP) on Post-2015 Development Agenda to issue recommendations on the post-2015 agenda (UN, 2012).

The initiatives undertaken by the UNSG were completed by three levels of global consultations facilitated by the United Nations Development Group (UNDG):

1. 88 national consultations organized with different groups of stakeholders by the UN Country Teams between June 2012 and March 2013 to discuss the post-2015 development agenda, to provide inputs to the global vision, to issue recommendations for governments, and to represent voices from the poor and align the agenda with expectations from the civil society (UNDG, 2012)
2. 11 thematic consultations with different stakeholder groups led by specialized UN agencies (UNDG, 2013) between September 2012 and March 2013 to discuss: inequalities, health, education, growth and employment, environmental sustainability, food security and nutrition, governance, conflict, violence and disaster, population dynamics, and water and energy
3. Global online conversation taking place on the www.worldwewant2015.org website and through the www.myworld2015.org survey to ask individuals to select 6 among 16 issues that are most important to their lives (UNDG, 2013).

The main outcomes of this process were:

- The report *Realizing the Future We Want for All* produced by UNSTT in June 2012, which lays out a vision of inclusive, people-centred, sustainable global post-2015 development, based on the principles of human rights, equality and sustainability, structured along the four dimensions of inclusive social development, inclusive economic development, environmental sustainability and peace and security, and supported by various development enables (UNSTT, 2012a).
- The report *A Renewed Global Partnership for Development* produced by UNSTT in March 2013 to consider the nature of the partnership required to support the post-2015 agenda including the

dimensions and format of the partnership, financing for sustainable development, debt and trade, technology and migration, governance and accountability (UNSTT, 2013).

- In May 2013, HLP released the report *A New Global Partnership: Eradicate Poverty and Transform Economies through Sustainable Development* that calls for completing MDGs and advancing sustainable development by implementing five global shifts: leave no one behind; put sustainable development at the core; transform economies for jobs and growth; build peace and effective, open and accountable institutions; and forge a new global partnership (HLP, 2013).
- In September 2013, UNDG released the report *A Million Voices: The World We Want* (UNDG, 2013) that collects the results of national consultations, thematic consultations and the global online dialogue and summarizes the key messages obtained: finishing the job of MDG is critical; the world has the resources and technology to eradicate poverty; the new agenda should pursue quality, not only access; growing inequalities and insecurities create feeling of injustice among people; governments should do a better job representing and giving voice to people; etc.

While the first phase of the post-2015 consultations focused on the goals and issues to be included in the agenda, the second phase commenced in April 2014 by UNDG launching the "Dialogues on Implementation of the Post-2015 Development Agenda" (UNDP, 2014). The dialogues focus on: 1) localizing the agenda; 2) strengthening capacities and institutions; 3) monitoring and accountability; 4) partnering with civil society and the private sector; and 6) culture and development.

In parallel to the process outlined above, the United Nations Conference on Sustainable Development which took place in Rio de Janeiro, Brazil in June 2012, initiated a process aimed at developing Sustainable Development Goals (SDGs) as a successor of the MDGs. According to the outcome document *The Future We Want* (UNGA, 2012) agreed upon by this conference, SDGs must be "limited in number, aspirational and easy to communicate", they must address all three dimensions of sustainable development and their inter-dependencies, not divert efforts towards MDGs, and be well-integrated into the post-2015 agenda. The outcome document also mandated the creation of an inter-governmental Open Working Group (OWG) to work on the SDGs (UNGA, 2012), which was established in January 2013 (UNGA, 2013) with the mandate to prepare a proposal for SDGs for consideration by the UNGA at its 68th session in September 2014.

**Box 12.5: Open Working Group on the Sustainable Development Goals**

OWG is a thirty-member body based on the new to the UNGA constituency-based system of representation where most of the seats are shared by several countries. The body comprises representatives of five country groups: African, Asia-Pacific, Latin American and Caribbean, Western European and Others, and Eastern European Group; and is open to participation from Non-Governmental Organizations in consultative status with the UN Economic and Social Council (ECOSOC). During 11 sessions held by OWG since January 2013, the group deliberated proposals from member states, country groups, local authorities, indigenous people, business and industry, and other stakeholders, concerning additions, deletions and amendments to existing Sustainable Development goals and targets, focusing on several areas:

- Poverty eradication, building shared prosperity and promoting equality
- Sustainable agriculture, food security and nutrition
- Health and population dynamics
- Education and life-long learning
- Gender equality and women's empowerment
- Water and sanitation
- Energy
- Economic growth, employment and infrastructure
- Industrialization and promoting equality among nations
- Sustainable cities and human settlements
- Sustainable Consumption and Production
- Climate change
- Conservation and sustainable use of marine resources, oceans and seas
- Ecosystems and biodiversity
- Means of implementation/Global partnership for sustainable development
- Peaceful and inclusive societies, rule of law and capable institutions; and others.

The UNSTT was assigned as the Technical Support Team (TST) to the OWG, with the report (UNSTT, 2012a), various thematic think pieces prepared by the UNSTT, and a series of TST Issues Briefs provided as inputs.

Other important contributors to the post-2015 process are: Sustainable Development Solutions Network which mobilizes scientists and development practitioners to contribute to problem-solving for sustainable development published in May 2014 a report to the UNSG *An Action Agenda for Sustainable Development* (Sustainable Development Solutions Network, 2014); and United Nations Global Compact which brings together companies and the UN system under the framework of principles in the areas of human rights, labour, the environment and anti-corruption, published in June 2013 a report to the UNSG *Corporate Sustainability and the United Nations Post-2015 Development Agenda* (United Nations Global Compact, 2013).

## ICT and post-2015 development

The current debates and processes that are feeding into the development of the post-2015 development agenda do not seem to sufficiently recognize the potential and the importance of ICTs. None of the key input documents, nor the thematic think pieces that were produced by the UN System Task Team on some of the key issues of the post-2015 development agenda, focus on ICTs. While a number of documents have made reference to ICTs, there is limited substantive content and no clear or sufficiently strong message on the role of ICTs for achieving future development goals.

The thematic think piece *Science, Technology and Innovation and Intellectual Property Rights The vision for Development* produced by the members of UNSTT in May 2012 (UNSTT, 2012b) called for: improving access to ICTs to contribute to economic growth; using ICTs and mobile phones to support

the delivery of health services and the management of health records; and using ICTs, combined with real-time data, to produce early warning systems and reduce disaster risks. The report also promotes regulatory reform to encourage ICT investment and growth through public-private partnerships.

The report *Realizing the Future We Want for All* (UNSTT, 2012a) refers to ICTs as:

- an opportunity, enabling "the creation, transmission and dissemination of information"
- a challenge, due to inequalities in access to ICT and demand for energy-efficiency
- an innovation driver, towards more "sustainable patterns of consumption and production"
- an enabler to human development, through principle-based knowledge societies
- an enabler to social development, supporting social development and empowerment of families
- an enabler to economic development, generating inclusive and green growth through ICTs
- an enabler to environmental protection, reducing the impact of climate change through ICTs
- an enabler to empowerment, holding institutions accountable through ICTs and social media
- a development enabler in general, through access to technology and knowledge.

However, the document does not present a coherent statement about ICTs, as might be implied by this collection of quotes from different parts of the document. At best, the document views ICT as an interesting tool for development but certainly not central to development.

According to the Expert Group Meeting on "Governance, Public Administration and Information and Communication Technology for the Post-2015 Development" organized by UNDESA and UNU during the ECOSOC High-Level Segment Meetings in Geneva in July 2013 (UNDESA, 2013), technology-enabled governance is fundamental to achieving the expected policy outcomes as part of post-2015 development. ICTs should play the role of an enabler, in order to add value to public service, institutional efficiency and participatory governance. The meeting further noted three key issues concerning ICT for governance, public administration and development:

1. Treating ICT as an enabler of post-2015 development is both a challenge and an opportunity, but it should lead to institutionalizing ICT in the post-2015 agenda.
2. Public governance will be impacted by technology in the years to come, particularly in the areas of social media, mobile technology, cloud computing, big data and cybersecurity.
3. The challenge to integrating technology-enabled governance in post-2015 development by different member states is unequal access to ICTs.

The high-level event of the UNGA "Contributions of North-South, South-South, Triangular Cooperation, and ICT for Development to the implementation of the Post-201S Development Agenda" in May 2014 aimed at mobilizing political commitment for implementing the post-2015 agenda (Ashe, 2014), using "How can [ICTs] help countries be integrated as technological enablers for the achievement of future sustainable development goals?" as one of the guiding questions.

In the stream of work contributing to the SDGs, the 2013 UNDP report *ICTs and Participation: Learning from the Sustainable Development Networking Programme* (UNDP, 2013) analyses the experience and lessons learnt from the Sustainable Development Networking Programme established by UNDP in 1992 to utilize the potential of ICTs to "supporting access to sustainable development information and broadening stakeholder participation in local decision-making processes".

The potential of ICT4D contributing to the post-2015 development agenda is also being noticed in the research community. In particular, Heeks (2014) compares the content of the post-2015

development agenda against existing development informatics research and identifies a set of 16 priorities for international development with insufficient coverage within development informatics research, in priority order as follows: environment and sustainability, poverty, development management, food and agriculture, development finance, inclusive development, rights and justice, data revolution and development 2.0, growth and jobs, security and violence, gender/women, cross-border flows, resilience, governance and urban development.

The 2013 ITU World Telecommunication/ICT Indicators Symposium, a key global forum to discuss telecommunication/ICT measurement issues, included a high-level panel on ICTs, MDGs and the post-2015 development agenda. The panel recognized that ICTs are critical for achieving development goals, including future SDGs. The panel further highlighted that many people are excluded from the information society. Therefore, high priority should be given to increasing access and use of ICTs as a key enabler for future sustainable development. The high-level panel emphasized the important role of ICTs as a development enabler in such areas as employment, education, health, governance and peace-building, women's empowerment, and their ability to accelerate progress towards the achievement of broader development goals. The panel's discussions highlighted the need to identify synergies between a post-2015 ICT monitoring framework and the post-2015 development agenda.[7]

The UNESCAP secretariat, in line with global mandates and further supported by its regional mandate (UNESCAP Commission resolution 69/10), carried-out a review of the WSIS targets at the regional level. The review examines the evidence available at the regional level on the WSIS target indicators and offers recommendations on the post-2015 ICT framework for development. The review finds that while important progress have been made with regards to some of the targets, the evidence is less clear in other areas and at times reflects a growing digital divide, that is evident from qualitative analysis. Further quantification of the nature of this divide is crucial, for the evolution of an inclusive knowledge society, while fostering regional cooperation is an important means of implementation.[8]

## Measuring WSIS+10 for post-2015 development

This chapter has identified a number of efforts undertaken by various actors from the United Nations system, government, academia and the civil society with the aim of utilizing ICT as part of the post-2015 development agenda. The discussion now turns to the efforts associated with the final review of the WSIS outcomes and the development of a new proposal for WSIS beyond 2015, organized around the high-level event called WSIS+10.

Coordinated by ITU and co-organized by ITU, United Nations Educational, Scientific and Cultural Organization (UNESCO), United Nations Conference on Trade and Development (UNCTAD) and UNDP, WSIS+10 will take place in Geneva in June 2014 in order to "review the progress made in the implementation of the WSIS outcomes", take stock of achievements in the last ten years based on the reports from countries, action line facilitators and other WSIS stakeholders and "review the WSIS Outcomes (2003 and 2005) related to the WSIS Action Lines with the view of developing proposals on a new vision beyond 2015, potentially including new targets" (ITU, 2014a).

The WSIS+10 High-Level Event will be an extended version of the WSIS Forum. It is designed to review the progress made in the implementation of the WSIS outcomes under the mandates of participating agencies, and to take stock of achievements in the last ten years based on reports of

WSIS Stakeholders, including those submitted by countries, Action Line Facilitators and other stakeholders.

The WSIS+10 High-Level Event will review the WSIS Outcomes (2003 and 2005) related to the WSIS Action Lines with the view of developing proposals on a new vision beyond 2015, potentially including new targets. This process will take into account the decisions of the 68th Session of the UN General Assembly.

The preparatory process of the WSIS+10 High-Level Event was an open and inclusive consultation among WSIS Stakeholders (governments, private sector, civil society, international organizations and relevant regional organizations) focused on developing multistakeholder consensus on two WSIS+10 High- level Event Outcome Documents; the thematic aspects, and innovations on the format of the Event. The two Outcome Documents, developed during the open consultation process and submitted for endorsement by the WSIS+10 High-Level Event are[9]:

- WSIS+10 Statement on the Implementation of WSIS Outcomes
- WSIS+10 Vision for WSIS Beyond 2015

Five important documents constitute inputs to process:

1. *WSIS+10 Visioning Challenge* (ITU, 2013d) – a compendium of WSIS+10 reports and meetings
2. *Identifying Emerging Trends and a Vision Beyond 2015* (ITU, 2013b) – combined outcomes and recommendations produced by more than 150 sessions organized as part of the 2012 and 2013 editions of the WSIS Forum
3. *WSIS Forum 2013 Outcome Document* (ITU, 2013c) – compilation of session descriptions submitted to the WSIS Secretariat by the organizers of different sessions that took place during the WSIS Forum 2013
4. *Towards Knowledge Societies for Peace and Sustainable Development: Final Statement* (UNESCO, 2013) – the recommendations issued by the meeting hosted by UNESCO in February 2013
5. *Measuring the Information Society 2013* (ITU, 2013a) – 2013 edition of the ICT Development Index which "captures the level of ICT developments in 157 economies worldwide and compares progress made during the last year".

Here are examples of findings documented by these reports:

- The Ministerial Round Table on "WSIS+10: Future of the Information Society and Challenges to Address beyond 2015" organized at WSIS 2013 and documented in (ITU, 2013c) encouraged WSIS to continue beyond 2015 and emphasised the importance of the review process to properly define the vision and objectives. The Ministers stressed the importance of linking the WSIS and post-MDG processes and ensuring interaction between the Post-2015 and WSIS+10 reviews. They also outlined possible future vision of WSIS to include time-bound, measurable targets and objectives, and key performance indicators that consider global and regional circumstances. However, the challenges ahead include: affordability; broadband for sustainable development; local content; ICT infrastructure; capacity building including e-learning; fostering of innovation and ICT entrepreneurship; preservation of culture and ecology; good governance and wellbeing; accessibility; cloud computing; cybersecurity; spam; ICT policy and regulatory frameworks; use of ICTs for economic integration; financial resources and new business models; and others.
- The plenary "WSIS+10 Visioning Session" at WSIS 2013 (ITU, 2013c) included contributions by countries, civil society and the private sector, for example: prioritizing digital literacy and

infrastructure development; learning from the MDGs process that ICT is crucial to sustainable development; digital technologies are enablers, they enhance users' capabilities; WSIS+10 should concentrate on accessibility, infrastructure, pricing, digital divide, content, multilingualism and multiculturalism; WSIS should link informatics and development; future agenda requires finding local innovative ICT solutions; and the ethical dimension should underpin the information society post-2015. The discussion also explored possible expansion of WSIS action lines with: capacity building, cultural factors, green ICTs and public governance. It also called for strengthening the WSIS Process Design through: regional coordination and preparatory process, government role to enable access, inclusiveness, and providing a larger role for young people.

- The "WSIS+10 Visioning Challenge: Geneva Phase" at WSIS 2013 (ITU, 2013c) engaged WSIS participants in examining the achievements, opportunities, expansion and emerging themes for the WSIS Action Lines. The achievements include: access, connectivity, mobile penetration, innovation in ICTs and civil society involvement in ICT4D. The opportunities include: people-oriented policies, new technologies and innovation, partnerships and cooperation, and cybersecurity. The action lines expanded with new topics such as: social inclusion; gender issues; security issues and ethics; access to infrastructure; and climate change, e-waste, open data, cyber ethics and cybersecurity, and social media. The emerging issues include: public governance including green ICTs and ICTs as a tool for governance; infrastructure including broadband, cloud and cybersecurity; capacity building on new technologies; and culture protection through ICTs.
- The "WSIS +10 Visioning Challenge: Tunis Phase" at WSIS 2013 engaged WSIS participants in discussing the evolution of WSIS Implementation Process including key features, strengthening the WSIS Forum, and opportunities and challenges beyond 2015. The features include: clear targets; monitored, time-bound progress; repository of success stories; regional coordination; and enabling environment. Strengthening the WSIS forum includes: raising engagement amongst politicians; transparent and inclusive sharing of the outcomes; international technical bodies and other social actors taking part; using social media to create awareness and encourage remote participation; and fostering innovation and training the trainers. The challenges beyond 2015 include: security threats, aligning WSIS and MDG, and protecting intellectual property rights. Opportunities exist in terms of: advocacy for knowledge sharing; multicultural and multilingual content; connecting agriculture and health; ICTs to empower small and medium enterprises (SMEs); developing cybersecurity skills; and improving regional coordination.
- The document "Identifying Emerging Trends and a Vision Beyond 2015" (ITU, 2013b) contains trends observed during the implementation of the 11 WSIS action lines discussed during the WSIS Forum 2012 and 2013. Example trends for different action lines are: 1) support e-strategy review; 2) develop devices to expand ICT usage to underdeveloped areas; 3) secure Open Knowledge Commons; 4) ensure safe use of mobile technologies for education; 5) promote "security by design" concept; 6) leverage ICTs for transparency and public service reform; 8) safeguard endangered languages; 9) contribute to rights-based sustainable development through media; 10) contribute to online commerce, by businesses adopting rights-based codes of practice; and 11) use internationally-agreed ICT indicators by the national statistical systems. For Action Line 7: e-government – promote legally-bound use of mobile signatures; e-business – engage users in sustaining e-business solutions; e-learning – make learning accessible through mobile devices; e-health – empower health professionals with information for high-quality care; e-environment – spur cooperation between environmental and ICT communities on

sustainability; e-agriculture – promote ICT innovations; and e-science – promote e-publishing and open access.

- The document "Towards Knowledge Societies for Peace and Sustainable Development: Final Statement" (UNESCO, 2013) states that: education is key to empowering people for sustainable development and peace; given the potential of ICTs, it is important to protect freedom of expression; finding pathways to sustainable development must rely on scientific knowledge; knowledge societies must respect cultural diversity and freedom of expression; etc. The document also calls on all stakeholders to: promote universal access and free flow of information; protect privacy in the cyberspace; solve the problem of inaccessibility; promote information and media literacy; ensure the availability of data for measuring the WSIS targets; and apply the lessons learned during the WSIS review to development goals post-2015.

The current report complements the input documents produced by the Open Consultation Process for the High-Level WSIS+10 Event both in terms of quantitative assessment of the WSIS targets, summarized in this chapter, and the recommendations for measuring WSIS+10 post-2015, issued by each target-specific chapter, and summarized as follows:

- *Target 1*: Have fewer indicators to provide more concise insights into the information lives of rural households, shifting attention from coverage to quality of access, and capturing rurally-relevant applications and content.
- *Target 2*: Narrow the target to monitor ICT access in primary and secondary schools, introduce learner-to-computer connected to Internet ratio as a new indicator, recognize the role of community media centres, and negotiate low-cost Internet access.
- *Target 3*: Measure the information and knowledge shared through the networks including software models and applications, and international research and development efforts, and measuring open access to scientific information and data.
- *Target 4*: Shift attention from access to ICTs to libraries, museums, post offices and archives as online content providers and public Internet access venues.
- *Target 5*: Revise this target with the aim of making the data more applicable to e-health, measure connectivity of health-related institutions and access to medical knowledge through the WHO HINARI database, and capture the development and implementation of national e-health strategies.
- *Target 6*: Address the scarcity of globally-comparable data by revisiting the indicators on ICT in government to capture a wider assessment, and review the framework of supporting and monitoring e-government at the global level.
- *Target 7*: Disaggregate enrolment data in programmes offering computer-assisted instruction and/or Internet-assisted instruction by gender, collect additional metadata about teacher training qualifications, measure how ICTs are integrated into the educational setting (for example, location in schools) and measure the increasing presence of mobile learning models using newly emerging technologies.
- *Target 8*: Continue tracking household access to radio and TV and the adoption of multichannel television and add an indicator to track transition to digital TV. New indicators could measure supply of radio and TV services in terms of availability and quality of content, and content variety and competition through multiple stations and operators.
- *Target 9*: Enable output on Internet usage by language spoken by national statistical offices (in national censuses and household surveys), include data on the evolution of domain name

registrations by country weighted by general and Internet user population, include Wikimedia data on content creators and pageviews, measure online social networks and mobile apps, and incorporate qualitative data in the monitoring of content and language.

- *Target 10*: Continue tracking ICT access but replace the usage with ownership of mobile phones, and move towards measuring the quality of access, barriers to and equality of Internet use, and mobile phone and Internet usage activities.
- *Target 11*: Monitor connectivity and the use of ICT by businesses, to ensure continuity and the highest technical standard of official statistics, integrate data collection into national statistical plans, and assess the presence of regulatory and legal frameworks.

Finally, this report presents a number of key recommendations with regards to measuring ICT developments and the information society in a post-2015 development agenda. In particular, it emphasizes the important role of ICTs in the achievement of broader development goals and recommends that any future ICT monitoring framework should be closely linked to the broader post-2015 development agenda in order to help achieve this future development agenda.

This final review of the WSIS targets has shown that a forward-looking ICT monitoring framework should be developed in close cooperation between UN agencies, WSIS Action line facilitators, and other relevant stakeholders. New goals and targets should be identified based on the most pressing priority areas for policy-making and be ambitious but realistic, time-bound, concrete and measurable to be able to track progress, identify shortcomings and evaluate existing and help identify new policies. Future ICT targets should be accompanied by a monitoring framework that could regularly assess achievements and challenges, and provide an update on progress made.

This report has further highlighted the importance of an open, inclusive, multistakeholder process to develop such a monitoring framework, including goals, targets and indicators. These should be developed with technical support from the statistical community and include a timetable and also regular assessments and reviews of progress. In terms of the production and dissemination of results, data should be shared transparently, online to the extent possible. Dedicated funds should be made available for data collection and capacity building of data producers, in particular in developing and least developed countries. Only clearly defined and monitored ICT goals will be able to monitor the information society post-2015, and its impact on the future development agenda.

In this context, the *Partnership* should continue to take the lead in coordinating measurement of the information society at the international level. In close collaboration with national statistical offices, relevant ministries, regulatory authorities and other relevant stakeholders, the *Partnership* should continue its work on identifying and disseminating statistical standards, concepts and classifications on ICT measurement, in order to produce data needed to assess information society progress and measure the impact of ICTs on development.

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## Endnotes

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[5] For more information on the work of the IAEG on MDG Indicators and the monitoring of the MDGs, see: http://mdgs.un.org/unsd/mdg/Default.aspx.

[6] Inter-Agency Expert Group on the MDG Indicators (IAEG-MDG)'s Task Team. Report of the Task Team on Lessons Learned from MDG Monitoring of the IAEG-MDG, at: http://unstats.un.org/unsd/broaderprogress/pdf/Lesson%20Learned%20from%20MDG%20Monitoring_2013-03-22%20(IAEG).pdf.

[7] See the Final Report of the 11th ITU World Telecommunication/ICT Indicators Symposium (WTIS): http://www.itu.int/en/ITU-D/Statistics/Documents/events/wtis2013/WTIS13_final_report.pdf.

[8] See UNESCAP Secretariat, Working Paper on Assessing the outcome of the World Summit on the Information Society in Asia and the Pacific, 23 April 2014, at: http://www.unescap.org/resources/assessing-outcome-world-summit-information-society-asia-and-pacific.

[9] Both documents can be accessed at: http://www.itu.int/wsis/review/mpp/pages/consolidated-texts.html.

**International Telecommunication Union**
Place des Nations
CH-1211 Geneva 20
Switzerland

www.itu.int

Printed in Switzerland
Geneva, 2014

ISBN 978-92-61-14871-3

**Price: 76 CHF**