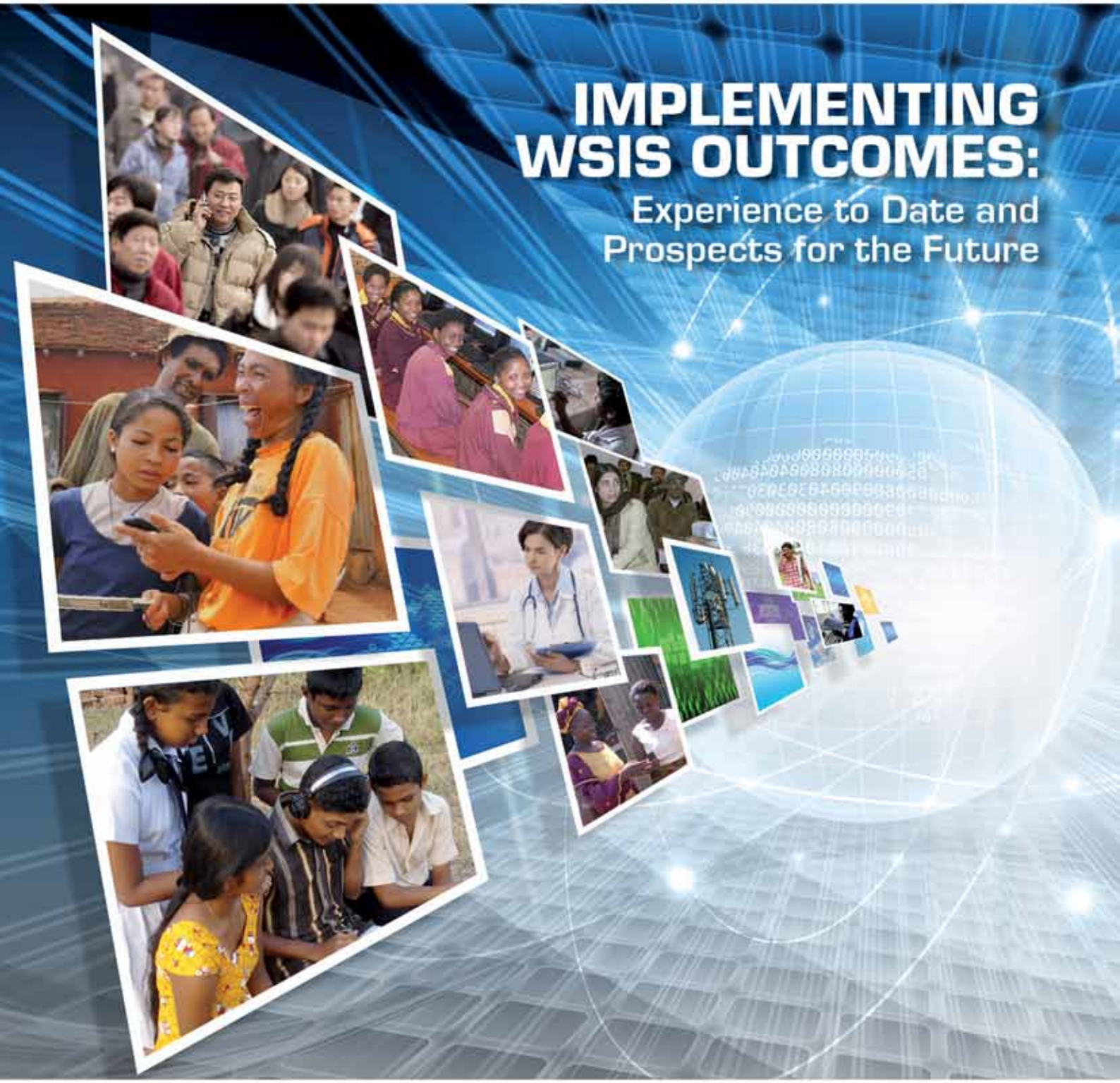
COMMISSION ON SCIENCE AND TECHNOLOGY FOR DEVELOPMENT

IMPLEMENTING WSIS OUTCOMES:

Experience to Date and Prospects for the Future



world summit
on the information society
Geneva 2003 - Tunis 2005

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New York and Geneva, 2011

UNCTAD/DTL/STICT/2011/3
GE.11-50941 – May 2011 – 2,000
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PREFACE

Since the conclusion of the World Summit on the Information Society (WSIS) in 2005, the world has witnessed dramatic progress towards a "people-centered, inclusive, and development oriented Information Society." Mobile telephony has expanded beyond expectations and efforts to ensure Internet access have shifted from basic services to broadband. There have also been changes in how people interact and communicate. For example, the social networking site Facebook, which was just launched in 2005, now has over 500 million active users. The micro-blogging site Twitter, which has an estimated 200 million users, was not even founded until two years after WSIS. Innovative information and communication technologies (ICTs) have influenced diverse aspects of society, including governance, commerce, education, health, employment, environment, agriculture, and science.

Despite the tremendous changes and achievements over the past five years, WSIS stakeholders must cooperate to address a number of remaining challenges. Although the digital divide in voice telephony has narrowed, the digital divide in the quality of Internet access persists and may even be growing. Additionally, even with improved access to ICTs and the introduction of myriad new ICT applications, achievement of the Millennium Development Goals (MDGs) by 2015 in a large segment of developing countries is unlikely. This is particularly true for the first goal, to eradicate extreme poverty and hunger, as the number of undernourished people in the world has actually *increased* since 2005. Concerted effort, innovative thinking, and persistent vigilance among all stakeholders are essential to fully realize the WSIS vision and to meet the MDGs.

UNCTAD hosts the secretariat of the Economic and Social Council's Commission on Science and Technology for Development (CSTD), which has been charged with regularly reviewing progress towards implementation of WSIS outcomes at the international and regional levels. In addition to these regular reviews and other related activities, the CSTD has been called upon to assess progress at this midpoint between the second phase of WSIS and the comprehensive review of implementation scheduled for 2015.

The purpose of the present review is to identify areas where progress has been made and where progress has been slow since 2005. It further identifies obstacles and constraints encountered as well as actions and initiatives to overcome them and important measures for further implementation of WSIS outcomes. It concludes with a discussion of new developments since 2005 as well as findings and suggestions in the lead up to the 2015 comprehensive review of WSIS outcomes. The report draws on existing reports and open consultation with all stakeholders, in particular the International Telecommunications Union and other UN and intergovernmental agencies, Governments, ICT sector associations and agencies, and private sector and civil society actors. The principal issues in this consultation were set out in a questionnaire sent out in September 2010.

This report is a tangible contribution of the CSTD to the review of the progress made in the implementation of the World Summit on the Information Society, bringing to it the much-needed holistic view of the ongoing important societal transformation.

Ms. Sherry Ayittey
Chair, Commission on Science and Technology for Development
Minister for Environment, Science and Technology, Ghana

CONTENTS

ACKNOWLEDGEMENTS

Implementing WSIS Outcomes: Experience to Date and Prospects for the Future was prepared by David Souter under the direction of Dong Wu and with the assistance of Jason Munyan and Franziska Klopfer. Mongi Hamdi supervised the preparation of this report and Anne Miroux provided overall guidance.

Malou Pasinos extended administrative assistance at various stages of the preparations.

The CSTD gratefully acknowledges the extensive contributions of the national Governments; the International Telecommunications Union; the United Nations Educational, Scientific and Cultural Organization; other entities in the United Nations system; civil society organizations and academia; the private sector; and other stakeholders that participated in the global consultation to gather inputs for this review. *Implementing WSIS Outcomes: Experience to Date and Prospects for the Future* benefited from comments and suggestions provided at the inter-sessional panel in Geneva in December 2010. Useful comments and suggestions were also received during various stages of preparation from Torbjörn Fredriksson and Shigehisa Kasahara.

Sophie Combette designed the cover and formatted the report. *Implementing WSIS Outcomes: Experience to Date and Prospects for the Future* was edited by Michael Gibson.

Preparation and publication of this report would not have been possible without the generous financial support from the Government of Finland. Their support and the continued financial support of the Government of Switzerland for WSIS follow-up are gratefully acknowledged.

EXECUTIVE SUMMARY

The World Summit on the Information Society (WSIS) was held in two phases, in Geneva in 2003 and Tunis in 2005. Its outcome documents called for Governments and other stakeholders to work towards the development of a "people-centred, inclusive and development-oriented Information Society." The Commission on Science and Technology for Development (CSTD) has been charged by the Economic and Social Council (ECOSOC) to review progress towards implementation of WSIS objectives at the international and regional levels, with particular attention to development.

Structure of the report

This report summarises progress at the midpoint between the second phase of WSIS and the comprehensive review of implementation which is scheduled for 2015. It is based primarily on reports published by a range of organisations and on the results of a consultation process conducted in late 2010. The report is structured as follows.

Chapter 1 summarises the outcomes of WSIS.

Chapters 2 to 5 review progress towards achieving specific outcomes which were established in the *Geneva Plan of Action* and the *Tunis Agenda for the Information Society*.

- Chapter 2 summarises growth in the availability and use of information and communication technologies (ICTs) since 2005.
- Chapter 3 reviews progress towards achieving the 10 targets for connectivity and ICT deployment which were established by the *Geneva Plan of Action*.
- Chapter 4 describes the work of the 11 action lines which were established by the *Plan of Action* and the *Tunis Agenda for the Information Society* as the framework for continuing multi-stakeholder activity towards the Information Society.
- Chapter 5 summarises work since 2005 on Internet governance and financing mechanisms for ICTs and ICTs in development (ICT4D), and describes the work of the United Nations Regional Commissions, member agencies of the UN Group on the Information Society, and a selection of other stakeholders.

Chapter 6 is concerned with new developments which have taken place since 2005, including the rapid expansion of mobile and broadband markets, innovations such as social networking and cloud computing, and new thinking about ICTs and development, rights and the environment.

Chapter 7 summarises the findings of the report and makes recommendations towards the comprehensive review of the implementation of WSIS outcomes which is scheduled for 2015.

Findings

Substantial progress has been made towards achieving the universal availability and use of basic telecommunications since 2005. The expansion of mobile telephony has considerably exceeded expectations at the time of WSIS and, for the first time, enabled the majority of people worldwide to communicate with one another at a distance. The digital divide in voice telephony has narrowed and is now focused on a relatively small proportion of the world's population, mostly in rural areas of Least Developed Countries.

Internet use has grown rapidly in developed and middle-income countries, but is at much lower levels in less developed countries and is not yet growing there as quickly as in the industrial world. Internet use is particularly limited in sub-Saharan Africa. Broadband networks, meanwhile, have become pervasive in many developed countries, but are much less available in many developing countries. While the digital divide in basic access has diminished, there is increasing concern about continuing, and perhaps even growing, divergence in the quality of access to communications, including the Internet, and in the value which can be derived from it.

Chapter 3 of the report illustrates the progress which has been made towards achieving the ten targets set by the *Geneva Plan of Action*. Most progress has been achieved in ensuring that everyone has access to ICTs "within their reach" and in enabling access to ICTs in rural areas. Progress towards achieving connectivity in facilities such as schools and clinics is more variable, and has proved difficult to measure because of a lack of precision in the targets and weaknesses in data collection. The International Telecommunication Union (ITU) and other entities in the Partnership on Measuring ICT for Development have suggested indicators which should improve our ability to measure progress before the comprehensive review in 2015.

There has also been progress in each of the action line thematic areas which were established at WSIS. Here too, however, progress has been variable, and there have been significant shifts in priorities as a result of ongoing developments in technology, networks and services.

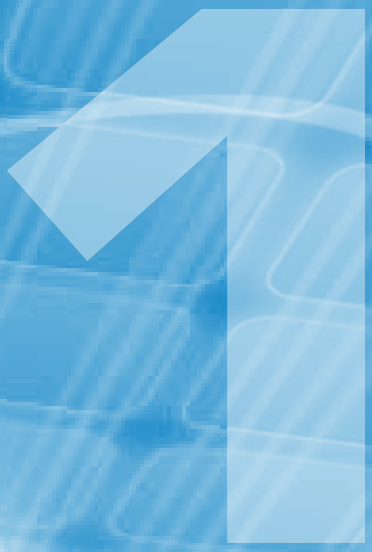
Much attention has been paid to developments in Internet governance since 2005, including the work of the Internet Governance Forum and the process towards "enhanced cooperation." Separate review processes are currently underway concerning these, and developments are briefly summarised in Chapter 5 of this report.

The need for multi-stakeholder participation in achieving WSIS outcomes was emphasised in the WSIS outcome documents, in both implementation (for example, public-private partnerships) and policy development. Many stakeholders have seen this as one of the most important legacies of WSIS. This report focuses primarily on the international and regional organisations involved in WSIS implementation, though it also illustrates the participation of the wide range of other stakeholders involved. It suggests that a comprehensive survey of the work of the private sector and civil society organisations in WSIS implementation would add considerable value to the review scheduled for 2015.

The story since 2005 is not only one of progress. Respondents to the consultation for this report identified a number of constraints which have inhibited the achievement of WSIS outcomes. The lack of affordable infrastructure remains a challenge for many, especially in lower-income areas. There are continuing weaknesses in investment and in communications regulation. Users need the capabilities to make use of communications services and access to relevant content if they are to take full advantage of the potential of ICTs. Policy approaches need to be rooted in a more holistic understanding of the changes that are taking place in society, economy and culture, at international, national and local levels.

Information and communications technology and markets change very rapidly. Although it is only five years since the end of WSIS, major changes have taken place in the communications landscape which affect how ICTs interact with society and how the Information Society is developing. Some of these are rooted in technology and in the ways in which technology has been adopted by citizens and consumers—for example, exceptionally rapid growth in mobile telephony and increasing importance of broadband. Entirely new services have emerged and become significant since 2005—including social networking and other aspects of what is known as Web 2.0, the increasing emergence of the mobile Internet, and cloud computing. The relationship between ICTs and society, and the thinking about this in Governments, international agencies, business and civil society, is also constantly evolving, as ICTs become more prevalent and pervasive. These changes, which are described in Chapter 6, have been unpredictable, and similarly unpredictable changes are likely to follow in the next five years. Many are rooted in the way that people make use of ICTs.

Assessing progress towards the kind of Information Society sought in the WSIS outcome documents requires going beyond measuring targets and summarising action lines. The vision of WSIS is a "people-centred, inclusive and development-oriented Information Society." To understand the development of the Information Society, when a comprehensive review of WSIS implementation takes place in 2015, will require a thorough analysis of wider social and economic developments in world society and the relationship between these and ICTs.



CHAPTER 1

INTRODUCTION

In 2003 and 2005, the United Nations held a World Summit on the Information Society (WSIS). In three years of preparatory meetings and two plenary sessions held in Geneva and in Tunis, Governments and other stakeholders considered the impact, potential and challenges of information and communication technologies (ICTs) for human society, economies and culture. The WSIS process stimulated awareness and debate around the concept of an Information Society, what it could and should mean for human development, and how its potential value could be facilitated by everyone concerned. The five years since the second WSIS summit have seen continued rapid growth in the scope and range of ICTs and their impact on society.

In one of the Summit's outcome documents, the *Tunis Agenda for the Information Society*, Governments participating in WSIS proposed a framework for the United Nations to review progress towards the achievement of WSIS objectives. This framework is to culminate in a comprehensive review of progress which will be undertaken in 2015, ten years after the Tunis summit. Ahead of this comprehensive review, the UN Economic and Social Council (ECOSOC) asked the Commission on Science and Technology for Development (CSTD) to undertake regular reviews of progress towards achieving WSIS outcomes at international and regional levels.[1] Other UN agencies have also reported regularly on their implementation of these outcomes.[2]

The present report has been commissioned by the CSTD to summarise progress at the halfway point between the Tunis summit and the review that will be undertaken in 2015. It is not intended as a comprehensive account of overall achievements or of the activities of the many international and regional agencies engaged in WSIS implementation. Detailed accounts assessing progress towards the WSIS targets and the work of WSIS action lines have been published by other agencies, particularly the International Telecommunication Union (ITU), and accounts of the workshops and activities that UN and other agencies have undertaken in support of those targets and action Lines have also been published elsewhere.[3]

This report seeks to do three things.

- Firstly, in Chapters 2 to 5, the report provides a broad summary of what these more detailed accounts describe concerning progress towards achieving the WSIS targets, promoting the themes identified in WSIS action lines, and moving towards an inclusive and development-oriented Information Society.
- Secondly, in Chapter 6, the report considers ways in which the communications landscape has changed since 2005, in terms of technology, markets and international thinking about the Information Society and its impact on development and other policy domains.
- Finally, in Chapter 7, it summarises the previous chapters and looks towards the comprehensive review of WSIS outcomes scheduled for 2015, including suggestions as to how this should be approached by the CSTD and its partners over the next four years.

ORIGINS AND PURPOSE OF THE REPORT

The *Tunis Agenda for the Information Society* gave the UN Economic and Social Council (ECOSOC) responsibility for overseeing the system-wide follow-up of Summit outcomes.[4] In a resolution adopted in 2006 (resolution E/2006/46), ECOSOC tasked the CSTD to review WSIS outcomes on its behalf, asking it, in particular, to:

a) Review and assess progress at the international and regional levels in the implementation of action lines, recommendations and commitments contained in the outcome documents of the Summit;

b) Share best and effective practices and lessons learned and identify obstacles and constraints encountered, actions and initiatives to overcome them and important measures for further implementation of the Summit outcomes; and

c) Promote dialogue and foster partnerships, in coordination with other appropriate United Nations funds, programmes and specialized agencies, to contribute to the attainment of the Summit objectives and the implementation of its outcomes and to use information and communication technologies for development and the achievement of internationally agreed development goals, with the participation of Governments, the private sector, civil society, the United Nations and other international organizations in accordance with their different roles and responsibilities.[5]

The CSTD has fulfilled this mandate since 2006 through dialogue with stakeholders concerned with WSIS

implementation, discussion at its annual sessions and intersessional panels, and a series of annual reports of the Secretary-General based upon submissions from UN agencies and other organisations which have been engaged in implementing WSIS outcomes. Other work to review WSIS implementation has been undertaken by the UN Group on the Information Society (UNGIS), the ITU and other UN agencies (notably the United Nations Educational, Scientific and Cultural Organisation (UNESCO), the United Nations Conference on Trade and Development (UNCTAD) and the United Nations Development Programme (UNDP)), and by the Partnership on Measuring ICTs for Development—as well as by Governments, private sector and civil society stakeholders.

This five-year report takes a broader and more long-term view than has been possible in the annual reports of the Secretary-General It is concerned with the bigger picture of WSIS implementation, rather than detailed accounts of the activities of individual agencies or with summarising the changes that have been happening at the national level.

This report also seeks to reach beyond a specialist audience concerned with the Information Society and the ICT sector, in order to address issues of interest to the wider international and development community. Progress towards the Information Society is not just a matter for the ICT sector. It has important implications for every policy domain—for development and governance, for economic growth and poverty reduction, for health, education and social welfare, for human rights and the environment, for international and national security, and for the achievement of internationally agreed development goals, including those contained in the Millennium Declaration.

WSIS established a number of targets and action lines through which its objectives could be pursued, and progress towards achieving these forms an important part of this report. However, participants in WSIS were concerned to bring about more than just the achievement of specific targets or to stimulate action in specific areas. They were also concerned with the development of the Information Society as a whole—with the transforming impact of ICTs and media on global, national and local economies, societies and culture, and with efforts to turn the "digital divides" that were apparent in 2005 into "digital opportunities" for all.[6] The WSIS outcome documents established a global consensus which set out the international community's aspirations for "a people-centred, inclusive and development-oriented Information Society."[7] As well as reviewing progress towards specific targets and on specific action lines, the report also considers how international agencies, Governments and other stakeholders have pursued these more holistic Information Society goals. Recommendations concerning the ongoing review of this broad outcome can be found in Chapter 7.

Information and communications technology and markets, meanwhile, have been changing faster than any technology or markets in history. Dramatic changes have occurred in the communications landscape since the world community met in Geneva and in Tunis, in 2003 and in 2005, respectively—in infrastructure and services, connectivity and access, the use of ICTs by businesses and consumers, and their impact on other public policy domains. Today's networks are much more pervasive and capable than those of 2005. Some services which were at most novelties in 2005—such as mobile internet and social networking—have become pervasive in many countries, while Governments and citizens have elevated their communications aspirations and expectations. The priorities of Governments and businesses have moved increasingly to broadband infrastructure and the services that can be enabled by it. Experience and policy concerning the relationship between ICTs and development, the environment and security—to name just three areas—have broadened, deepened and evolved.

This report is concerned with global and regional outcomes of the WSIS process, not with assessing those that take place at a national level. It is primarily concerned with the work of international and regional agencies, especially those within the UN system, although it also pays attention to the interaction between these and other stakeholders whose participation the WSIS outcome documents considered essential in achieving the kind of Information Society that the international community sought to bring about. The report focuses particularly on developmental outcomes, opportunities and challenges. It does not consider in as much detail those aspects of WSIS outcomes which are primarily concerned with international governance, such as the Internet Governance Forum and the process of "enhanced cooperation" on the Internet. These are the subjects of other international review processes which were underway at the time of this review (early 2011).

METHODOLOGY AND SOURCES

The WSIS outcome documents themselves provide the foundation for analysing WSIS outcomes.[8] In addition to these, there is a considerable literature published by international agencies as a result of regular review processes of WSIS outcomes. This literature includes annual reports by agencies to the CSTD and the summaries of those reports which are presented to the United Nations by its Secretary-General,[9] the proceedings of the UN Group on the Information Society[10] and the WSIS Forum and action lines,[11] and the more detailed reports of their work which UN and other agencies have published. The reports of the five UN Regional Commissions have been particularly valuable in this context.

For this report, the CSTD also undertook an open consultation exercise, to which more than 50 organisations, Governments and individuals submitted contributions. Many of these responded to a series of questions concerning their perceptions of progress towards achieving WSIS objectives, the changing communications landscape and priorities for the future.[12] A preliminary discussion of the review was held at an intersessional panel of the CSTD in December 2010.[13]

In addition to formal contributions to the WSIS review, UN and other agencies have produced a great deal of statistical and narrative analysis of the changing ICT landscape since 2005, including their own series of annual publications and special reports. Many of these publications are listed in the bibliography to the report. Particularly important have been the *World Telecommunication/ICT Development Reports*, published by the ITU, the 2010 volume of which is concerned with *Monitoring the WSIS Targets*[14], and the work of the Partnership on Measuring ICT for Development.[15] Important and influential reports have also been published by the other lead agencies in UNGIS (UNESCO, UNDP and UNCTAD), by the UN Regional Commissions and specialized agencies such as the Food and Agriculture Organisation of the United Nations (FAO) and the World Health Organisation (WHO), and by other intergovernmental agencies such as the World Bank, the Organisation for Economic Cooperation and Development (OECD) and the African Union (AU).

Valuable contributions to this report have come from stakeholders other than these international agencies. The WSIS outcome documents emphasised the contributions of diverse stakeholder groups to the achievement of WSIS outcomes. Many relevant initiatives and much valuable material has come from national Government agencies (including donor agencies), private sector businesses and business associations, NGOs and civil society organisations, and professional associations of personnel involved in the telecommunications and Internet sectors.

Only a few non-governmental stakeholders submit reports through formal WSIS follow-up mechanisms. Further work should be undertaken to explore in depth the contributions which they have made to achieving WSIS outcomes as part of the comprehensive review which is to be undertaken in 2015.

BEFORE THE SUMMIT: THE CONCEPT OF THE INFORMATION SOCIETY

The concept of the Information Society was developed by political scientists and others in the latter half of the twentieth century, and widely adopted in international discourse as the role of ICTs increased and intensified towards the century's end.[16] In essence, it refers to a society in which information and the use of information—its transformation into knowledge and the application of that knowledge—become crucial resources in economic production and social interaction, perhaps the most crucial in enabling continued growth and prosperity. Consequently, the development of an Information Society has often been associated with economic and cultural globalisation and with a transition from agricultural or manufacturing economies to those based on services.

A variety of complementary terms have been used to emphasise different aspects of the changes represented by this development. UNESCO, for example, uses the term "Knowledge Societies" to describe "societies in which people have the capabilities not just to acquire information but also to transform it into knowledge and understanding, which empowers them to enhance their livelihoods and contribute to the social and economic development of their societies."[17] The terms "Knowledge Economy" and "Digital Economy" are increasingly used to refer to economic systems in which production is geared around intellectual rather than physical labour, many goods are virtualised, and work tasks are undertaken by people cooperating from remote locations. Others have used the term "Network Societies" to describe

a restructuring of social, economic and cultural behaviour which they anticipate emerging from the Information Society, in which informal networks of individuals and social groups play an enhanced role at the expense of more formal political, economic and social hierarchies.[18]

While there are significant differences between these concepts, one thing is clear: they all perceive the Information Society as a conjunction of technological and human development.

How the Information Society is developing and will develop in the future has been a matter of debate. It has been hard to predict how new information and communication opportunities will change society, not least because of the very rapid pace of change in such technologies and markets.

- Some observers emphasise the continuity between past, present and future, seeing the changes that are taking place as the evolution of economic and social structures from one period to another, in which new technologies interact with those that have been long established. Others emphasise the disruptive and transformative effect which they believe new ICTs will have, displacing old technologies, patterns of behaviour and modes of production.
- Some see the Information Society as something that we can observe happening around us. Others see it as a vision of the future which we can and should seek to achieve, and which may be of particular benefit to marginalised individuals and communities, enabling them to overcome past disadvantages.

Discussion of the Information Society has also been associated with the role of innovation in social and economic change, and with concepts of social and economic "modernisation."

The CSTD has been engaged in debates concerning the Information Society since the 1990s. In 1998, it published a comprehensive and influential study, *Knowledge Societies*, led by Professor Robin Mansell, which explored the relationship between information technology and sustainable development in countries around the world.[19] That report coincided with an upsurge in international interest in the Information Society, including the first Global Knowledge Conference (Toronto, 1997);[20] publication of the *World Development Report* on *Knowledge for Development* in 1998; continued work on Knowledge Societies within UNESCO and on ICT developments in the ITU; and the work of the G8 Digital Opportunity Task Force and the UN ICT Task Force. Concepts of the Information Society became intermingled in this process with what became known as ICT4D (ICT for Development), i.e. the application of information and communication technologies in social and economic development planning and programmes. These developments contributed to the decisions of the ITU Plenipotentiary Conference in 1998 and the UN General Assembly in 2001 to instigate the World Summit on the Information Society (WSIS).[21]

The outcome documents which emerged from WSIS in 2003 and 2005 envisaged the Information Society as an opportunity to achieve lasting improvements in the quality of life for citizens throughout the world, and for developing countries to achieve new levels of sustainable economic growth. At the same time, participants in WSIS feared that these opportunities would be constrained by lack of investment and acknowledged the risk that an already evident digital divide—the gap between access and use of ICTs in richer and poorer regions, countries and districts; and between richer and poorer, more and less educated individuals—would become greater, and so exacerbate other divides in income, health, education and social welfare. The vision of a better future to be gained from the potential of ICTs and the anxiety that this future could be jeopardised by inequality and disadvantage are both reflected in the opening call of the first summit meeting's *Geneva Declaration of Principles* for:

> "… a people-centred, inclusive and development-oriented Information Society, where everyone can create, access, utilize and share information and knowledge, enabling individuals, communities and peoples to achieve their full potential in promoting their sustainable development and improving their quality of life …."[22]

That definition of what Governments in WSIS agreed the Information Society should mean provides an essential lens through which more detailed assessment of WSIS outcomes can be viewed.

THE WORLD SUMMIT AND ITS OUTCOMES: A SUMMARY

The World Summit on the Information Society was held in two phases, in Geneva in December 2003 and Tunis in November 2005. The lead role in organising these meetings was undertaken, for the United Nations, by the ITU, in conjunction with other UN agencies and interested parties.

Each of its two phases consisted of a series of preparatory meetings (PrepComs), culminating in a three-day plenary summit meeting attended by a significant number of Heads of State and Government.

The first (Geneva) phase of the Summit focused on developing broad principles for understanding the Information Society, and on identifying ways to maximise the benefits that could be drawn from it and minimise associated problems. The outcomes of the Geneva phase were encapsulated in two documents:

- the *Geneva Declaration of Principles*, which set out the international community's vision for the Information Society; and
- the *Geneva Plan of Action*, which established targets for connectivity in different social contexts and considered the need and scope for international action within 11 broad themes and eight application areas. These subsequently developed into action lines for the implementation of WSIS outcomes.[23]

The second (Tunis) phase concentrated on two specific aspects of the Information Society—financing mechanisms for investment and development, and the governance of the Internet—and on establishing mechanisms for achieving the objectives that had been identified in Geneva. Its outcomes were encapsulated in two further documents:

- the *Tunis Commitment*, which reaffirmed and built upon the agreements reached in Geneva; and
- the *Tunis Agenda for the Information Society*, which reflected agreements on financing mechanisms and Internet governance, and established implementation arrangements for the future.[24]

The WSIS outcomes, which are set out in these four documents, fall into six main categories. These are:

a. A vision of the future Information Society and of ways in which the international community should seek to bring that vision into being.

b. A series of 10 targets, principally concerned with connectivity, to be achieved for the most part by 2015, which is also the target date for the Millennium Development Goals.

c. A series of action lines, dealing with themes of Information Society development, to be addressed by diverse stakeholders with facilitation by UN agencies and others.

d. Initiatives to improve the measurement of ICTs and ICT impacts, including support for the Partnership on Measuring ICTs for Development which was established in 2004, and a Stocktaking Database of initiatives undertaken by diverse stakeholders.

e. Mechanisms and institutional formations to address two broad themes in ICT development—Internet governance issues and the financing of ICTs and ICT4D.

f. Follow-up arrangements for the monitoring and review of WSIS outcomes, including the establishment of the UN Group on the Information Society (UNGIS), the coordination of action lines in what has now become an annual WSIS Forum, and an overall review process scheduled to culminate in 2015.

These outcomes are summarised in the following paragraphs.

a) The WSIS vision

At the heart of WSIS outcomes lies a vision or ethos for Information Society development—the international community's consensus of aspirations and expectations for the future. This vision is encapsulated in the opening paragraph of the *Geneva Declaration of Principles*:

> "We, the representatives of the peoples of the world … declare our common desire and commitment to build a people-centred, inclusive and development-oriented Information Society, where everyone can create, access, utilize and share information and knowledge, enabling individuals, communities and peoples to achieve their full potential in promoting their sustainable development and improving their quality of life, premised on the purposes and principles of the Charter of the United Nations and respecting fully and upholding the Universal Declaration of Human Rights."[25]

This brings together a number of themes which were discussed in WSIS, in particular those of digital inclusion and the need to "bridge the digital divide," sustainable development, freedom of expression and human rights. The *Geneva Declaration* places these objectives within the framework of other international agreements, including the Millennium Development Goals.

The *Declaration* recognised that "the benefits of the information technology revolution are … unevenly distributed between the developed and developing countries and within societies," and committed the world community "to turning this digital divide into a digital opportunity for all, particularly for those who risk

being left behind and being further marginalized."[26] At the same time, it recognised that ICTs "should be regarded as tools and not as an end in themselves." They ought not to be seen as a panacea for development challenges. "Under favourable conditions," it said, "these technologies can be a powerful instrument, increasing productivity, generating economic growth, job creation and employability and improving the quality of life of all. They can also promote dialogue among people, nations and civilizations."[27] Broad policy issues concerning the relationship between ICTs and development, rights and the environment, which have been influenced by this vision, are discussed in Chapter 6.

The principles in the *Geneva Declaration* were reaffirmed in the *Tunis Commitment*. Responsibility for achieving them was seen as belonging not just to Governments and intergovernmental agencies, but as requiring "strong commitment" and "new forms of solidarity, partnership and cooperation among Governments and other stakeholders, i.e. the private sector, civil society and international organisations."[28] This multi-stakeholder approach has been a hallmark of subsequent implementation initiatives, including both the action line process and the Internet Governance Forum (see below). Much of the literature which has discussed WSIS outcomes, and many contributors to the consultation for this report, regard the multi-stakeholder approach as an important contribution to international governance and a major legacy of the WSIS process.[29]

The *Geneva Plan of Action* set out the WSIS consensus on the responsibilities of different stakeholders as follows:

All stakeholders have an important role to play in the Information Society, especially through partnerships:

a. Governments have a leading role in developing and implementing comprehensive, forward looking and sustainable national e-strategies. The private sector and civil society, in dialogue with governments, have an important consultative role to play in devising national e-strategies.

b. The commitment of the private sector is important in developing and diffusing information and communication technologies (ICTs), for infrastructure, content and applications. The private sector is not only a market player but also plays a role in a wider sustainable development context.

c. The commitment and involvement of civil society is equally important in creating an equitable Information Society, and in implementing ICT-related initiatives for development.

d. International and regional institutions, including international financial institutions, have a key role in integrating the use of ICTs in the development process and making available necessary resources for building the Information Society and for the evaluation of the progress made.[30]

b) The WSIS targets

In recent decades, the international community has adopted a number of internationally agreed development targets aimed at reducing poverty and enhancing opportunity. The most prominent of these have been the Millennium Development Goals (MDGs), adopted by the UN General Assembly in 2000, which set targets for the reduction of poverty and disadvantage in areas such as health, education and food security, to be achieved by 2015.

Throughout WSIS, connectivity was seen as crucial to the development of an Information Society. Without the ability to connect to broadcasting and telecommunications networks, at prices they can afford, individuals and communities cannot reap the benefits which new technology offers them. While other factors, such as the availability of desired content and the capabilities to make use of networks and services, are also crucial, basic access to affordable infrastructure is fundamental to the development of an Information Society that is inclusive and enabling. Its importance was captured in ten targets, mostly for connectivity, which were included in the *Geneva Plan of Action.* The WSIS targets are listed and discussed in Chapter 3.

Much of the discussion around the Information Society—before, during and since WSIS—has concerned the "digital divide." Digital divides are evident both geographically—between the global North and South, between industrial and developing countries, between urban and rural areas—and socially—between women and men, more and less educated, literate and non-literate, impoverished and prosperous. These cases are inherently associated with income levels and can be compared with other development divides in access to services such as health and education, to other general purpose resources such as safe drinking water and electric

power, and to ownership of assets such as vehicles and household goods. Advocates of ICTs in development have argued that access to ICTs can help to overcome some of these other development divides, for example in access to health and education, financial services and the information that microbusinesses need in order to improve their productivity. At the same time, there has been concern that digital divides may deepen other development divides, enabling those countries with better network access and those communities and individuals with more resources to afford them to accelerate their prosperity at the expense of less privileged countries, communities and individuals. The international community pledged itself at WSIS to bridge these digital divides, to ensure that everyone could benefit from access to information and communications, and to turn inequalities in this area into opportunities.

c) The WSIS action lines

Building a "people-centred, inclusive and development-oriented Information Society" is about much more than connectivity and access. The fundamental premise of an Information Society is one of transition—not just towards new ways of doing things but towards new social and economic structures, new forms of governance, new types of culture and interaction between individuals and communities.

In the decade before WSIS, ICTs enabled substantial changes in Government, business and individual behaviour in developed countries, and showed their potential to deliver similar changes in developing countries. Computing and the Internet, electronic government and ICT-enabled delivery of public services, in particular, were identified during WSIS as agents of this transformation, alongside the growing potential of e-commerce. ICTs have also been considered important for empowering the disadvantaged, enabling them to access new opportunities, reduce vulnerability to crisis and influence decisions that affect their lives. In the years since WSIS, the pace of change enabled by ICTs has accelerated with the rapid expansion and diversification of services (such as mobile telephony and mobile Internet), deployment of new technologies (such as broadband), and innovation in applications (such as mobile finance and social networking).

Transformation on this scale is complex and disruptive of established norms in many policy domains. Many of the changes which can be achieved through information and communications offer opportunities to advance longstanding goals of the international community, such as poverty reduction and economic empowerment, including internationally agreed development goals such as the MDGs. The *Geneva Plan of Action* expressed the international community's aspirations for the Information Society in many of these areas. But the transforming power of information technology also raises challenges for the international community and for other stakeholders—not only requiring new types of governance to accommodate new types of interaction between Government, business and citizens, but also responding to new threats concerning national and personal security, and to changes in mechanisms such as taxation and intellectual property. The balance between these different aspects of transformation can be highly complex—especially between those that are considered developmental gains and those (such as in cybersecurity and climate change) that are considered threats.

The WSIS outcome documents sought to promote international multi-stakeholder action to accelerate the achievement of social and economic gains from the Information Society, and to minimise problems (such as cybersecurity) that are also associated with the adoption of new ICTs. The *Geneva Declaration of Principles* and *Plan of Action* established a structure for addressing these themes, which became, in the *Tunis Agenda for the Information Society*, the framework for a series of eleven action lines, one of which was subdivided into eight separate application areas. Following WSIS, these action lines have been facilitated by different UN entities. Work on them is reported annually to CSTD and other agencies, and is reviewed in Chapter 4 of this report.

d) Measuring ICT for development: statistical and other initiatives

Assessing progress towards the WSIS targets and meeting the thematic objectives of the WSIS action lines requires reliable and consistent information. Accurate data sets on ICTs and their developmental impact are difficult to obtain for a number of reasons. Historically, detailed data on ICTs have not usually been collected by national statistical offices, least of all in Least Developed Countries (LDCs). The nature of today's ICT markets, in which transactions are not always easy to record and in which usage is not coincident with ownership or subscription, make it hard to assess the reach of different goods and services. Most importantly, the pace of change in ICT technology and markets is so rapid that even recently collected data soon fall out of date. Without good data, it is hard

for Governments and other stakeholders to design effective strategies for achieving goals such as those agreed at WSIS. This problem was identified during the Geneva phase of the Summit, and a multi-agency Partnership on Measuring ICT for Development was set up during 2004. This Partnership now includes eight UN offices and agencies—the ITU, UNCTAD, the United Nations Department of Economic and Social Affairs (DESA), the UNESCO Institute for Statistics, the Economic Commission for Africa (ECA), the Economic Commission for Latin America and the Caribbean (ECLAC), the Economic and Social Commission for Asia and the Pacific (ESCAP) and the Economic and Social Commission for Western Asia (ESCWA)—and three other international organisations—the World Bank, the OECD and Eurostat. The work of the Partnership is described further in Chapter 2.

As well as fostering an enabling environment, many Governments and other stakeholders in ICT4D have introduced programmes and projects which seek to promote access and stimulate developmental outcomes. Information about these has been collated, on the basis of voluntary submissions, in a Stocktaking Database of ICT-related initiatives and projects which has been maintained by the ITU since 2005 and now contains information about more than 5,000 activities categorised according to the WSIS action lines. This Stocktaking Database is also described in Chapter 2.

e) Mechanisms and institutional formations for Internet governance and financing of ICTs and ICT4D

Internet governance and financing mechanisms have been regarded, alongside the measurement of ICTs and ICT4D, as substantial broad themes of WSIS implementation requiring the involvement of all stakeholders, including international organisations, Governments, the private sector and civil society.

Internet governance

The *Tunis Agenda for the Information Society* recommended the establishment of two new formations to address issues of Internet governance:

- The Internet Governance Forum (IGF) was created as a "multilateral, multi-stakeholder, democratic and transparent" forum to discuss public policy issues related to the Internet, facilitate discourse between entities concerned with Internet governance, and build wider understanding of the Internet, its administration and emerging issues. The Forum has met annually in different countries since 2005, and its initial five-year mandate was extended to 2015 by the UN General Assembly in December 2010.[31] Its work is summarised in Chapter 5.
- A process was also put in place by the UN Secretary-General for "enhanced cooperation … to enable Governments, on an equal footing, to carry out their roles and responsibilities" in relation to international public policy issues concerning the Internet, though not in its day-to-day management. (Progress on enhanced cooperation was under review by DESA at the time of writing (early 2011).)

Financing mechanisms

Financing mechanisms for the future Information Society were debated during the Geneva phase of WSIS, systematically reviewed by a Task Force on Financing Mechanisms which the UN Secretary-General initiated between the two phases (which was led by UNDP), and found consensus in the *Tunis Agenda for the Information Society*.

This consensus acknowledged the central importance of securing investment in infrastructure, particularly in geographical areas which are less commercially attractive, advocating national and international action to create an enabling environment for investment by the private sector, and urging cooperation between private and public sectors in meeting infrastructure needs. It called for increased investment and innovative approaches to financing in a number of areas, notably regional backbone infrastructure and broadband capacity, and communications access and connectivity for remote rural areas, landlocked countries and small island developing states. The *Tunis Agenda* also endorsed the establishment of a voluntary Digital Solidarity Fund to complement existing financing mechanisms.[32]

f) Follow-up activities

The *Tunis Agenda* envisaged all stakeholders taking responsibility for implementing the outcomes of the Summit. "Building an inclusive development-oriented Information Society," it said,

> "… will require unremitting multi-stakeholder effort. … Taking into account the multifaceted nature of building the Information Society, effective cooperation among governments, private sector, civil society and the United Nations and other international organizations, according to their different roles and responsibilities and leveraging on their expertise, is essential."[33]

Governments and other actors were enjoined to take responsibility for various aspects of the work required. At the national level, Governments were encouraged to develop national e-strategies that would contribute towards achieving internationally agreed development goals, and to work with non-governmental actors through public-private partnerships. Developing countries and donors were encouraged to mainstream ICTs into official development assistance strategies including those under the United Nations Development Assistance Framework (UNDAF).

International and regional organisations, which are the primary focus of this report, were asked to ensure that WSIS follow-up was integrated with other intergovernmental processes and that progress on WSIS outcomes was reported regularly within the UN and other contexts.

At the international level, the *Tunis Agenda* urged UN entities to support WSIS objectives through their existing programmes of activity:

> "Each UN agency should act according to its mandate and competencies, and pursuant to decisions of their respective governing bodies, and within existing approved resources. Implementation and follow-up should include intergovernmental and multi-stakeholder components."[34]

To facilitate the implementation of WSIS outcomes, the *Tunis Agenda* asked the UN Secretary-General to establish a coordinating body of UN agencies—the UN Group on the Information Society (UNGIS). UNGIS was subsequently formed in 2006 and now has 29 member-organisations, mostly from within the UN system but also including the World Bank and the OECD.

The *Tunis Agenda* provisionally allocated responsibility for action line facilitation to a variety of UN agencies (see Chapter 4). Overall action line coordination and the organisation of an annual cluster of action line meetings has since been undertaken by the ITU, UNESCO, the UNDP and UNCTAD. Since 2009, this cluster of meetings has been nested within a more substantial annual event known as the WSIS Forum.

At a regional level, the *Tunis Agenda*:

- invited regional intergovernmental organisations to work with other stakeholders to "carry out WSIS implementation activities, exchanging information and best practices at the regional level, as well as facilitating policy debate on the use of ICT for development," with special reference to internationally agreed development goals; and
- suggested that UN Regional Commissions might organise follow-up activities within their regions, with appropriate frequency, and assist Member States in developing regional strategies for WSIS follow-up.[35]

The work undertaken by international and regional agencies within the UN system is discussed in Chapter 5 of this report, along with some discussion of the work of other international and regional agencies.

Finally, ECOSOC was given responsibility to oversee "the system-wide follow-up of the Geneva and Tunis outcomes of WSIS," a process which the CSTD was then invited to support on its behalf.[36] An overall review of the implementation of WSIS outcomes will be made by the UN General Assembly in 2015. This report covering the past five years since WSIS represents part of the CSTD's work to fulfil its mandate to ECOSOC.

International and regional activities to follow-up WSIS objectives are reported regularly by UN agencies in their own publications and websites and through the reporting process for WSIS action lines.[37] These documents are available elsewhere and this report does not seek to duplicate them through a comprehensive listing of activities. It does, however, summarise the range of work which has been undertaken to implement WSIS outcomes in Chapters 2 to 5 below, and illustrates this summary with selected examples of initiatives that have been undertaken at the international and regional levels.

Chapters 2 to 5 of this report look back from today's midpoint between the second WSIS summit at the end of 2005 and the date set for a comprehensive review of WSIS outcomes in 2015.

- Chapter 2 looks at large scale developments in the communications landscape since WSIS ended in 2005.
- Chapter 3 reviews progress towards achieving the WSIS targets.
- Chapter 4 reviews developments in the thematic areas covered by the WSIS action lines, and the implementation of those action lines.
- Chapter 5 reviews progress towards two broad themes of WSIS—Internet governance and financing mechanisms for ICTs for development. In addition, it reviews reviews the work which has been done by international and national agencies, paying particular attention to United Nations Regional Commissions and agencies with substantial responsibilities for WSIS implementation.

NOTES

[1] See http://www.unctad.org/Templates/Page.asp?intItemID=4972&lang=1.

[2] See the annual reports of UN and other agencies to the CSTD. Available from http://www.unctad.org/Templates/Page.asp?intItemID=4242&lang=1.

[3] *Ibid.*

[4] *Tunis Agenda for the Information Society*, (WSIS-05/TUNIS/DOC/6 (rev. 1)), article 105. Available from http://www.itu.int/wsis/docs2/tunis/off/6rev1.html.

[5] Resolution E/2006/46, article 6. Available from http://www.un.org/docs/ecosoc/documents/2006/resolutions/Resolution%202006-46.pdf.

[6] See, for example, *Geneva Declaration of Principles* (WSIS-03/GENEVA/DOC/0004), paragraph 61. Available from http://www.itu.int/wsis/docs/geneva/official/dop.html.

[7] *Geneva Declaration*, paragraph 1.

[8] *Geneva Declaration of Principles*; *Geneva Plan of Action* (WSIS-03/GENEVA/DOC/0005); *Tunis Commitment* (WSIS-05/TUNIS/DOC/7); and *Tunis Agenda for the Information Society*. Available from http://www.itu.int/wsis/index.html.

[9] http://www.unctad.org/Templates/Page.asp?intItemID=4242&lang=1.

[10] http://www.ungis.org/.

[11] http://www.itu.int/wsis/implementation/.

[12] The consultation responses are available from http://www.unctad.info/en/CSTD_WSIS5.

[13] http://www.unctad.org/templates/meeting.asp/?intItemID=2068&lang=1&m=20306.

[14] International Telecommunications Union (ITU) *World Telecommunication/ICT Development Report 2010: Monitoring the WSIS Targets*. Available from http://www.itu.int/ITU-D/ict/publications/wtdr_10/material/WTDR2010_e.pdf.

[15] http://www.itu.int/ITU-D/ict/partnership/.

[16] For a summary, see Robin Mansell, *The Information Society*, introduction to Volume 1.

[17] UNESCO (2010) *Towards Inclusive Knowledge Societies*. Available from http://unesdoc.unesco.org/images/0018/001878/187832e.pdf.

[18] See for example Manuel Castells (2009) *The Rise of the Network Society*, 2nd edn.

[19] Robin Mansell and Ute Wehn (1998) *Knowledge Societies: Information Technology for Sustainable Development.*

[20] http://www.globalknowledgepartnership.org/gkp/index.cfm/pageid/347.

[21] A/RES/56/183.

[22] *Geneva Declaration of Principles*, para. 1.

[24] Also available from http://www.itu.int/wsis/documents/doc_multi.asp?lang=en&id=2316|0.

[25] *Geneva Declaration*, article 1.

[26] *Ibid.*, articles 2, 10.

[27] *Ibid.*, article 9.

[28] *Ibid.*, article 17.

[29] See for example, responses to this consultation from the Internet Society and APC. Available from http://www.unctad.info/en/CSTD_WSIS5/Contributions/.

[30] *Geneva Plan of Action*, article 3.

[31] General Assembly resolution 65/141, "Information and communications technologies for development," 20 December 2010.

[32] *Tunis Agenda*, articles 3-28.

[33] *Tunis Agenda,* article 83, and see article 97.

[34] *Ibid.*, article 102.

[35] *Ibid.*, article 101.

[36] ECOSOC Resolution 2006/46 "Follow-up to the World Summit on the Information Society and review of the Commission on Science and Technology for Development," 28 July 2006.

[37] There have been other initiatives to follow up WSIS outcomes undertaken by different organisations. These have included a series of annual *ICT4All* events which have been organised by the Government of Tunisia in association with intergovernmental agencies. See for example http://www.ict4allforum.tn/.

CHAPTER 2

THE CHANGING COMMUNICATIONS LANDSCAPE

This chapter is organised as follows.

- The first section raises some of the challenges facing those who seek to assess change in ICTs and the impact of the evolving Information Society.
- The second section assesses changes which have taken place in the overall communications landscape, in particular those in the numbers of people making use of ICTs and participating in the Information Society. It includes a note on the changing nature of the digital divide over the period since WSIS.
- The final section summarises the important work of the ITU and the Partnership on Measuring ICT for Development in improving our understanding of what is happening to the communications landscape.

SECTION 1—ASSESSING PROGRESS AND IMPACT

It is not easy to assess progress towards large-scale objectives like those of WSIS, particularly in social and economic development where outcomes can vary substantially between and within communities and many different factors need to be taken into account. While it is possible to quantify measures such as telephone ownership and access, this tells only part of the story. Assessing progress towards the Information Society also requires us to assess the extent to which such ownership and access are used, and to which information and communication are derived from them. Information and communications themselves cannot be precisely defined like physical assets or services such as water and electricity supply. There are no standard units by which they can be measured, and there is significant difference of opinion about what it is about them that is most valuable.

Assessing impact is even more difficult, as it reaches beyond the immediate consequences of a specific intervention or application to the longer-term effect this has on individuals and communities. Impact assessment must consider unexpected as well as anticipated outcomes, and effects in other policy domains and in communities beyond that which is the main subject of study. This challenge is intensified by the rapid pace of change in ICT technology and markets, as a result of which researchers find that relatively recent innovations for which they can find data have been overtaken and surpassed by a later generation of new technologies. The dynamism of change itself is an important factor in progress towards an Information Society.

This report reviews progress towards WSIS implementation with particular attention to social and economic development. Two further aspects of this challenge are worth noting.

The first concerns the relationship between technological and human development. New technology enables people to do many things that they would not be able to do without them—for example, gaining knowledge that can be used to support their livelihoods, acquiring information on where they can find the best prices for goods to buy or produce to sell, maintaining contact with family members working in other districts or other countries, and securing more timely remittances. It also enables businesses to improve productivity and compete more effectively with one another. The developmental impacts that result are not the product of changes in technology, connectivity or access alone, but of the conjunction of those changes with human development activity—the choices people, businesses and Governments make, the ways in which they connect with new opportunities, the extent to which they seek to change their prospects in the longer term.

Changes in connectivity and access, therefore, are just the starting point in assessing progress towards the Information Society or understanding the impact of ICTs on development objectives. The human development challenge is to understand how they can be most effectively harnessed by individuals and communities to improve their circumstances and to mitigate any adverse impacts. At an organisational level, it is concerned with how to integrate ICTs in other development programmes and with the targets that have been agreed for poverty reduction, economic growth and social welfare.

It is important to recognise that new technology can cause problems as well as enable opportunities. The WSIS outcome documents not only emphasised the potential value of ICTs for development, but also acknowledged the need for action to address problems such as new forms of criminality and marginalisation. Without policy intervention, participants in WSIS understood, the Information Society could deepen rather than diminish inequalities in power, wealth and the distribution of resources, both within and between countries and communities. Those individuals, communities and nations which are already well-endowed with power and wealth are better equipped to afford and take advantage of the new opportunities that arise. Monitoring progress towards the “people-centred, inclusive and

development-oriented Information Society" sought by WSIS requires measurement of the equity of what has been achieved as well as of its volume.

The second important impact assessment challenge concerns causality. Many aspects of the communications landscape and of the relationship between ICTs and development have changed since 2005, but these are not the only changes that have taken place around the lives of people in countries at all levels of development. Progress towards achieving the WSIS targets—and, indeed, progress towards other internationally-agreed development goals like the MDGs—is affected by other changes in the political, economic and social context. Some of those changes are global in character, like the economic downturn of the period from 2008 to 2010. Some affect whole regions, like the tsunami which hit countries around the Indian Ocean in 2004. Others are purely national, the result of democratic change or civil strife, of changes in the price paid for oil or earned from cocoa, of good harvests or of drought. The impact of ICTs, and progress towards achieving WSIS objectives, needs to be measured against this background context.

Furthermore, when measuring impact in this area, it is important to distinguish between what has happened as a result of the dynamism of the ICT sector itself—for example, the way in which private sector companies have deployed infrastructure and marketed mobile telephony, and the enthusiasm with which this has been adopted by consumers—and the impact of development interventions—the actions of Governments, international agencies and NGOs to leverage ICTs in order to secure specific developmental goals. The dynamism of the ICT sector has, in some cases, greatly exceeded the expectations of participants in WSIS, and the results of that dynamism are welcomed. At any rate, these results would almost certainly have occurred whether or not there had been a World Summit on the Information Society. Distinguishing exactly what developmental gains can be attributed to the Summit and to post-Summit efforts to implement the WSIS outcomes is a more subtle matter than identifying the impact of ICTs themselves.

In addition to these general challenges, there are some problems in measuring the progress and impact of ICTs, many of which are concerned with the quality and reliability of available data. The Partnership on Measuring ICT for Development has summarised these problem thus:

> "For developing countries, limited resources and infrastructure still constrain their ability to produce ICT statistics. Moreover, while infrastructure and access indicators are widely available, indicators on ICT use … are less frequent, especially in developing countries. There are also shortcomings that continue to exist in the comparability … and quality of data."[38]

Four main challenges arise:

- Detailed data on ICTs were not always collected before and even after WSIS. Even where they are collected, national statistical offices (NSOs), especially in developing countries, are under-resourced and have found it difficult to supplement information which is provided by the ICT sector itself with data from other sources. It is therefore difficult to compare current experience with that in the past, and in many cases even at the time of WSIS.
- Data which are available are not always comparable internationally. Different countries collect data on the same variable in different ways, at different times. For example, different multipliers may be used to estimate the number of internet users from the number of computers available in places like cybercafes. NSOs are often reliant for data on ICT sector businesses which collect information for business management rather than for public purposes. This problem has been exacerbated by the liberalisation of the ICT sector. Competing businesses may well have incompatible approaches to compiling the data they supply to NSOs and communications regulators, for example on the length of time that they continue to include inactive subscriptions in reported numbers of fixed or mobile subscribers.
- It is much more difficult to generate data on usage than on access. Access can be measured, at least in part, through network coverage and, in the case of mobile phones, through the number of active SIMs. Ownership and use of most ICT devices, however, including televisions and computers, are not recorded in official statistics. Internet usage is particularly difficult to measure as much of it takes place on shared computers in workplaces, educational institutions, cybercafes and telecentres. To understand usage, it is necessary to explore patterns of behaviour in depth through sample surveys of businesses, households and other groups. NSOs and research institutes have limited resources available for this. The only major continental study of household use of ICTs in Africa, for example, was undertaken in 2007.[39]

- The pace of change in many areas of ICT is too rapid for traditional data collection methods. Data which are provided to international organisations for publication in their annual reports may be outdated as long as two years. While this may not be significant in sectors which are changing slowly, such as water and power, it is much more important where rates of adoption are growing very fast, as with mobile telephony and the Internet. Outdated data are problematic because they give an inaccurate picture of the present, making business and policy choices for the future more difficult.

Connectivity and access are fundamental to the achievement of WSIS objectives. Without them, there can be no use of the ICTs that they enable. However, as noted above, measurement of connectivity alone is insufficient. What matters is the extent to which ICTs are used and the range of people that make use of them. These depend on other factors in addition to connectivity and access—for example, the affordability of access and services, the relevance and value to end-users of the content and resources that can be accessed through them, and the capabilities of end-users to make use of access (such as their literacy and research skills). If connectivity and access represent the supply side of the Information Society, these other factors might be thought to represent the demand side. Understanding (and therefore measuring) the relationship between them is critical to addressing digital divides because the poor and less educated are less likely to be able to afford to make use of access or to have the skills required to maximise its value.

Communications technology and use have been changing more rapidly over the past few decades than any previous technology, economic or social sector has changed in history. The capabilities of microprocessors and other key components of communications equipment have grown almost exponentially for several decades—a process sometimes known as "Moore's Law."[40] This has proved an extraordinary driving force for innovation in hardware, software, content and applications. It has been accompanied by the convergence of hitherto distinct industrial and media sectors around the common use of digital technology and bit transmission. The resulting interaction between telecommunications and broadcasting, computing and information systems, the ICT sector and sectors that make intensive use of ICTs such as high-end manufacturing and financial services, has also proved a driving force of innovation. New transmission media, protocols and networks, using a variety of available technologies, many of them wireless, are in continual development.

The dynamism of these technological changes has been at the heart of increased use of ICTs and of progress towards an Information Society and Knowledge Economies. As a result, many of the assumptions and expectations made even five years ago no longer hold true. In the five years since WSIS, some technologies and services which were relatively new have become pervasive, while new services (such as social networking and mobile transactions) have become not just available but influential on the way in which ICTs are used and on the direction of public policy.

Concepts of critical mass are also important in understanding change in interactive sectors such as ICTs. Often there seems to be a tipping point at which ownership and use of a particular device or technology ceases to be unusual but becomes expected within society. This tipping point might occur, for example, around a particular level of mobile teledensity. When it is reached, adoption and use of new technologies may accelerate. The ways in which they are used within society in general and by individuals are likely to change further, intensifying impacts on other areas of business, Government and social behaviour.

This makes it difficult to assess the impact of new technologies over time. Later adopters of a technology or service, such as mobile telephony or social networking, may well behave differently from early adopters. Not only that, but the character and complexity of such a technology or service may have changed dramatically within a short space of time. Mobile telephony changed very rapidly in developed countries, for example, from a relatively expensive complement to fixed telephony to an alternative which has become the primary mode of telephony for social interaction and incorporates many additional communications and non-communications functions alongside basic voice telephony. Assessments of outcomes which were accurate in 2005, and policy prescriptions derived from them, may no longer be accurate or appropriate five years on. The need for understanding of the changing Information Society and for adaptive policy responses was raised by a number of respondents to the consultation process for this report, and is increasingly evident in the wider post-WSIS literature.[41]

SECTION 2—THE CHANGING COMMUNICATIONS LANDCSCAPE

This section presents an overview of the changing communications landscape over the past decade—the five years of the WSIS process and the five years that have followed the Tunis summit. It is concerned primarily with connectivity and access—with the infrastructure that enables people to make use of ICTs and with the extent to which adoption of ICTs has become pervasive. It draws on the comprehensive data sets collected and published by the ITU, through its *World Telecommunication/ICT Indicators Database*,[42] with additional data from Internet World Statistics (IWS)[43] and other sources. Its purpose is to give an overview of the change which has taken place, and so provide context for the implementation monitoring, activities and developments described in Chapters 3 to 6.

The changes described in this section, and in particular the rapid growth of communications access, can be ascribed to a number of factors. The most important of these factors has been investment in infrastructure and services by private sector communications businesses, which has outpaced that in other network and utility sectors. New services and applications have also been adopted enthusiastically by individuals even at quite low levels of income. Governments have contributed to these outcomes in many countries through policies and regulatory frameworks designed to stimulate investment, network deployment and affordable tariffs. The outcomes of this rapid growth in access include increased potential for Governments and businesses, citizens and consumers to benefit from the evolving Information Society and so achieve developmental gains such as those that were advanced in the WSIS outcome documents.

While the WSIS process has encouraged awareness of the potential of ICTs and access, it is commercial decisions by private sector companies that have been the principal drivers of network growth. ICT investment was discussed in detail during the World Summit by the Task Force on Financing Mechanisms, which was set up by the UN Secretary-General between the first and second summit sessions. Following recommendations of the Task Force, the *Tunis Agenda* urged international institutions, Governments and the private sector to work together to facilitate investment, using existing mechanisms and innovative approaches such as public-private partnerships. It was especially concerned with the need for investment in places such as remoter rural areas and oceanic regions, and in new types of infrastructure, particularly broadband.[44]

Levels of investment in Africa were of particular concern at WSIS. Private sector telecoms investment on the continent had been at best stagnant in the period from 2000—the end of the "dot.com bubble," a period which had seen high-levels of ICT investment—up to the World Summit.[45] Investment levels have picked up again from that point and were much higher by 2006–7 than earlier. At the Connect Africa summit in Rwanda in 2007, GSM businesses announced that they would be investing US$50 billion in African networks over the five years to 2012.[46]

Anxiety has been expressed about the risk to communications investment from the economic downturn of 2008–2010. Reductions were reported in the telecoms equipment market during 2009.[47] Although the final picture on this is not yet clear, the dynamic growth of telecommunications markets in developing countries seems to have resulted in their remaining relatively attractive to investors during the downturn, while a number of developed countries included further ICT investment in their economic stimulus programmes.[48]

The most eye-catching and symbolic illustration of the growth in global communications infrastructure since 2005 has been the connection of the last main stretch of Africa's coastline to global cable networks. At the time of WSIS, only one undersea cable connected the west African coast to submarine fibre networks, while none connected countries along the continent's east coast. Many coastal as well as inland African countries were dependent on satellite infrastructure for international connectivity, enjoying much lower levels of international bandwidth than those available in other world regions. Internet access was therefore generally more expensive, slower and less reliable in Africa than elsewhere. By contrast, by the end of 2011, there should be four competing submarine cables along the east coast of Africa and five along the west coast.[49] While this does not necessarily resolve the continent's connectivity challenge, it does mean that African countries are able to access much greater international bandwidth than before, allowing for better and cheaper Internet connections.

Africa's infrastructure challenge has moved inland—to investment in new national backbones which are capable of delivering broadband into rural areas, and to local access networks. Extensive new investment in fibre backbone networks is being made by private sector operators and, in some countries, by Governments either in partnership with the private sector or with support from international financial

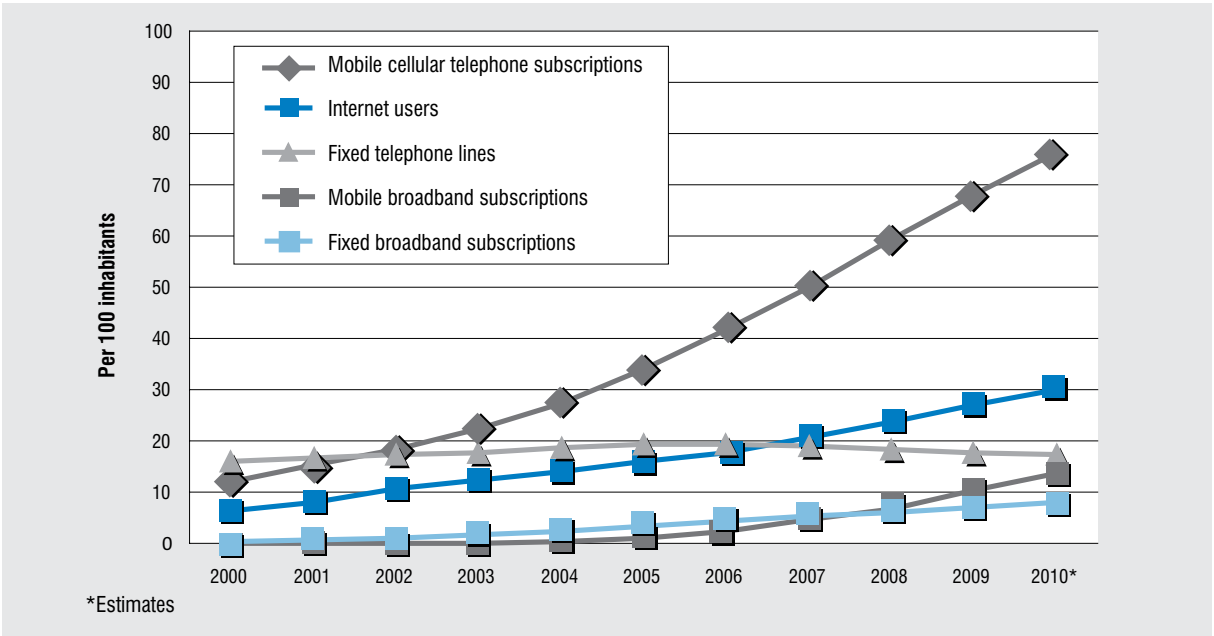
institutions.[50] In some places, private companies are also laying "dark fibre"[51] where this is permitted by regulators and they believe that it will prove commercially advantageous. Making bandwidth available to end-users in rural areas will continue to be a challenge which communications operators address through a variety of "last mile" technologies. Some commentators have written enthusiastically about the potential for expanding to other regions what has been called the "budget model" of low-cost access charges which has emerged in south Asia, though it remains to be seen in practice if this model will bring broadband access to local markets.[52]

Access to telephony and Internet

The following paragraphs draw on ITU and other sources to illustrate the changes in connectivity and access which have taken place in the distribution of telephone and broadband subscriptions per 100 inhabitants, and in estimated Internet use per 100 inhabitants worldwide. These are summarised in Figure 1 and Table 1. The most important changes evident from these data are as follows:

- Mobile telephone connections worldwide have grown rapidly throughout the period and particularly rapidly since WSIS. By the end of 2010 there were approximately 5.28 billion mobile phone subscriptions worldwide, close to 80 subscriptions for every 100 inhabitants of the planet or just above one subscription for every inhabitant above the age of 14. This compares with 2.22 billion subscriptions in 2005 (a subscription density of 33.9 per cent).
- There are now more than four times as many mobile subscriptions worldwide as fixed subscriptions. The number of fixed lines worldwide has declined since 2005, following a slight increase in the previous five years. There are now approximately 1.20 billion fixed lines worldwide compared with 1.26 billion in 2005.
- The estimated number of Internet users has increased more slowly than that of mobile phone users, but has also picked up pace since 2005. The ITU estimates that there were 2.08 billion Internet users worldwide at the end of 2010 (a density of approximately 30 per cent), double the figure of 1.04 billion in 2005 (a density of 15.9 per cent). The number of estimated Internet users at the end of 2010 was approaching double the number of fixed line subscriptions, as fixed lines often provide service to many individual users.
- Broadband access has also grown substantially, with a rise in estimated global broadband subscriptions (fixed and mobile) from 289 million (a density of 4.4 per cent) in 2005 to 1.49 billion (a density of 21.6 per cent) in 2010. Fixed broadband access has grown gradually over the period since 2000 but has been overtaken by mobile broadband access, which has risen from close to zero in 2005 to an estimated 940 million subscriptions in 2010 (a density of 13.6 per cent).

FIGURE 1: GLOBAL ICT ACCESS DEVELOPMENT, 2000-2010



Source: ITU, World Telecommunications Indicators Database, http://www.itu.int/ITU-D/ict/statistics/material/graphs/2010/Global_ICT_Dev_00-10.jpg

TABLE 1: GLOBAL ICT ACCESS DEVELOPMENT, 2005-2010 Per 100 inhabitants

	2005	2006	2007	2008	2009	2010
Mobile lines	33.9	41.7	50.1	59.3	67.9	76.2
Fixed lines	19.3	19.4	19.0	18.3	17.7	17.3
Internet users	15.9	17.5	20.8	23.8	27.1	30.1
Mobile broadband subscriptions	1.1	2.4	4.6	6.8	10.3	13.6
Fixed broadband subscriptions	3.3	4.3	5.2	6.1	6.9	8.0

Source: ITU, World Telecommunications Indicators Database, http://www.itu.int/ITU-D/ict/statistics/at_glance/KeyTelecom.html

However, these overall figures mask considerable differences in the experience of developed and developing countries. Figures 2 and 3 illustrate the changes for these same communications modes in these two categories of countries since 2005.[53]

FIGURE 2: ICT ACCESS IN DEVELOPED COUNTRIES, 2005-2010

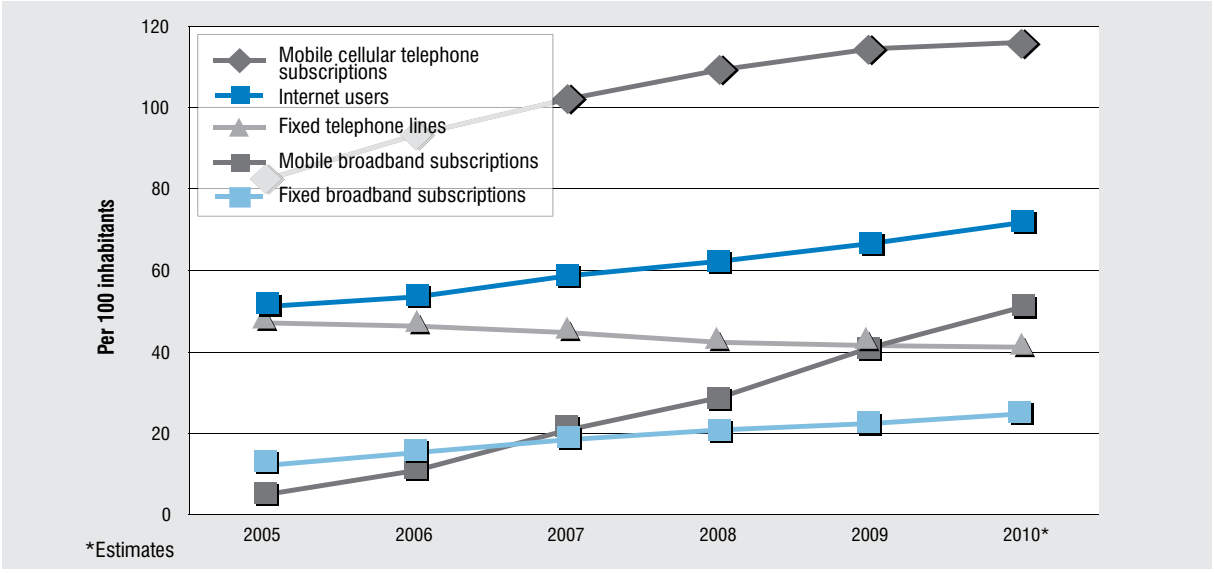
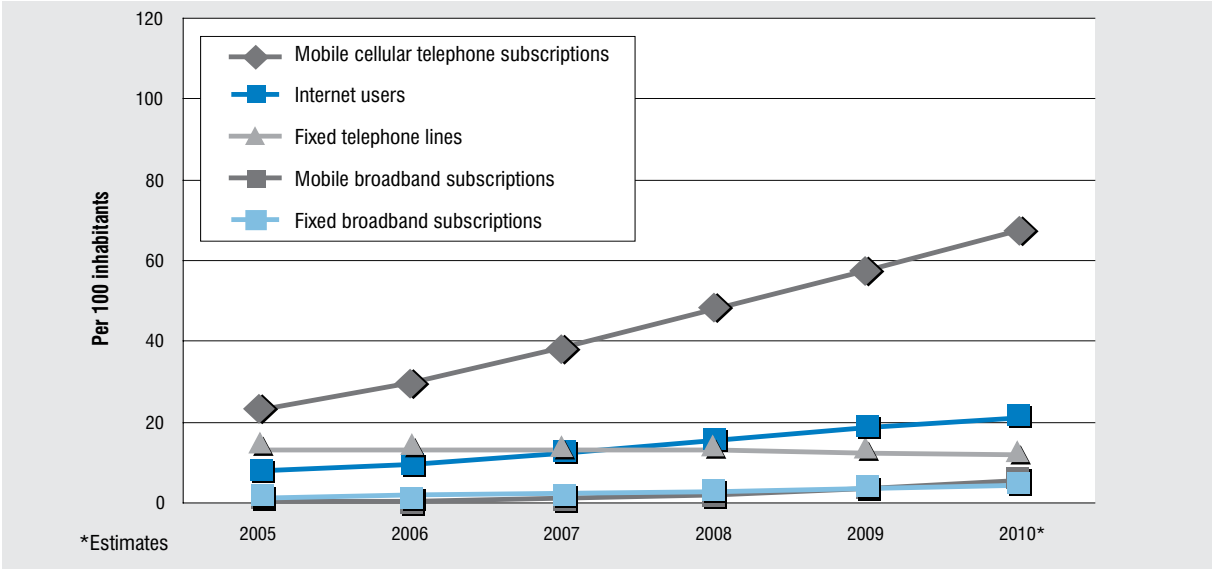


FIGURE 3: ICT ACCESS IN DEVELOPING COUNTRIES, 2005-2010



Source: ITU, World Telecommunications Indicators Database, http://www.itu.int/ITU-D/ict/statistics/index.html

These Figures show that in developed countries mobile telephone subscriptions have risen since 2005 from 82 per 100 inhabitants to 116 per 100 inhabitants. (Subscription rates above 100 per cent result from ownership of multiple mobile phones or SIM cards and from delays in the removal of subscriptions from phone company databases when they become inactive (see below).) Mobile telephony is therefore now close to universal in developed countries, at least for adults. By contrast, in developing countries, the number of mobile subscriptions is continuing a steady growth trend, which had reached a density of 68 per cent in 2010. In some Least Developed Countries, subscription rates are still much lower than this (see below).

The fall in fixed telephone subscriptions per 100 inhabitants has been sharper in developed countries (from 47 per cent to 41 per cent) than in developing countries (from 13 per cent to 12 per cent). However, this masks substantial variations in the experience of different developing regions (see below).

Internet use has grown steadily in both developed and developing countries, but is much higher in the former, where the proportion of estimated users has risen from 51 per cent to 72 per cent over the five year period. In developing countries, the comparable figure is estimated to have risen from 8 per cent to 21 per cent. Even allowing for the difference in age profiles between developed and developing countries, the ratio of access by adults between the two is therefore probably around 3:1. Again, these figures mask substantial differences between access levels in different developing regions. They also give no indication of the quality of access of which people in different countries can make use, or of the average amount of time that people spend online.

Finally, broadband access is now widespread in developed countries, where the total number of broadband subscriptions is above half the population. By contrast, broadband access has very limited availability in developing countries, with a (fixed plus mobile) subscription rate of less than 10 per cent.

From a digital divide perspective, these data therefore show three specific trends.

- The digital divide in access to voice telephony has narrowed markedly since 2005, as many developing countries have moved to mass markets in mobile phone adoption and use.
- The digital divide in Internet access, measured by numbers of users, has remained relatively steady, and is still very substantial.
- The digital divide in broadband access has grown since 2005, as broadband has become a mass market phenomenon in developed countries but remained scarce in developing countries.

The CSTD has described this conjunction of trends as a shift in the nature of the digital divide away from inequalities in basic "quantity" and "access" to include differences in "quality" and "capacity."[54]

The following sections provide more detailed information at a regional level about the developments in the different communications modes described above.

Mobile telephony

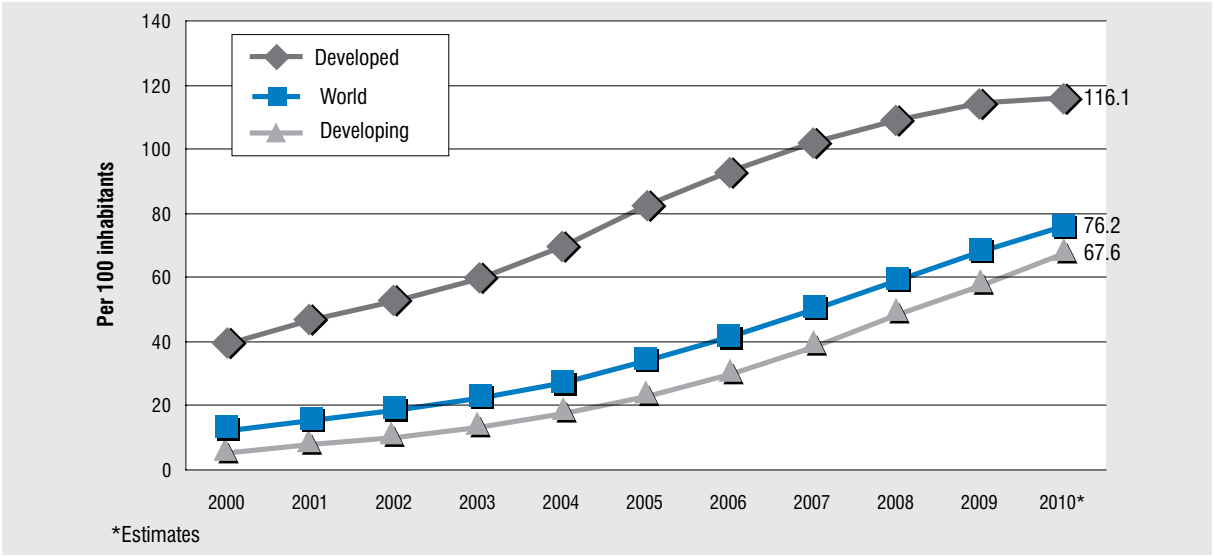
The WSIS outcome documents pay less attention to mobile telephony than to computers and the Internet. Yet, since 2005, mobile telephony has seen the most dramatic growth in ICT access and usage around the world. Two aspects of this must be considered: the growth in geographical coverage by mobile networks, and the growth in numbers of mobile subscriptions.

Firstly, in terms of coverage, there has been extensive investment in mobile networks worldwide, reaching increasingly deeply into rural areas which have never been reached by fixed communications networks. In 2009, the ITU estimated that 90 per cent of world population was covered by a mobile telephone signal, much higher than at the time of WSIS. The majority of areas that are still unserved by a mobile signal are in Africa, where only about half of the rural population was covered in 2009. The ITU believes that "almost all regions will achieve mobile phone coverage of rural populations before 2015" and that a target of almost universal coverage by 2015 is attainable with "the right policy emphasis."[55]

By the end of 2010, the ITU estimated that there were 5.28 billion mobile phone subscriptions worldwide, equivalent to 76.2 for every hundred people, with year-on-year growth in subscriptions over the previous two years running at 13 per cent to 16 per cent. In 2005, the number of recorded mobile phone subscriptions was just 2.22 billion, equivalent to 33.9 for every hundred people, so the global number of mobile subscriptions has more than doubled since the Tunis summit. In many countries, mobile teledensity now exceeds 100 per cent, *i.e.* there are more subscriptions than inhabitants, and the market is therefore saturated.

Figure 4 shows the distribution of mobile phone subscriptions in developed and developing countries as it changed during the first decade of the present century. It shows that mobile subscription numbers in developed countries have levelled off as they approach saturation, while the figures in developing countries continue to grow. Although starting later, the pace of growth of mobile telephony in developing countries replicates that which was experienced in developed countries, with a time difference of approximately six years.

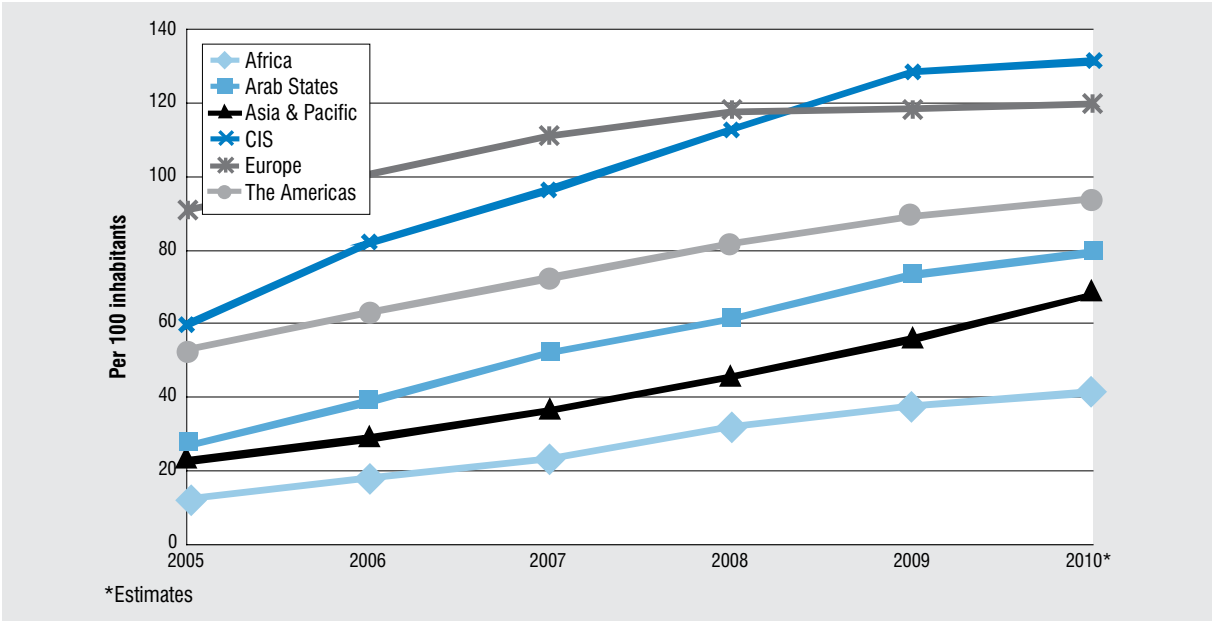
FIGURE 4: MOBILE TELEPHONE SUBSCRIPTIONS, 2000-2010



Source: ITU, World Telecommunications Indicators Database
http://www.itu.int/ITU-D/ict/statistics/material/graphs/2010/Mobile_cellular_00-10.jpg

However, Figure 4 masks significant continental level differences in the degree of adoption of mobile phones, which are illustrated in Figure 5 for the five years since the Tunis summit. Table 2 presents the underlying data for Figure 5.

FIGURE 5: MOBILE TELEPHONE SUBSCRIPTION DENSITY, 2005-2010 BY CONTINENT



Source: ITU, World Telecommunications Indicators Database

TABLE 2: MOBILE TELEPHONE SUBSCRIPTIONS, 2005-2010 BY CONTINENT (millions)

	2005	2006	2007	2008	2009	2010
Africa	88	130	174	246	295	333*
Arab States	85	126	174	209	255	282*
Asia & Pacific	834	1,071	1,377	1,743	2,159	2,649*
CIS	166	227	267	313	356	364*
Europe	550	610	677	721	729	741*
The Americas	469	564	656	750	826	880*

Source: ITU, World Telecommunications Indicators Database
*Estimates indicated by **

These data show that, although there is a strong rate of growth in mobile telephony in all regions, overall numbers of subscriptions in sub-Saharan Africa—at a subscription density just over 40 per cent—are still well below those in other world regions. This reflects both the lower level of population coverage of mobile networks in rural Africa and the relative affordability of mobile services. There are also considerable differences between countries and subscription rates are much lower in some LDCs. In 2009, for example, when the overall figure for sub-Saharan Africa was 37.6 per cent, the Democratic Republic of Congo had a mobile subscription density of just 14.3 per cent, according to ITU statistics, and Niger a density of 17.0 per cent.[56]

Interpretation of these data is not simple, as the number of mobile subscriptions does not equate with the number of mobile users. In practice, many mobile users subscribe to more than one network, in order to ensure that they have coverage countrywide or to take advantage of lower tariffs for "on-net" calls (i.e. calls within one operator's network). Subscription numbers need to be discounted to take account of dual subscriptions, although the extent to which this is necessary will vary significantly between countries. The large majority of mobile accounts are also prepaid "pay-as-you-go" accounts, and not all of these remain in use for long. Counting mobile subscriptions is therefore less precise than counting fixed subscriptions, which are usually based on postpaid contracts. On the other hand, many mobile phones are used by more than one person. Access for non-subscribers is widely available through kiosks run by informal entrepreneurs in low-income countries, and households (and friends) may share mobile phones in the way that fixed phones have historically been shared.[57] In countries with high population growth, it is also worth remembering that a quarter of the population may be considered too young to be likely to have their own mobile devices.[58]

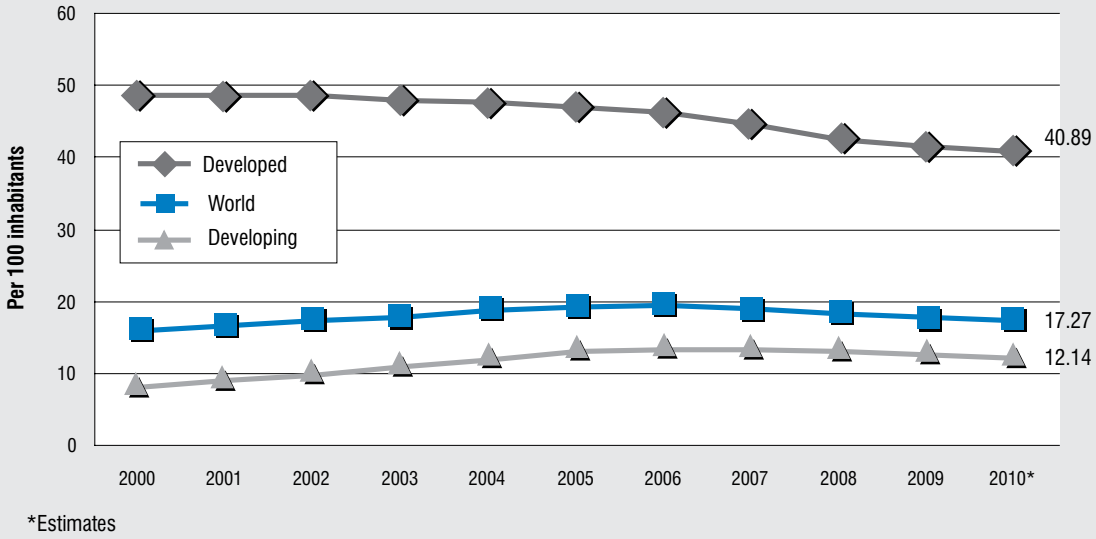
What is undeniable is that the growth in mobile telephony worldwide, in all developing regions and in almost all developing countries, has been exceptionally rapid over the past decade, and that this growth trend is continuing. The growth in mobile telephony since 2005 has exceeded expectations at the time of WSIS, and it is now the primary mode of electronic communications in most countries, including their low-income social groups. Connectivity still needs to be completed in rural areas, particularly in Africa, but expectations of continued growth in coverage between 2010 and 2015 are optimistic (see Chapter 3). The development of new services accessible through mobile phones, including mobile Internet and mobile transactions, is discussed in Chapter 6.

Fixed telephony

The experience with fixed telephone access over the same period has been very different. This reached near ubiquity in households in most industrial countries in the last quarter of the twentieth century. It also grew rapidly in middle-income countries during that period, but fixed subscription density remained obstinately low—in some cases below 1 per cent—in LDCs. In practice, in these latter countries, fixed networks have generally served only urban centres and the transport corridors between them, and fixed phone access has been largely confined to Government departments, medium-sized and larger businesses, and a few wealthy individuals. The high cost of deployment has proved a lasting deterrent to investment in local fixed access infrastructure beyond these areas and user groups.

This pattern of fixed telephone access has not changed substantially over the past decade. Figure 6 shows the distribution of fixed phone subscriptions in developed and developing countries as it changed during the first decade of the present century.

FIGURE 6: FIXED TELEPHONE SUBSCRIPTIONS, 2000-2010

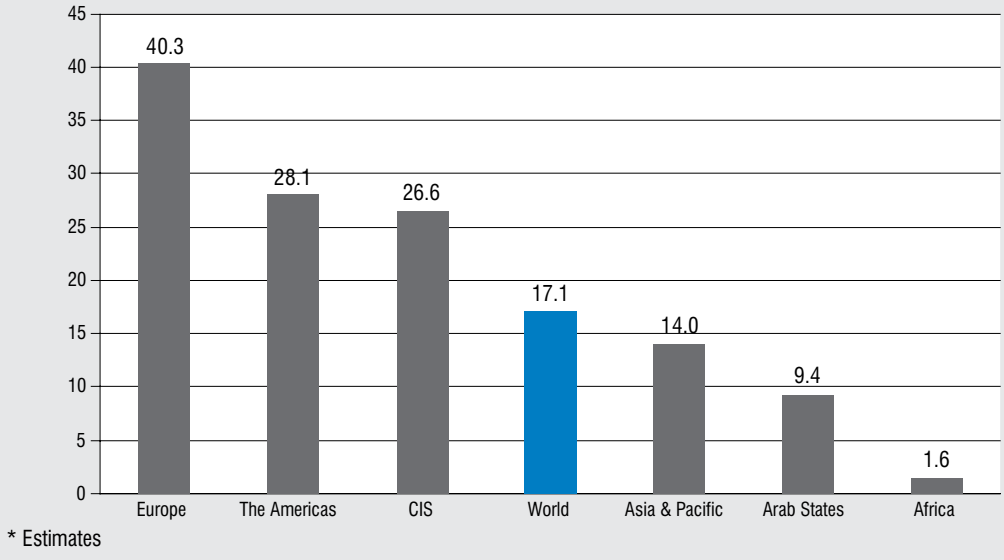


Source: ITU, World Telecommunications Indicators Database
http://www.itu.int/ITU-D/ict/statistics/material/graphs/2010/Fixed_00-10.jpg

The total number of fixed phone subscriptions worldwide has fallen in the five years since the Tunis summit from 1.26 billion to 1.20 billion, a drop of just under 5 per cent, reflecting the fact that new subscribers are choosing mobile rather than fixed lines even in countries with established fixed local access networks. Rather than complementing fixed telephony, as originally envisaged, for an increasing number of people (and now for most) mobile has become the usual form of telephone access.

The differential distribution of fixed telephones between world regions is much more marked than that of mobile phones. Figure 7 compares the teledensity rates in different world regions in 2010.

FIGURE 7: FIXED TELEPHONE SUBSCRIPTION DENSITY, 2010*, BY CONTINENT



Source: ITU, World Telecommunications Indicators Database
http://www.itu.int/ITU-D/ict/statistics/material/graphs/2010/Fixed_10.jpg

Fixed line subscription disparities between continents are very high, with near ubiquity of access in Europe but exceptionally low levels of access in sub-Saharan Africa. If telephone lines were solely concerned with voice telephony, this transition from fixed to mobile predominance would merely reflect a change in the prevalent mode for obtaining an essentially similar service. However, telecommunications networks also provide the infrastructure for data services, including the Internet. Internet access has to date been gained by end-users primarily through computers connected to fixed networks, while mobile networks have not until recently been able to match the bandwidth capabilities of fixed network access. There are also limits to the capabilities of mobile devices as Internet terminals, in particular their limited screen and keyboard size, memory and battery life. As a result, concern has been expressed that the continued weakness of fixed telephone markets will inhibit the achievement of WSIS objectives in developing countries. The evolution of mobile and broadband markets over the years since 2005 is considered further in Chapter 6.

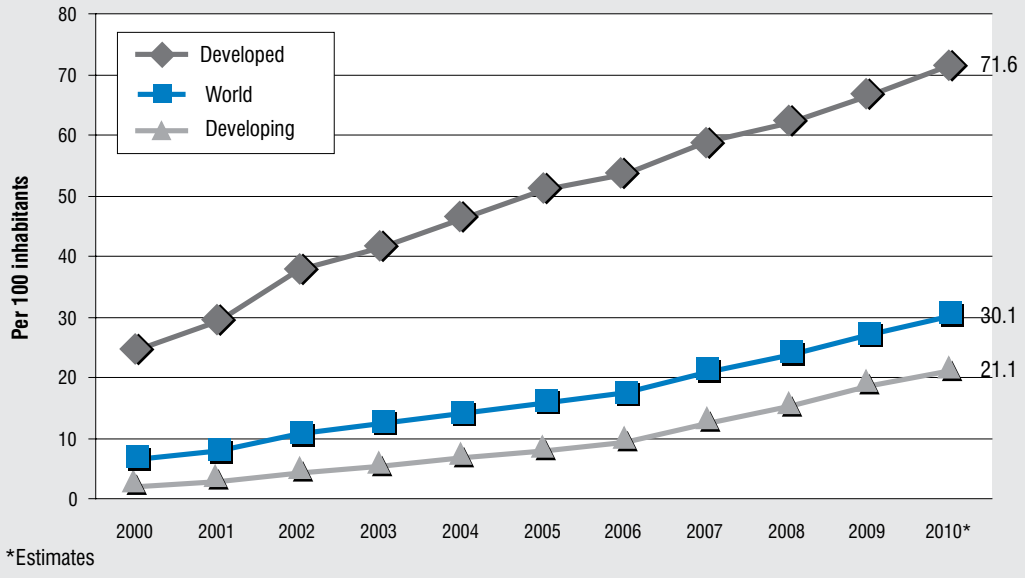
Internet access

Internet access is more difficult to measure than telephone access because it is less dependent on ownership of terminal devices. Many people access the Internet at workplaces, educational institutions or cybercafés, and so subscriptions to Internet Service Providers give a less useful indicator of the reach of Internet than fixed or mobile subscriptions do of the reach of voice telephony. Where survey data are not available, the usual way of estimating Internet users is by applying a multiplier to the number of ISP subscriptions. However, the multipliers which are appropriate in different countries are likely to vary with local circumstances, leading to apparent distortions in total numbers. In addition, by changing the balance of Internet access between personal devices and cybercafés, the advent of mobile Internet may well have affected the appropriateness of multipliers used in the past, making it more difficult to compare past and current data.

The main sources of estimates for Internet use in different countries are the ITU and Internet World Statistics (IWS). The ITU estimates the total number of Internet users worldwide at the end of 2010 at 2.08 billion, approximately 30 per cent of world population.[59] Internet World Statistics gives a slightly lower figure of 1.97 billion for June 2010. [60]

ITU estimates for growth in the number of Internet users between 2000 to 2010 are set out in Figure 8.

FIGURE 8: ESTIMATED INTERNET USERS, 2000-2010

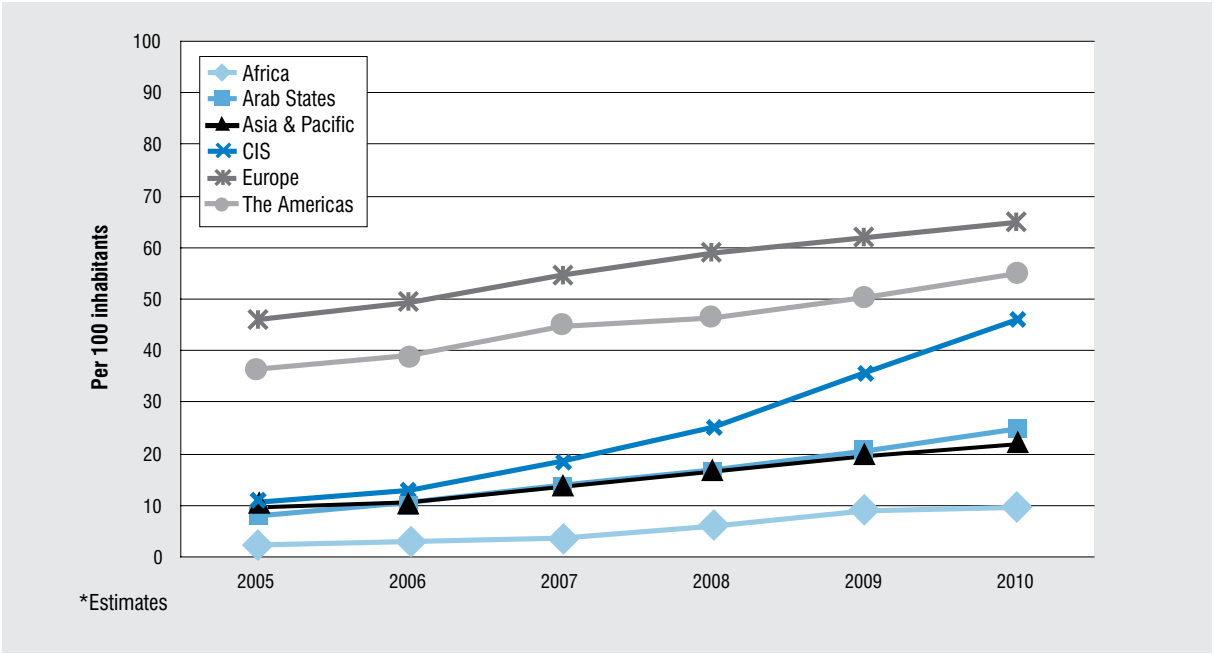


Source: ITU, World Telecommunications Indicators Database
http://www.itu.int/ITU-D/ict/statistics/material/graphs/2010/Internet_users_00-10.jpg

According to IWS, the growth in Internet access over the period from the end of December 2000 to June 2010 has been 445 per cent, from 361 million to 1.97 billion. IWS' geographical regions differ from those of the ITU. It records the fastest growth over this period in Africa (2,357 per cent), followed by the region it defines as "Middle East" (roughly equivalent to the ESCWA region) (1,825 per cent) and Latin America and the Caribbean (1,033 per cent). The lowest rates of growth it records over this period are in regions which already had relatively high levels of Internet access in 2000—North America (146 per cent), Oceania/Australia (179 per cent) and Europe (352 per cent).

ITU data for the period from 2005 to 2010, which use the same geographical divisions as used in previous sections to illustrate mobile and fixed telephony, are set out in Figure 9:

FIGURE 9: ESTIMATED INTERNET USERS BY CONTINENT—2005-2010



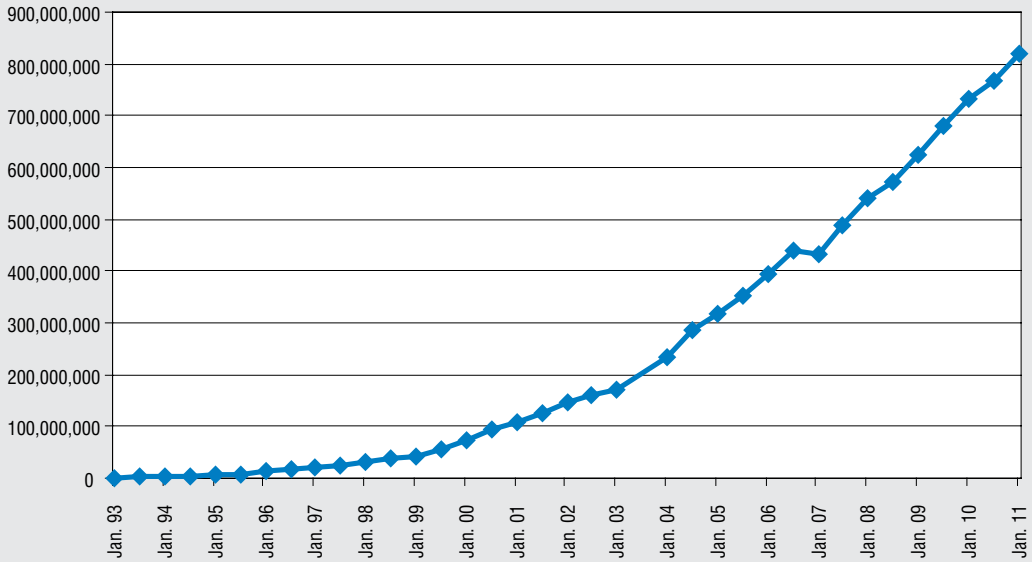
Source: ITU, World Telecommunications Indicators Database

These data suggest that the proportion of people with Internet access has grown slightly faster since WSIS in more developed regions (Europe, North America and especially the CIS region), than they have in less developed regions (in particular Africa), thought he rate of growth is faster in developing countries. Internet access is now available in the large majority of households in many developed countries. IWS records an average of 67.6 Internet users per 100 inhabitants in the European Union's 27 member-states in May 2010, with a high of 92.5 per 100 inhabitants in Sweden. The growth rate in such countries will decline as they reach near ubiquity. Figures for Africa fall below 1 per 100 inhabitants in seven countries, including the Democratic Republic of Congo, but are above 20 per 100 inhabitants in others (including Nigeria).[61] They are also below 1 per cent in several countries in Asia.

Internet content

Data for Internet access measure one aspect of the Internet. It is also important to look at the growth of the Internet from the content side, by measuring the number of Internet hosts and web pages which are available at any given point in time. Figure 10 illustrates the growth in the number of Internet hosts over the period between 2000 and 2010. This shows an increase from just under 93 million in 2000 to just under 769 million in July 2010. The number of hosts has approximately doubled during the five year period since the Tunis summit.

FIGURE 10: INTERNET HOSTS, 1994-2010



Source: Internet Systems Consortium, Inc. (http://www.isc.org/)

However, this figure underestimates the growth in the number of overall content providers on the Web since 2005 because an increasing amount of content is now provided through Web 2.0 resources such as social networking sites. The growth in these and their significance within the Information Society is discussed in Chapter 6.

Measuring the number of pages of information on the World Wide Web is challenging, partly because the number itself is large and rapidly changing, and partly because the definition of a "web page" is imprecise. One way to look at this is to examine the number of pages found by search engines. In 2008, the search engine Google claimed to have found more than one trillion unique pages (in the sense of unique URLs) on the Web, though many of these would be automatically-generated pages which do not represent meaningful content.[62] One calculation published in 2009 found that the number of pages in the publicly indexable Web rose from 11.5 billion in January 2005 to 25.2 billion in March that year.[63]

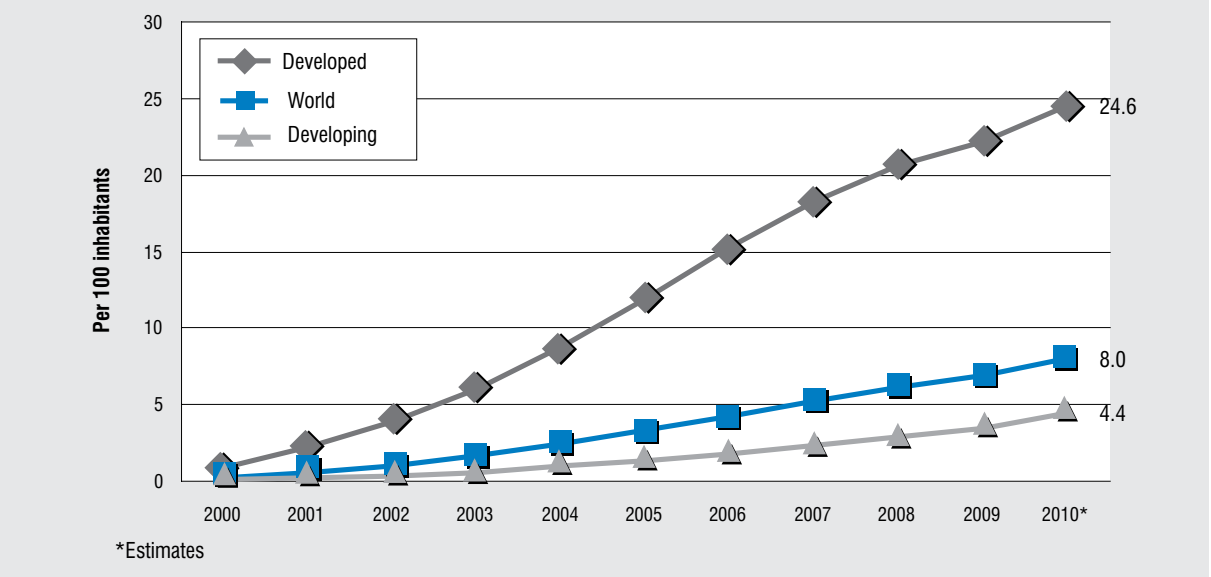
Broadband access

The growth of mobile telephony from 2000 to 2010 has narrowed the digital divide in basic voice telephony. However, while basic telecoms access has been growing worldwide, the nature of telecoms access has been changing, especially in developed countries. In many of these, the majority of fixed telecommunications subscribers—which includes the majority of households—now have broadband access, offering varying qualities of high-speed Internet and a much better (and, at higher usage levels, generally cheaper) Internet experience than can be obtained through dial-up access on traditional fixed lines.

As a measure of bandwidth, and so of the capacity of telecommunications access, the term "broadband" is imprecise. A threshold figure of 256kbps has often been used in practice as a basic definition, by ITU and other statisticians. That speed, however, is much lower than the speeds which have now become widely available in developed countries. In addition to speed, broadband access is characterised by the continuous ("always on") availability of internet/data services for a flat rate charge and, as a result of these factors, more qualitative definitions have recently been suggested by the World Bank and the Broadband Commission for Digital Development (see Chapter 6).

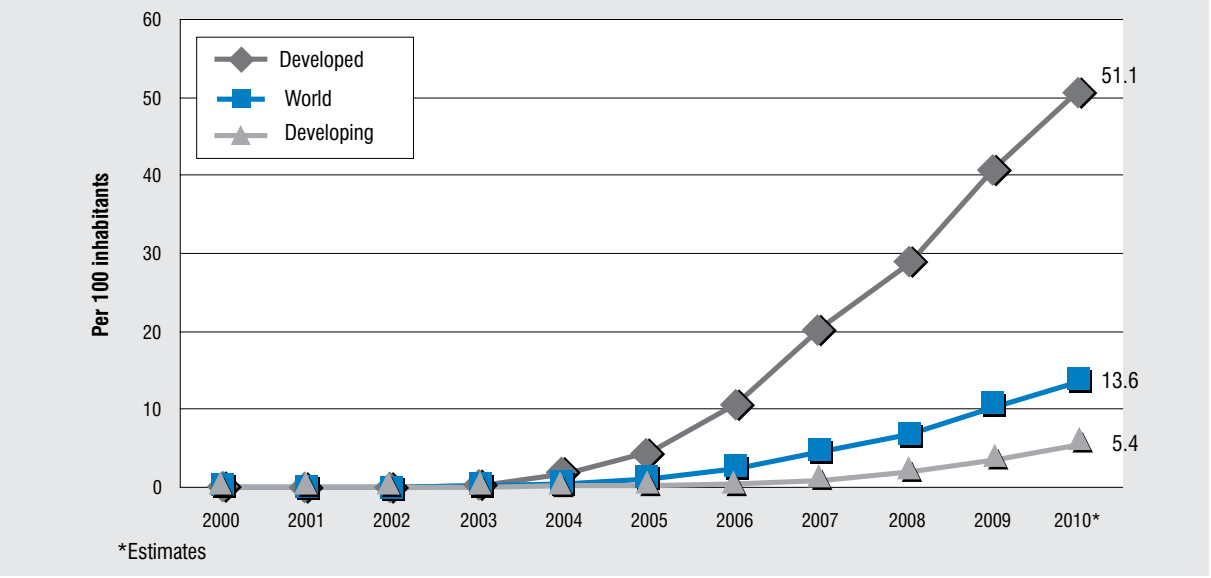
Figures 11 and 12 below illustrate the growth of fixed and mobile broadband access globally and in developed and developing countries since 2000, defined by a threshold download speed of 256kbps.[64] The number of fixed broadband lines worldwide has slightly more than doubled between 2005 and 2010, from 261 million to an estimated 555 million. The number of mobile broadband lines, meanwhile, has increased almost twelvefold, from 73 million in 2005 to an estimated 940 million in 2010.

FIGURE 11: FIXED BROADBAND SUBSCRIPTIONS, 2000-2010



Source: ITU, World Telecommunications Indicators Database
http://www.itu.int/ITU-D/ict/statistics/index.html

FIGURE 12: MOBILE BROABAND SUBSCRIPTIONS, 2000-2010



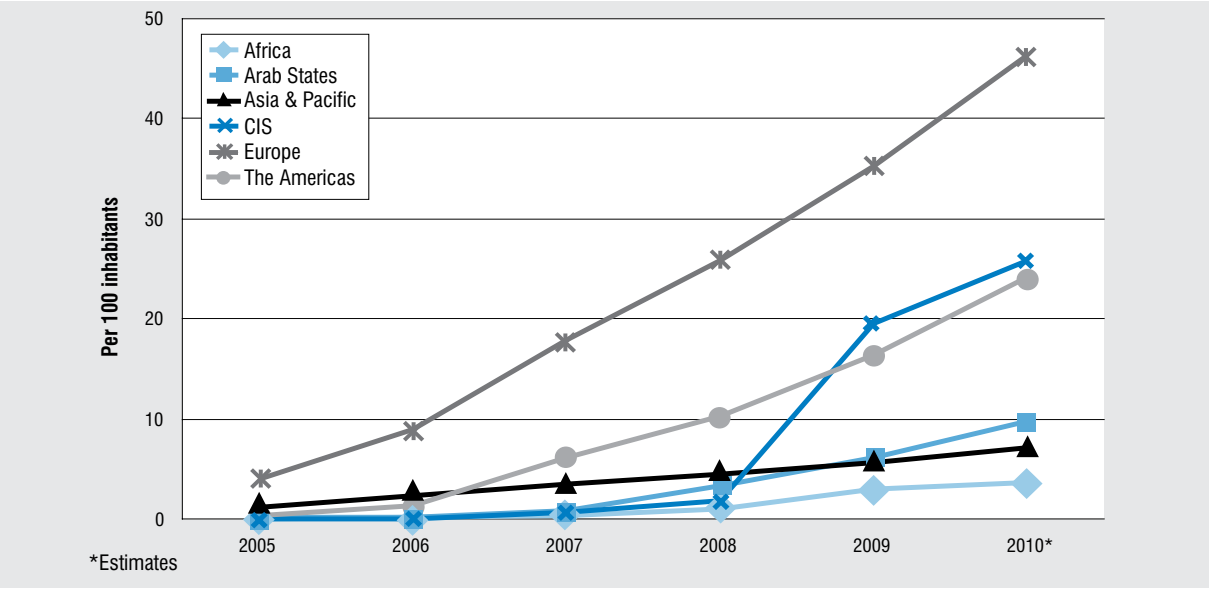
Source: ITU, World Telecommunications Indicators Database
http://www.itu.int/ITU-D/ict/statistics/index.html

Figures 11 and 12 show clearly that:

- Mobile has now exceeded fixed as the principal mode of broadband access worldwide. Almost the entire growth of mobile broadband has taken place since 2005.
- The gap between developed and developing countries in broadband access is increasing.

The preponderance of mobile over fixed broadband is evident in all world regions, but there are substantial gaps in access levels on different continents. In Africa, the ITU estimates that the number of fixed broadband lines remained below 2 million in 2010 (a subscription density of 0.2 per cent) while the number of mobile broadband lines reached a figure of only 29 million (a subscription density of 3.6 per cent). Figure 13 illustrates the disparity in mobile broadband access at a continental level, though it should be noted that the figures for some LDCs will be much lower.

FIGURE 13: MOBILE BROADBAND ACCESS BY CONTINENT, 2005-2010



Source: ITU, World Telecommunications Indicators Database
http://www.itu.int/ITU-D/ict/statistics/index.html

While the digital divide in basic voice telephony has shrunk since 2005, there has therefore been a growing digital divide in broadband access. Given the importance attached to broadband in current thinking about ICT4D, this represents a major challenge for WSIS implementation, which is discussed in Chapter 6.

Broadcasting networks and access

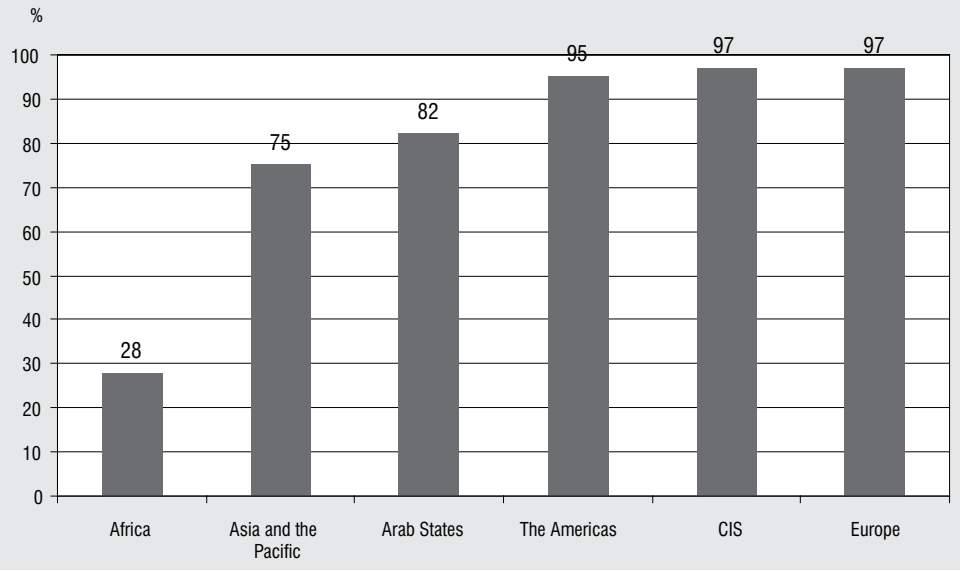
Although the primary focus of WSIS was on "new" ICTs—computing, modern telecommunications and the Internet—it recognised that their development took place alongside established media, including broadcast radio and television. Before the recent spread of mobile telephony, radio and television were the most widespread ICTs available, with broadcast radio often the only form of electronic communications in rural areas of developing countries. Digitalisation has recently led to substantial convergence between broadcasting, telecommunications and the Internet, in terms not just of networks but also of the structure of communications businesses and regulation, as well as of the devices which consumers use to access them. Mobile phones, for example, are increasingly used as radio receivers, and the industry has high hopes for mobile TV. Computers are now commonly used for timeshift viewing of TV programmes in some countries. Many people now access news and entertainment online, either alongside or in place of print media or broadcast programmes.

Statistics for radio and television ownership are more difficult to obtain than those for telecommunications because they do not depend on subscriptions in the same way as telecommunications services. Measurement of the coverage of television is also complicated by the availability of satellite networks, which provide wide-ranging territorial coverage but generally require subscriptions. However, even terrestrial network coverage includes the large majority of people—estimated in 2002 at 95 per cent of world population for radio signals and 89 per cent for television signals.[65]

Network coverage, however, is not the same as access, which also requires the availability of affordable terminal devices and is influenced by the availability of content which is sufficiently attractive to encourage listeners and viewers. According to the *WTDR* in 2010, in the majority of countries more than 75 per cent of households have access to a radio, though the proportion falls below 50 per cent in some countries. Access to television is more variable, and is constrained by the limited availability of power infrastructure as well as by the range of broadcast signals. Worldwide, the proportion of households with a television is estimated to have risen from 73 per cent in 2002 to 79 per cent in 2009. Figure 14 shows significant continental variation in this latter figure, however, with household access to television in Africa still well below the rest of the world and below that continent's household radio access.

There may be an element of trade-off between radio and television, with growing access to the latter

FIGURE 14: HOUSEHOLD ACCESS TO TELEVISION BY REGION, 2009 ESTIMATES



Source: ITU (2010) World Telecommunication/ICT Development Report

sometimes diminishing use of the former, depending on the type and quality of content that is available. In some developing countries, the number of households with access to a radio receiver appears to be falling, but this may be affected by the use of alternative listening devices such as mobile phones.

The availability of computers

As with radios and televisions, computer ownership is not based on subscriptions and does not require registration. This alone makes it difficult to establish reliable figures for computer ownership in any society. That difficulty is compounded by the high levels of use of computers in Government and business, by the short lifecycle of computer terminals and by the fact that their disposal is unrecorded. Even if it is possible to count the number of computers imported or purchased in a country, it is not possible to know when they fall out of use. Furthermore, computer ownership is far from being equivalent to computer use: many people who do not own computers make use of them, for personal as well as professional purposes, in schools and colleges, workplaces and cybercafés. Regular household surveys are the best way to secure reliable data on computer ownership and use, but they are not often undertaken in developing countries.[66]

It is clear, however, that computer ownership and use are becoming more widespread in almost all countries. Household ownership of computers has now become the norm in developed countries, while ownership of laptops, netbooks and tablet computers may have begun to personalise computer ownership in much the way that mobile handsets have personalised telephony. In developing countries, household computer ownership is much less common but is growing, as is the use of computers in cybercafés, telecentres, workplaces and educational institutions. Research cited by the Global eSustainability Initiative estimates that the proportion of people owning a computer worldwide will rise from one in 50 to one in 3 between 2008 and 2020. It anticipates that the nature of PC ownership will also change markedly, from 84 per cent desktop to 74 per cent laptop predominance during the same period.[67] If correct, such growth rates will have a marked effect on the range of communications options available to people in low-income countries.

SECTION 3—THE CHANGING DIGITAL DIVIDE

This section briefly summarises the conclusions that can be drawn from the data presented in this chapter concerning the progress which has been made towards bridging digital divides and advancing the Information Society.

- The divide in access to radio and television is narrowing, with significant growth in television usage in developing countries as TV signals become more widely available and TV devices more affordable. Africa still lags behind other continents in this regard.

- There has been a dramatic reduction in the divide in access to basic voice telephony, as a result of very rapid growth in mobile telephone coverage, ownership and use. For the first time in history, during 2005 to 2010, the majority of people in the majority of communities have been able to make use of telephony, and so to communicate interactively at a distance. Mobile phones can also be used for a variety of other communications purposes, include SMS texting, the sharing of images and audio files, and an increasing range of more complex services including Internet.
- There has been no comparable shift in the digital divide where fixed telecommunications are concerned. In practice, the use of telephony in all countries has moved away from fixed phones towards mobile phones, while in low-income developing countries mobile subscriptions now make up well over 90 per cent of all phone lines. Fixed line subscription density is falling worldwide.
- The international digital divide in computer and Internet access, measured in terms of the numbers of people making use of computers and the Internet, has fallen from 2005 to 2010. However, during this period, the majority of Internet users in industrial countries have migrated to faster and more user-friendly broadband access, while most developing country subscribers have not yet been able to upgrade their access in the same way. This is exemplified by a growing divide in broadband access.
- As a result, the digital divide is changing character, from one based on whether access is available to one based on the quality of access that users can obtain and the value which they can derive from it. Some commentators have expressed concern that reliance on mobile networks in developing countries may inhibit access to high-quality Internet, while others are confident that mobile networks will be able to meet demand in terms of both volume and quality. The recent development and high rates of adoption of mobile Internet and mobile broadband have reinvigorated debate around this issue, which is discussed further in Chapter 6.

SECTION 4—MEASURING THE COMMUNICATIONS LANDSCAPE

Data on connectivity and access, therefore, suggest that there has been considerable progress in the infrastructural underpinnings of the Information Society since the Tunis summit in 2005, and that this progress is continuing. However, this is only part of the picture where WSIS outcomes are concerned.

- Firstly, "big picture" figures for connectivity and access, of the kind described above, do not have the granularity needed to enable us to understand what is happening to people in the very different communities in which they live.
- Secondly, as WSIS made clear, the Information Society is not something that is brought about by connectivity alone, but through the application of that connectivity by Governments, businesses and citizens, and through the interaction of ICTs with other resources and in other policy domains.

Attempts to enable more focused measurement and analysis of progress towards the Information Society were included in WSIS follow-up processes through the WSIS targets and action lines, which are discussed in Chapters 3 and 4 below. In addition to these, two post-WSIS initiatives have sought to build a more holistic framework for understanding WSIS outcomes by bringing together indicators of connectivity and aspects of the communications landscape. These are the ICT Development Index developed by the ITU, and the work of the Partnership on Measuring ICT for Development.

The ICT Development Index

A number of indices have been developed, during and since WSIS, in an attempt to measure progress towards the Information Society as a whole. These have been built on the experience and lessons learned from the weaknesses of earlier attempts to measure what was often called "e-readiness." Two measures emerged around the time of the second WSIS summit—an ICT Opportunity Index and a Digital Opportunity Index—but it became clear that a single measure would be more effective in enabling comparisons between countries and over time, so allowing an overall picture of progress towards the Information Society to be achieved.

The ITU made an important contribution to understanding of ICT trends in 2009 by merging earlier indices and establishing a new ICT Development Index (IDI). This is a composite index which is made up of three dimensions of the ICT environment: access, usage and the skills required to make effective use of them. These are measured through the following eleven indicators:

TABLE 3: ICT DEVELOPMENT INDEX INDICATORS

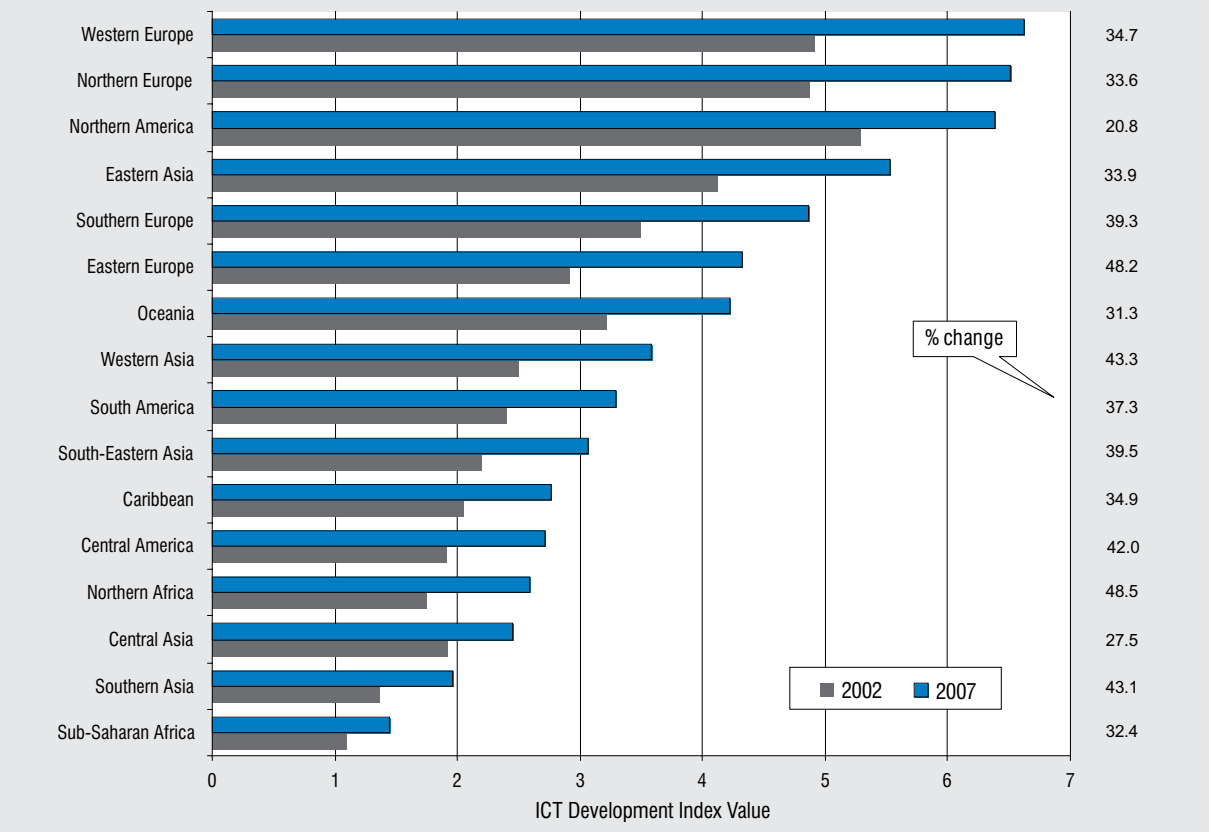
ICT access	ICT use	ICT skills
• Fixed phone lines per 100 inhabitants	• Internet users per 100 inhabitants	• Adult literacy rate
• Mobile phone subscriptions per 100 inhabitants	• Fixed broadband Internet subscribers per 100 inhabitants	• Secondary education gross enrolment ratio
• International Internet bandwidth per Internet user	• Mobile broadband Internet subscribers per 100 inhabitants	• Tertiary education gross enrolment ratio
• Proportion of households with a computer		
• Proportion of households with Internet access at home		

Source: ITU (2009) Measuring the Information Society: the ICT Development Index

The ICT Development Index can be used to benchmark and assess changes in ICT performance between countries and over time. As with other measures, the indicators within the index may need to change over time as the nature and reach of different ICTs evolves, but for the present they provide a more systematic and more comprehensive framework for assessing progress on the WSIS outcomes than alternatives. IDI scores can even be seen as proxies for progress towards the Information Society itself.

When the ITU published the Index in 2009, it drew comparisons between the latest date for which it had consistently reliable data (2007) and a point five years previously (2002). This is not the same timescale as that required for the review of WSIS outcomes, but it nevertheless provides some useful benchmarks against which other data now available can be compared. The overall outcomes of the ICT Development Index at that time, at a sub-regional level, are set out in Figure 15.

FIGURE 15: ICT DEVELOPMENT INDEX BY GEOGRAPHICAL SUBREGION, 2002-2007

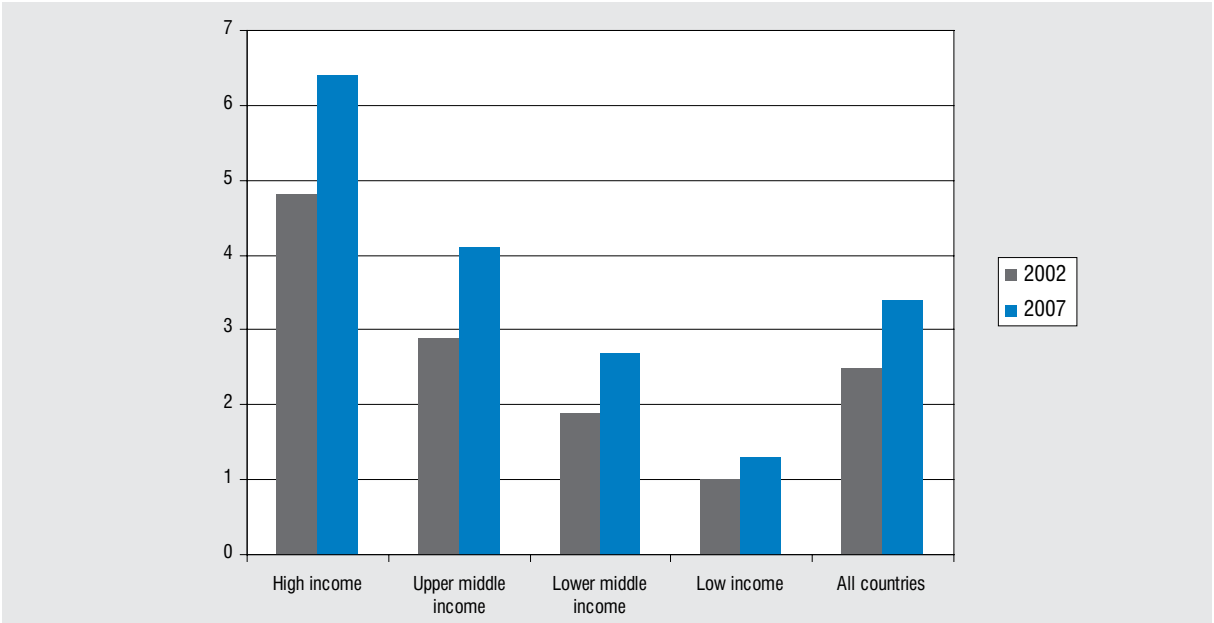


Source: ITU, Measuring the Information Society—the ICT Development Index, 2009

These show that developed countries in Europe, North America and East Asia had a strong advantage over developing countries in other regions in 2007. They also show that all geographical regions saw a significant improvement in their IDI scores—and thus also progress towards the Information Society—over the period from 2002 to 2007, but that the advantage of developed countries over developing countries increased during that period, especially that between Europe and East Asia, on the one hand, and Africa and South Asia on the other. If the data in this diagram are broken down into the three components of the index, it is clear that the pattern for ICT access and use indicators closely follows that for the index as a whole, but that there are notable differences between sub-regions where ICT skills are concerned.

Averaged IDI ratings for country groupings by income-level are set out in Figure 16. The change in these levels between 2002 and 2007 was significantly lower in the low-income category than in other categories.

FIGURE 16: IDI AVERAGES BY COUNTRY INCOME-LEVEL GROUPING, 2002-2007



Source: derived from ITU (2009) Measuring the Information Society—the ICT Development Index, p. 46

The Partnership on Measuring ICT for Development

The Partnership on Measuring ICT for Development was launched in 2004 in order to address the challenges of data collection on ICTs.[68] Its central achievement has been the establishment of a core set of ICT indicators which can be collected as part of the data-gathering processes of national statistical offices (NSOs). The development of these core indicators began at a WSIS Thematic Meeting on Measuring the Information Society in February 2005, continued in consultation with NSOs, and led to the publication of an initial list of indicators in 2007. The development of indicators is a continuous process, however, given the rapid continuing change in technology, access and use. The initial list was therefore revised and supplemented in 2009, and will continue to evolve with changing circumstances and data needs, notably the spread of broadband networks and mobile applications.

The current list includes 50 indicators, distributed across the following categories:

- ICT infrastructure and access;
- ICT access and use by households and individuals;
- ICT access and use by enterprises;
- ICT sector and trade in ICT goods; and
- ICT in education.

Another eight indicators will be added in 2011. In May 2010, the Partnership established a task group, led by the ITU, to consider indicators that will help to measure WSIS outcomes, building on work in the 2010 *World Telecommunication/ICT Development Report* (WTDR)

which is discussed in Chapter 3. A work group on the impact of ICTs is currently led by the OECD, while a work group on indicators for e-government is being coordinated by DESA with two UN Regional Commissions (ECA and ECLAC).

The Partnership's work has done much to address a critical gap in the resources available to ICT policymakers. Partnership agencies are working with NSOs to improve their capabilities, and UNCTAD and the ITU have both published manuals to assist them in data collection and management.[69] However, as the Partnership acknowledges, more needs to be done. Rapidly changing data sets need more frequent updating. More attention needs to be paid to the use of ICTs, as well as their availability—something that can best be achieved through household surveys rather than aggregate data. Internationally comparable data with this level of granularity are expensive and need regular repetition. In Africa, for example, the only available wide-ranging international household survey of ICT use by households and SMEs, which was conducted in 2007, is now too old to have much bearing on current policy challenges.[70] The Partnership summarised these ongoing data collection challenges as follows in its consultation response for this report:

> "More work is also needed to measure ICT impact in order to help assess and set priorities for ICT policies. ICTs are powerful tools to enhance productivity and growth when combined with complementary assets, such as R&D and ICT skills, but the measurement of their impact in developing countries is just beginning. Better statistics—micro-data and indicators of ICT use—are needed to analyze correctly the impact of ICTs, including the spillover effects into non-ICT economic sectors and how ICTs help accelerate the diffusion of knowledge."[71]

Indeed, the nature of the indicators that are most relevant to measuring WSIS outcomes changes over time. As the Partnership puts it: "The nature of ICTs themselves is dynamic, and indicators and definitions should be adapted as technology progresses, such as broadband speeds or mobile applications and capabilities."[72] These challenges are relevant not just for the "big picture" data discussed in this section, but also for the more detailed assessment of WSIS targets which is discussed in Chapter 3.

NOTES

[38] Partnership on Measuring ICT for Development response to consultation. Available from http://www.unctad.info/upload/WSIS5/Contributions/UNGIS/Partnership on_Measuring_ICT_for_Development.pdf.

[39] Gillwald & Stork (2008) *Towards Evidence-Based ICT Policy and Regulation: ICT Access and Usage in Africa*, Research ICT Africa.

[40] Gordon Moore (1965) "Cramming more components onto integrated circuits," *Electronics Magazine* 19 April.

[41] See, for example, UNCTAD, *Information Economy Report 2010*, chapter 5.

[42] www.itu.int/ITU-D/ict/publications/world/world.html.

[43] www.internetworldstats.com.

[44] See Task Force on Financial Mechanisms for ICT for Development *The Report of the Task Force on Financial Mechanisms for ICT for Development*, December 22, 2004. Available from http://www.itu.int/wsis/tffm/final-report.pdf.

[45] OECD (2009) *African Economic Outlook*.

[46] See GSM World, "Mobile Operators Plan $50 Billion Investment to Blanket Africa With Telecoms and Internet Access," press release, 29 October 2007. Available from http://www.gsmworld.com/newsroom/press-releases/2078.htm.

[47] See Euroinvestor.co.uk, "World Telecom Equipment Market 259 Billion Euro in 2009 and an Expected 303 Billion in 2013," 30 June 2010. Available from http://www.euroinvestor.co.uk/news/story.aspx?id=11154367&bw=20100630005814.

[48] See, for example, ITU *Confronting the Crisis: ITS Impact on the ICT Industry*, February 2009. Available from http://www.itu.int/osg/csd/emerging_trends/crisis/18.html; C. Qiang, (2009) "Broadband Infrastructure Investment in Stimulus Packages," World Bank. Available from http://siteresources.worldbank.org/EXTINFORMATIONANDCOMMUNICATIONANDTECHNOLOGIES/Resources/282822-1208273252769/Broadband_Investment_in_Stimulus_Packages.pdf; The Daily Star, "S Asian telecom defies recession," 21 October 2009. Available from http://www.thedailystar.net/newDesign/news-details.php?nid=110599; The Economic Times, "Africa telecom investment to exceed $70 bln by '12," 1 February 2010. Available at http://economictimes.indiatimes.com/news/international-business/africa-telecom-investment-to-exceed-70-bln-by-12/articleshow/5523756.cms.

[49] See map at http://manypossibilities.net/african-undersea-cables/.

[50] Hamilton Research - Africa Bandwidth Maps (2011) Submarine Cables Reach 4.4% of Africa's Population, Terrestrial Fibre Networks Reach 31%." Available from http://www.africabandwidthmaps.com/?p=1735.

[51] unused fibre optic cable, laid in advance of need or on a speculative basis.

[52] See, for example, Rohan Samarajiva, "Leveraging the Budget Telecom Network Business Model to Bring Broadband to the People," http://itidjournal.org/itid/article/viewPDFInterstitial/630/270.

[53] ITU, Key Global Telecom Indicators for the World Telecommunication Service Sector. Available at http://www.itu.int/ITU-D/ict/statistics/at_glance/KeyTelecom.html.

[54] See, for example, *Report of the Secretary-General on Progress made in the implementation of and follow-up to the outcomes of the World Summit on the Information Society at the regional and international levels* (A/63/72–E/2008/48). Available from http://www.unctad.org/en/docs/a63d72_en.pdf.

[55] ITU (2010) *World Telecommunication/ICT Development Report*, p. 13.

[56] Data from ITU, *World Telecommuniction/ICT Indictors Database.*

[57] These issues are discussed in the ITU (2010) *World Telecommunication/ICT Development Report*, p. 195.

[58] Over 30% of the population of Kenya in 2006 was aged nine or under. See http://www.kenya-information-guide.com/kenya-population.html.

[59] ITU, Key Global Telecom Indicators for the World Telecommunication Service Sector. Available from http://www.itu.int/ITU-D/ict/statistics/at_glance/KeyTelecom.html.

[60] For data sources, see http://www.internetworldstats.com/surfing.htm.

[61] For data sources see http://www.internetworldstats.com/europe.htm and http://www.internetworldstats.com/africa.htm.

[62] Jesse Alpert & Nissan Hajaj, "We knew the web was big... ", *Official Google Blog*, 25 July 2008. Available from http://googleblog.blogspot.com/2008/07/we-knew-web-was-big.html.

[63] worldwidewebsize.com.

[64] See also ITU (2010) *Definitions of World Telecommunication/ICT Indicators*. Available from http://www.itu.int/ITU-D/ict/handbook.html.

[65] ITU (2010) *World Telecommunication/ICT Development Report*, p. 157.

[66] Very limited data only are available for LDCS on the ITU *World Telecommunications/ICT Indicators Database.*

[67] The Climate Group for GeSI, *SMART 2020*. Available from http://www.smart2020.org/publications/, pp 7-19. Sources cited include data from Shiffler, G III. (2007), Forecast: PC Installed Base Worldwide, 2003-2011, Gartner.

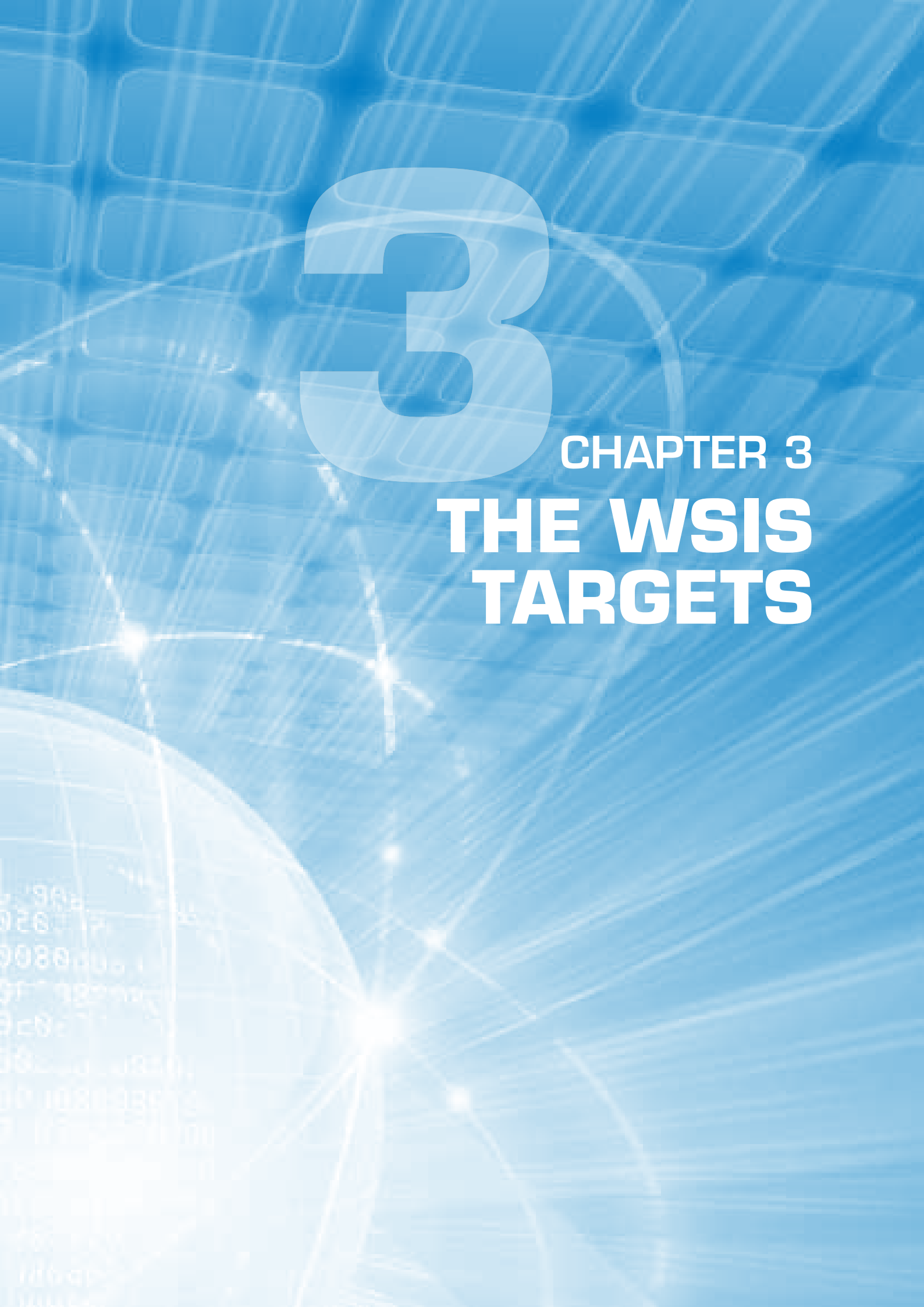
[68] Its work is reported at http://www.itu.int/ITU-D/ict/partnership/.

[69] UNCTAD (2009) *Manual for the Production of Statistics on the Information Economy*. Available from http://www.unctad.org/en/docs/sdteecb20072rev1_en.pdf. ITU, *Manual for Measuring ICT Access and Use by Households and Individuals,* 2009 edn.. Available from http://www.itu.int/ITU-D/ict/publications/hhmanual/2009/material/HHManual2009.pdf.

[70] Research ICT Africa, *ICT Access and Usage in Africa*. Available from http://www.researchictafrica.net/publications/Towards_Evidence-based_ICT_Policy_and_Regulation_-_Volume_1/RIA%20Policy%20Paper%20Vol%201%20Paper%202%20-%20ICT%20Access%20and%20Usage%20in%20Africa%202008.pdf.

[71] Partnership on Measuring ICT for Development response to consultation. Available from http://www.unctad.info/upload/WSIS5/Contributions/UNGIS/Partnership_on_Measuring_ICT_for_Development.pdf.

[72] *Ibid.*



CHAPTER 3
THE WSIS TARGETS

In recent decades, the international community has set several series of goals and targets for the achievement of developmental outcomes. The most prominent of these have been the Millennium Development Goals (MDGs), which were agreed by the UN General Assembly in 2000 and set targets for reductions in poverty and improvements in basic outcomes by 2015 in several core development areas, such as education, health, food security, gender equity and environmental sustainability.[73] Each of the eight MDGs was associated with one or more specific targets which represented critically important advances for development and poverty reduction in its development sector, but could also act as proxy indicators for improvements in general in that sector. These targets/indicators were designed to be measured at both national and international levels; for example, the target for Goal 4 is "to reduce by two thirds, between 1990 and 2015, the under-five mortality rate." Other internationally agreed development goals include those concerned with Education For All, most recently established in 2000.[74]

The eighth of the Millennium Development Goals is concerned with establishing "a global partnership for development" and its final target (target 18) calls on Governments and international agencies, in cooperation with the private sector, to "make available benefits of new technologies, especially information and communications." This target does not include any quantifiably measurable indicator.

The WSIS targets were intended to supplement the MDGs and other internationally agreed development goals. They are described in the *Geneva Plan of Action* as "indicative targets [which] may serve as global references for improving connectivity and access in the use of ICTs …, to be achieved by 2015."[75] As well as having global application, they were intended to "be taken into account in the establishment of … national targets, considering the different national circumstances." Much of the discussion around them has concerned ways in which it is hoped that they will also help to achieve the MDGs.

The ITU's *World Telecommunication/ICT Development Report* (*WTDR*) *2010* looks in detail at *Monitoring the WSIS Targets* and the current status of progress towards achieving them. It describes "the ultimate goal of the targets" as being "to connect the citizens of the world, and the institutions and facilities which serve them, so as to provide the communications infrastructure to deliver online the tools and services of the information age."[76]

The 10 WSIS targets are as follows:[77]

A. to connect villages with ICTs and establish community access points;

B. to connect universities, colleges, secondary schools and primary schools with ICTs;

C. to connect scientific and research centres with ICTs;

D. to connect public libraries, cultural centres, museums, post offices and archives with ICTs;

E. to connect health centres and hospitals with ICTs;

F. to connect all local and central government departments and establish websites and email addresses;

G. to adapt all primary and secondary school curricula to meet the challenges of the Information Society, taking into account national circumstances;

H. to ensure that all of the world's population have access to television and radio services;

I. to encourage the development of content and to put in place technical conditions in order to facilitate the presence and use of all world languages on the Internet; and

J. to ensure that more than half the world's inhabitants have access to ICTs within their reach.

These can be divided into three categories, as follows:

- Category 1 includes two targets which are concerned with basic access to ICTs (targets H and J).
- Category 2 includes six targets which address the connectivity of particular localities and services (targets A to F).
- Category 3 includes two targets which address aspects of usage, specifically capabilities and content (targets G and I).

Assessing progress towards these targets has proved difficult for two main reasons.

Firstly, the targets themselves are not "precise." It is not clear, for example, what level of connectivity is implied by the word "connect"; what specific "ICTs" are referred to in targets B, C, D, E and J; or what is meant by the term "within their reach" in target J.

Secondly, most of the WSIS targets do not have explicit indicators or benchmarks against which progress can be measured.[78] Even where indicators can be suggested for the targets, it is difficult to obtain accurate and up-to-date statistics, especially in developing countries, because these are not routinely collected by national

statistical offices. The development of ICTs which the targets seek to measure is a recent phenomenon, and the need for statistics on them was not necessarily perceived in the past. Developing country statistical offices are often under-resourced and find it difficult to add new indicators to those which are already collected. There are therefore few benchmarks which enable today's status to be compared with that in 2003 or 2005, when the WSIS targets were agreed, let alone with previous periods.

These problems are compounded by the rapid pace of change in technology and markets, whose implications are discussed in Chapter 2. Those statistics which are available from NSOs and other sources are often one or two years out of date, reflecting yesterday's rather than today's reality. The changing nature of ICTs means that people's expectations—and Governments' aspirations—regarding the range and quality of ICTs that they should be able to access and use—are also changing. As the *WTDR 2010* notes:

> "While the most basic connection could be a telephone connection, in today's world Internet—and preferably broadband—is often viewed as the most important type of connection worldwide, in particular with reference to the Information Society."[79]

This means that it is possible to interpret the targets in two different ways, one looking backwards from 2010 to 2005, the other looking forwards from 2010 to 2015. If the aim is to measure how far things have changed from the expectations that were held at the time of WSIS, then progress on the targets should be measured against the level of availability and expectations that were current at that time. Alternatively, thanks to the ambiguity of terms such as "connectivity," they can be seen as moving targets, to be reinterpreted in the light of changed technologies and market circumstances. Both of these approaches have value in assessing implementation of WSIS outcomes.

The ITU and other UN agencies within the Partnership on Measuring ICT for Development systematically reviewed progress on the WSIS targets from both of these perspectives during 2010, approaching the halfway point between the Tunis summit and the comprehensive review scheduled for 2015. Although hampered by the limited availability and quality of data, their conclusions, set out in the *WTDR 2010*, are by far the most authoritative assessment available at present. The following paragraphs summarise their findings within the three broad categories identified above, supplementing these where appropriate from other sources.

The *WTDR 2010* also proposes some revisions to the existing targets and suggests a set of more specific indicators that can be used to measure progress. These proposed indicators are more consistent with those used to measure progress on the MDGs. They are listed in Table 5 at the end of this chapter.

SECTION 1—BASIC ACCESS TARGETS

Target H: television and radio services

Broadcasting services differ from telecommunications and the internet in several important respects. Radio and television, like newspapers, are media in which specific content is provided to a wide and undifferentiated audience, usually without interactivity. Telecommunications, by contrast, is an interactive medium, which enables the exchange of information between people on an equal basis. The Internet has combined elements of both these modes of communication, enabling both relatively static content (most websites) and interactive content (some websites, email, social networking).

Broadcasting continues to play an important part in the evolving communications environment. Rather than being displaced by telecommunications and the Internet, as some have thought might happen, it has adapted, offering more diversity, new forms of content and new modes of access such as multi-channel cable and satellite television channels and local and community radio stations. Broadcasters have made increasing use of the Internet to add value to their output, such as the inclusion of online input in live broadcasts and the introduction of websites linked to particular programmes. Convergence has also enabled listeners and viewers to access broadcasting content through non-traditional devices, including computers and mobile phones. A transition is underway around the world from analogue to digital broadcasting, which enables further diversity of content and greater interactivity than has previously been possible.

The development of radio and television coverage and household access have been discussed in Chapter 2. While the evidence reported in the *WTDR 2010* indicates that the overall target for access to broadcast services of some kind has been largely met, particularly where radio is concerned, there is still a significant way to go in enabling effective access to television in Africa.[80] This is partly a matter of network coverage and affordability, but also reflects the limited availability of electrical power networks on the continent. Efforts to achieve the WSIS target by ensuring coverage to all citizens worldwide need to address these complementary infrastructure issues as well as those which concern the availability of broadcast signals. The quality of the material which is available through broadcasting is also an important driver of usage, and is related to other objectives included in the WSIS outcome documents, such as freedom of expression, plurality and diversity of media ownership, and the development of local and linguistically diverse content.

Target J: access to ICTs

Target J, as the ITU observes, "goes to the heart of all the WSIS targets, since the success of creating an Information Society depends primarily on whether people have access to ICTs."[81] The target that "more than half the world's inhabitants" should have access to ICTs "within their reach" is difficult to measure, because it is imprecise. It is not clear what those who drafted and agreed this text had in mind by either "ICTs" or by people having "access … within their reach," and both terms are susceptible to change over time as technology and markets have evolved. Furthermore, while essential, connectivity is insufficient on its own to measure access of the kind that might constitute progress towards an Information Society.

Core statistics for the growth of network coverage of ICTs and for the use of different access modes have been discussed in Chapter 2. The most impressive achievement from 2005 to 2010 has been the growth of mobile telephone coverage and usage, which has greatly exceeded expectations at the time of WSIS. As noted in that chapter, mobile network coverage stood at more than 85 per cent of world population by 2010, and it seems likely that coverage will reach almost everyone in the world by 2015. The number of mobile cellular subscriptions worldwide had reached the equivalent of 75 per cent of the world's population by 2010, compared with 20 per cent when this connectivity target was set at the Geneva summit in 2003. Even allowing for the statistical difficulties in using subscription data which are described in Chapter 2, these figures suggest that usage of telephony, let alone access, already exceeds half the world's population (and easily exceeds half the world's adult population). Most countries that have not achieved the target for usage already are likely to do so before 2015.

As well as an achievement, this represents an opportunity to develop and reinterpret the target in order to look forward to 2015 rather than back towards 2005—to set a new target, in other words, which builds on the achievement of the old. The ITU has therefore proposed two major changes to the text of this target, so that it would henceforth read: "To ensure that more than half the world's inhabitants have access to ICTs, in particular broadband Internet, within their reach and make use of them."[82]

Broadband access is now prevalent in many developed countries. The Broadband Forum has estimated that half of all fixed lines worldwide were broadband by mid-2010, though hardly any of these were in LDCs, which lack extensive fixed line networks.[83] Mobile broadband is growing rapidly in developed countries, and is already more prevalent than fixed broadband, although at much lower levels, in developing countries too. The consultancy Ovum estimates that the total number of broadband users will reach 3.6 billion by 2015, which is almost exactly 50 per cent of anticipated world population by that year.[84] As a result, a 50 per cent broadband target would be achievable globally, though it is less likely to be reached in individual lower-income countries by 2015 than that for Internet usage.

Two further suggestions could be made in this context:

- The target could be formulated in terms of household rather than individual access and usage. According to the *WTDR 2010*, some 25 per cent of households globally had Internet access at home by the end of 2008, with figures as high as 60 per cent in developed countries but only 12 per cent in developing countries.[85]
- ITU data suggest that Internet use by women is lower in most countries than that by men.[86] Raising access and usage levels above 50 per cent—globally and in individual countries—for women as well as men would be more inclusive, and more challenging than a target for the population as a whole.

SECTION 2—TARGETS FOR LOCALITIES AND PUBLIC SERVICES

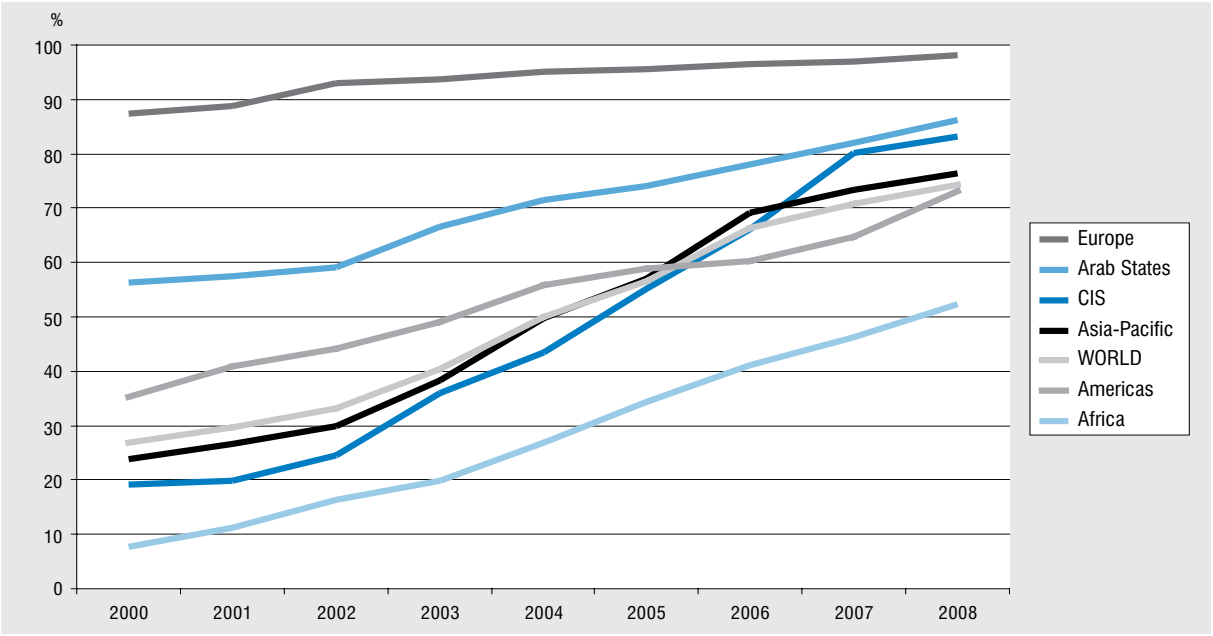
Target A: connecting villages

Target A has two elements. It is concerned firstly with village-level connectivity, and secondly with community access points in villages.

ICTs have historically been more available in urban than in rural areas for two main reasons. First, significant proportions of urban populations tend to have higher disposable income; and second, it is cheaper to deploy networks and secure returns on investment in areas with high population densities. Lack of availability of electrical power has also proved a problem in many countries. Rural communities in low-income countries have therefore not usually been connected to fixed networks. However, the economics of mobile wireless networks have made it commercially viable to connect such rural communities, and their connectivity has therefore grown.

The first part of target A, concerned with village-level connectivity, is difficult to measure because there is no internationally agreed definition of the term "village," and because few countries' NSOs collect data in a way that makes it easy to assess connectivity at village level. The ITU has therefore chosen to use rural connectivity as a proxy for village connectivity. It found that, by the end of 2008, 74 per cent of the rural population worldwide lived in areas covered by a mobile signal, with figures of 73 per cent or more in all regions other than sub-Saharan Africa, where only 52 per cent of the rural population had coverage. Although unsatisfactory, even this figure is a substantial improvement over the time when the target was established in 2003, when the continent had coverage for only 20 per cent of its rural population. Figure 17 illustrates the trend identified in rural coverage of mobile signals between 2000 and 2008.

FIGURE 17: RURAL POPULATION COVERED BY A MOBILE SIGNAL, BY REGION, 2000-2008

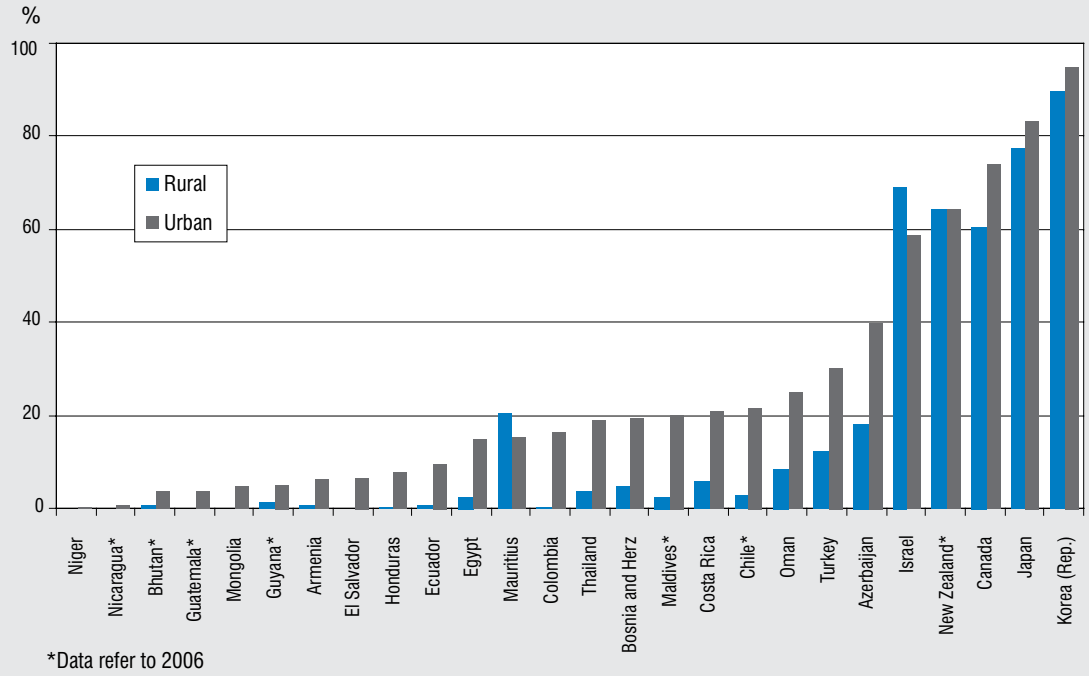


Source: ITU, World Telecommunication/ICT Development Report, 2010, p.14

On this trend, the ITU believes that "almost all regions will achieve mobile phone coverage of rural populations before 2015," the only significant exception being Africa, although there too coverage could exceed 90 per cent by 2015. "Complete mobile coverage of all rural areas around the world by 2015, or even earlier," according to the ITU, "would appear achievable with the right policy emphasis," effectively fulfilling the first part of target A. The *WTDR 2010* suggests, therefore, that this target should be amended so that it explicitly requires the availability of access in "all" villages.[87]

Measurement of the target could also be extended to include measurement of the adoption of ICTs as well as the availability of networks, and to include Internet and broadband as well as basic voice connectivity. Even where Internet and broadband are available in urban areas of a country, as Figure 18 shows, they may not extend far into rural hinterlands, especially in countries which do not have extensive fixed local access networks.

FIGURE 18: PROPORTION OF RURAL HOUSEHOLDS WITH INTERNET ACCESS, 2007/8: SELECTED COUNTRIES



Source: ITU, World Telecommunication/ICT Development Report, 2010, p.18

While these data, which are from 2007–8, antedate the recent growth in mobile Internet, it is unlikely that this has yet had much impact in rural areas, though it is likely to do so during the next five years, before the comprehensive review of WSIS outcomes scheduled in 2015.

As well as village connectivity to networks, target A is also concerned with the availability of community access points in village communities. This is of particular importance in developing countries where levels of Internet and broadband access at household level are generally very low. For village communities with limited personal access, at least for the present and near future, community access points will be important in enabling access, especially to the Internet.

Public and community access points to telecommunications take a number of different forms, from the streetside resale of voice telephony by micro-entrepreneurs, through commercial cybercafés and public service telecentres, to large-scale multipurpose community centres which have been established with Government, donor or international agency support. As target D suggests, community access can also be provided through facilities such as "public libraries, cultural centres, museums [and] post offices," as well as explicitly telecommunications facilities. Government offices whose primary purpose is to enable citizens to access mediated services—such as birth and death certificates, land registration and financial grants—may also offer access.[88]

Although public access facilities are available in almost all countries, hardly any Governments collect or publish data which would allow change in the numbers of access points, the facilities that they provide, or the number of their users to be measured. Such facilities are highly visible in urban areas of developing countries, but the extent of their presence in rural areas, particularly at village level, and of its growth since 2005, is hard to measure. The extent to which commercial cybercafes are available in any particular location also affects the requirement for and viability of public telecentre facilities, and so figures on the availability of public facilities may not necessarily reflect the availability of public access. Wireless Internet access in restaurants and other commercial enterprises also affects this in countries with higher levels of laptop and netbook ownership.

While it is hard to measure the current availability of community access points, it is even more difficult to predict their development from 2011 to 2015, because of the growth in the use of mobile phones and in their capabilities as Internet access devices. Wireless networks may provide the means for cybercafés and telecentres in rural areas to upgrade their services, offering higher speeds to users than they do at

present. At the same time, growing ownership of Internet-enabled mobile phones is likely to reduce patronage of cybercafés by phone users. It may be that a distinction is emerging in usage patterns for Internet use, with mobile phones being preferred for routine browsing and social networking, while cybercafés continue to be used for tasks that require more computing power, better screens or keyboards, or large downloads.

The ITU addressed this point in the *WTDR 2010*:

> "Over time, it is expected that, as incomes rise and electricity becomes available, households will opt for the convenience of using ICT services at home. Therefore, as household access increases, community access is expected to fall. Policy-makers need to keep this linkage in mind and policies to promote community access in rural areas need to move in tandem with facilitating home ICT access. As incomes rise, the emphasis should shift towards facilitating rural household access."[89]

While overall demand for community access points may fall, however, they will continue to play an important part in strategies for ensuring the inclusion of marginalised social groups. One pointer to future outcomes may lie in the experience of Grameen Village Phone operators in Bangladesh. Their initial business model—the provision of voice access through mobile phones in rural communities—has been eroded as mobile ownership has grown, but they are now migrating to provide a wider range of communications services, including the kind of services associated with cybercafés and telecentres.[90]

Targets B–F: public facilities

Targets B to F are concerned with the connectivity of specific public facilities, including educational institutions, research and cultural centres, health facilities and Government offices.

As with village connectivity, there are substantial difficulties in measuring these targets because they are imprecise. It is not clear what level of connectivity is expected, or in some cases what institutions are covered by them. Furthermore, few Governments, especially from developing countries, collect data that enable accurate measurement or cross-country comparisons. Those data which are available are rarely recent, regularly collected or benchmarked against past experience in a way that allows for reliable assessment of changes over the past five years.

In spite of these difficulties, two general observations can be made following assessments made in the *WTDR 2010*.

- Firstly, in most cases and with some notable national exceptions, the higher a country's level of economic development, the more likely it seems that access will be available in community facilities. In developed countries, broadband connectivity is now the norm in public institutions, including schools. In LDCs, any form of internet connectivity is often, or usually, absent from such facilities: even voice telephony and radio or television access may be unavailable in schools.
- Secondly, the distinction between access and usage (as discussed above in relation to village access) is also valid where public facilities are concerned. The fact that computers or Internet connectivity are available in a particular location does not mean that they are in practice used or, if they are used, that they are used in ways that add significant value either for individuals or from a community or national development perspective. As with basic access, therefore, in order to assess progress towards an Information Society, it is necessary to supplement connectivity indicators with indicators concerning usage.

The challenges posed by these targets have led the ITU and other UN agencies to consider how they can be developed in ways that will make them more susceptible to measurement in future. Among the principal outcomes of the assessments undertaken for the *WTDR 2010* is a proposed set of indicators which would establish a basis for more effective comparison. These proposed indicators, selected for their representativeness and measurability, are listed in Table 5 at the end of this chapter.

Target B: educational institutions

It is clear that there is now widespread access to ICTs, including broadband, in universities (under target C). The greater challenge lies in enabling ICT access and effective usage in primary and secondary schools, and the *WTDR 2010* proposes that in future this target should be confined to these, but that it should explicitly apply to *all* schools—a clarification of universality that is also applied to other targets in this section.

Computers and Internet access are widely seen as adding value for administrators, teachers and students in schools, and as contributing to students'

educational attainment and performance, although the overall assessment of their value is still a matter of debate.[91] Particular attention has been paid by Governments and international agencies to the extent to which computers and the Internet are available in schools and for student use. Radio and television also continue to offer educational value and are widely used in some countries as educational tools. Issues concerning ICTs and education are discussed further in the section of Chapter 4 that is concerned with Action Line C7 for e-learning.

The UNESCO Institute for Statistics (UIS), which prepared an assessment of this target for the *WTDR 2010*, concluded that:

> "In the main, in 2010 schools in developed countries are connected to the Internet, and usually through high-speed broadband networks, which offer the greatest potential for delivering innovative and useful applications and services. A number of developing countries have initiated projects to bring ICTs to schools, have set clear targets and have achieved high levels of Internet and even broadband penetration. Overall, though, Internet penetration levels in developing countries are still low, and many schools remain deprived of any form of Internet access. Unless many more governments take far-reaching policy decisions soon, it is unlikely that all schools will be connected to the Internet by 2015, let alone through high-speed networks."[92]

Data published alongside UIS' assessment show that the situation is least positive in Africa, where the proportion of schools with Internet access in both Ethiopia and Senegal was reported to be less than 10 per cent. Few of these schools are likely to be in rural areas. The lack of access to electricity is likely to be an important additional constraint on the use of ICTs in schools in LDCs.

It should be noted, however, that the relationship between ICTs and education is not straightforward. As with other targets, the measurement of progress in this context needs to be based around developmental outcomes rather than simply on the number of ICTs that can be counted within the education system. [93] Other important factors in determining outcomes include the availability of relevant curriculum and teaching staff who can make effective use of ICTs. The availability of teachers with appropriate skills is particularly challenging in low-income countries, where funds for public sector education are usually very limited, restricting the ability of schools and education managers to buy and maintain equipment and to use online services.

Targets C and D: scientific and research institutes and cultural centres

Universities and scientific and research centres generally have higher levels of connectivity than other public facilities. Most research centres and universities are now connected to the Internet worldwide, as required by target C—often with a broadband connection. In its basic form, progress on this target can therefore be considered strongly positive.

In assessing target C, the ITU lays emphasis on connectivity between universities and research centres, as well as on their connectivity to communications networks. In particular, the *WTDR 2010* observes the spread of National Research and Education Networks (NRENs), specialist ISPs which provide high-level connectivity to higher education and research institutions. By early 2010, 62 per cent of countries had established NRENs, although there were differences as elsewhere between regions and the figure for African countries was as low as 33 per cent.[94]

Target D includes a diverse group of public facilities, including libraries, cultural centres, post offices, museums and archives. Some of them, such as post offices and libraries, are widely used by the public and provide locations which can be used as community access points (see target A). Others, including libraries again, museums, archives and cultural centres, can be sources of online content of value to their communities (and are also relevant, therefore, to target I).

As with other targets, there is a shortage of data available to measure connectivity in these facilities, and, even where data are available, they are rarely in a form that permits ready comparison between countries. Museums and cultural centres, in particular, vary considerably in scale and are managed in the private sector and NGOs as well as Government agencies. The limited data which are available have been reported in the *WTDR 2010*. The International Federation of Library Associations, for example, has reported that, in 28 per cent of countries responding to a survey it conducted in 2009 less than a fifth of libraries were yet online. However, this represented an improvement over 2007, when the comparable figure was 39 per cent.[95]

From a community perspective, post offices are likely to be the most widespread and accessible of these facilities, reaching into more areas of national territory than libraries or museums. Some Governments have identified post offices as suitable locations for public Internet access, while others have preferred alternatives. The outcome is therefore highly variable and there appears to be no particular correlation between post office Internet access and GDP per head. Some LDCs (such as Bhutan and Burkina Faso) had a higher level of access than much more prosperous countries, suggesting that the level of access is dependent on Government policy choices rather than on economic status.[96]

The *WTDR 2010* summarises progress on target D as follows:

> "With the right policy focus, Target [D] could be attained by 2015, even if there is still some way to go, especially in developing countries. There are many initiatives under way to connect libraries, museums, post offices, cultural centres and archives, and the cost of connecting them is relatively low, especially relative to the potential benefits. Indeed, there are relatively fewer of these institutions than, for example, households or schools, thus increasing the feasibility of reaching the target. … Combining private funds with public resources could help to connect these institutions and enable them to create websites."[97]

Target E: health facilities

ICTs are perceived to have a wide range of potential benefits in health systems, from the promotion of healthier lifestyles, through epidemiology, to medical interventions, administration and record-keeping. Much attention is now being paid to mobile health initiatives, which have the potential to enhance the relationship between individuals and their health care providers, through health promotion, remote diagnosis and support for clinicians in rural areas. These issues are discussed further in the section on Action Line C7 (e-health) in Chapter 4.

As with education, it is difficult to measure progress since the establishment of the WSIS targets because of the lack of appropriate data collection, the lack of comparability between data that are collected in different countries, and the rapid pace of change in technology and applications which means that even recent information may no longer reflect current circumstances. In its contribution to the *WTDR 2010*, the World Health Organisation (WHO) reported as follows:

> "By the end of 2009, some progress had been made in establishing basic Internet access in health institutions, including in developing countries, but much more needs to be done if all health institutions are to enjoy Internet access by 2015. It is likely that progress will initially be made in the major cities of developing countries, and less so in the remote and isolated regions, even though ICTs can potentially bring even greater benefits in remote geographical areas."[98]

A 2009 survey by the ITU cited in the *WTDR 2010* showed that 100 per cent of health facilities in industrial countries such as Hungary and the Republic of Korea had broadband access to the Internet, while less than 10 per cent of health facilities in Egypt, Mexico and some other developing countries reported Internet access of any kind.[99] Such data are useful, but in the absence of standardisation, they are vulnerable to different interpretations—for example, of what institutions are included, and of what is understood by Internet or broadband access. As with other targets, usage also matters at least as much as connectivity in this context.

The WHO's Global Observatory for eHealth reported in 2009 that 79 per cent of countries in the World Bank's upper and upper-middle income categories had now established national e-health policies, but that only 32 per cent of those in lower-middle and lower income categories had done so. Data from the Observatory also suggest that, in 2009, the majority of local healthcare facilities around the world were still reliant on paper systems for handling patient records, with relatively low use of electronic systems for the storage or transmission of patient data. On a more positive note, 83 per cent of countries reported having at least one m-health initiative underway in 2009.[100]

These findings imply that, while there may have been significant gains in e-health since 2005, these are likely to have been achieved more in developed than in developing countries, and that there is a great deal more to be done before the objective in the WSIS target is achieved. As noted above, WHO expects progress to be faster in industrial countries and in urban centres than in developing countries and in rural areas. A global survey of e-health, which the WHO Observatory will be undertaking during 2011, should add significantly to our knowledge in this area. Technological developments and increased adoption of ICTs by the public are likely to be important in achieving progress towards this target from 2011 to 2015, including

the extent to which broadband connectivity is rolled out into rural areas. The continued rapid growth in mobile telephony, the enhanced capabilities of mobile phones (including camera and video functions) and the growing availability of mobile Internet may have a significant impact on the nature of e-health, enabling more direct communication between citizens/patients and clinicians/advisory services. Measuring connectivity for e-health may therefore become more of a matter of assessing individuals' connectivity as well as that of health facilities.

Target F: Government services

E-government draws together a number of objectives, including the improvement of administrative efficiency and accountability, the delivery of public services, and the provision of public information to citizens. The nature of these services and their delivery are discussed in the section of Chapter 4 which is concerned with Action Line C7 on e-government. WSIS target F is concerned with two aspects of e-government—the connectivity of Government offices and the availability of information resources in the form of websites.

As with other targets, assessment of the connectivity of Government offices is hampered by the lack of available information. According to the *WTDR 2010*:

> "In developed countries, Government institutions tend to have access to the Internet, often through a broadband connection. Much less is known about Internet access for government institutions in developing countries and in local government entities. In developing countries, a lack of resources—financial, human and infrastructure—is a constraint for increasing access to the Internet."[101]

Measuring connectivity alone is also insufficient. As with other targets, what matters in terms of outcomes is the extent to which ICTs are used in Government offices, the quality of their use and the extent to which the organisation of Government business is restructured to take advantage of the opportunities that e-government presents. Even less information is available on these aspects of e-government, as DESA recognises:

> "It is also important to obtain more information about the use of ICTs within government institutions, … especially regarding the type and quality of the connectivity, the extent of its diffusion (for example, what percentage of staff in government institutions have access to the Internet), and the actual use to which access to ICTs and the Internet is put. Indeed, little information is available on how ICTs are used, for example, for reforming and restructuring the interdepartmental organisation of different levels of government."[102]

A little more information is available about Government websites. At the end of 2009, the Governments of 189 UN member States reported that they had a Government website providing information to citizens and others, while only three reported that they did not. The comparable figures in 2003 were 173 and 18.[103] In around three quarters of member States, this web presence extended to Government ministries and non-ministerial departments. Local Government institutions, however, do not appear to be matching this level of web presence in lower-income countries.

The nature of web resources is also important in determining the reach and value of e-government. Some Governments, especially but not exclusively in developed countries, offer a range of transactional services enabling citizens to obtain permits, pay taxes and undertake other official activities online. In some countries, this has become a standard way for citizens to interact with Government. In developing countries, however, where Internet access is not widespread, such transactional services are less common. As an example, DESA reports that in 2009 only 21 of 192 UN member States offered tracking of Government-provided permits as an online service to their citizens.[104]

Changing technology and markets are likely to play an important part in progress towards achieving these targets between now and 2015. Firstly, in developing countries, only a small proportion of the population is currently online. This proportion will grow, probably quite rapidly as a result of the growth of mobile Internet. The value of online information and transactional services increases with the number of potential users, and there may well be a tipping point at which the availability of Government services on the Internet becomes commonplace or expected by end-users. This point has been passed in many developed countries but not yet reached in countries with low levels of Internet usage. Secondly, the ways in which Government services can be provided are also changing. The emergence of social networking sites since 2005 provides a new potential mode of access to Government services which may be more appealing to many users. It seems likely that the provision of information and transactional services through mobile and social networking channels, as

well as on conventional websites, will in future need to be measured in relation to this target.

Targets concerning capabilities and content

Target G: educational curricula

Target G recognises the need for Governments and other stakeholders to invest in the skills that people need to take advantage of the Information Society, and the particular role of the school system in this context. For end-users, these skills include literacy and the research and analytical skills required to locate, assess, interpret and make use of information. For society as a whole, they include the availability of ICT development, application, innovation and maintenance skills within the workforce. If schools are to teach these skills, they need teachers with relevant expertise and relevant curricula for them to use.

Once again, data that would enable substantive international comparisons for this target are not available. Figures for the availability of computers and Internet access in schools have been discussed under target E (above). Figures for the proportion of teachers with ICT qualifications, either to teach ICT skills or to make use of them in other subjects, would be useful, as would figures for the extent to which ICTs are used in the classroom. However, these need to be interpreted carefully, as not all subjects benefit equally from computer- or Internet-enabled learning. UIS believes that "a number of countries, both industrial and developing, have taken steps to provide teachers with the necessary skills to teach and use ICTs." As for curricula, UIS finds that, while a majority of primary and secondary schools in industrial countries make use of ICT-adapted learning, only "a small proportion of schools" in developing countries "have effectively integrated ICTs as part of the curriculum." These are more likely to be in urban than in rural areas, especially where the Internet is concerned resulting from communications and power connectivity issues.[105]

Target I: content and diversity

Content is the information resource that lies at the heart of the Information Society. Content in this sense includes all information that is exchanged through ICTs: from Government and business resources to audio and video entertainment; from official transactions to private messages; from broadcasting, telecommunications and the Internet; from websites, social networking fora, instant messages, SMS and voice telephony. Connectivity provides the medium through which content can be delivered, but without content to convey its value is limited.

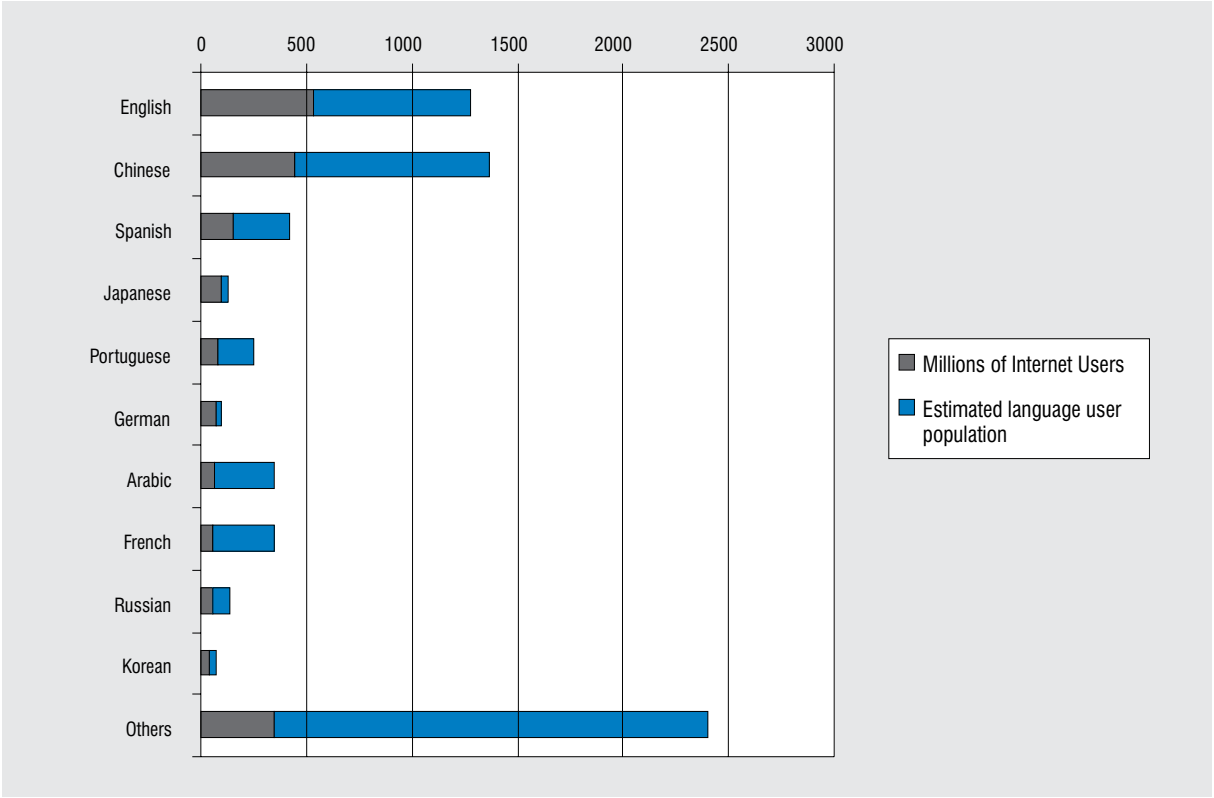
Target I is mostly concerned with content available over the Internet. It includes three issues: the development of content which is of value to users; the cultural diversity and inclusiveness of that content; and the capability of the Internet to handle multilingual content, particularly content in non-Latin alphabets.

Content on the Internet has grown enormously since 2005. The number of web pages has more than doubled between 2005 and 2009.[106] Even more dramatic has been the growth in social networking and other sites hosting user-generated content. Facebook, for example, claimed to have more than 500 million users providing content on its site in August 2010. YouTube, which launched with 8 million views per day in December 2005, the month after the Tunis summit, now has two billion video views per day.[107]

However, the value of this content is not universally available. Because the Internet originated as the tool of a specialist professional community, its technical standards made use of the limited range of characters within the Latin alphabet rather than the whole range of world languages. Because it originated for the most part in English-speaking cultures, a high proportion of its early developers and users were English-speaking. English is thought to be sufficiently well understood by only 15 per cent of the world population for them to make use of English-language content; however, the proportion of English-speaking Internet users in 1996 was estimated to be as high as 80 per cent.[108]

WSIS participants were clear that a geographically and culturally inclusive Internet needed to be more culturally and linguistically diverse than the Internet that they observed in 2003/2005. The balance of content on the Internet has changed substantially since the 1990s, and indeed since the Tunis summit. By 2007, it was estimated that around 30 per cent of Internet users were English speakers, while in June 2010 Internet World Statistics put the figure at 27.3 per cent. Between 2000 and 2010, the number of English speaking Internet users is estimated to have grown by 281 per cent, less than the growth rate of other world languages such as French (398 per cent), Spanish (743 per cent) and Portuguese (989 per cent). Even more dramatic has been the growth in the numbers of users speaking languages with non-Latin alphabets such as Arabic (2,501 per cent), Russian (1,826 per cent) and Chinese (1,277 per cent).[109] The estimated distribution of major language users on the Internet, as a proportion of overall users of those languages worldwide, is shown in Figure 19.

FIGURE 19: INTERNET USERS BY LANGUAGE, June 2010, ESTIMATES



Source: Internet World Statistics, http://www.internetworldstats.com/stats7.htm, accessed 28 January 2011

These growth rates reflect the growing capability of the Internet to manage non-Latin characters, symbolised by the introduction of internationalised domain names in 2009. Popular websites such as Google, Amazon and Facebook have also diversified their linguistic presence. By early 2010, the leading browsers Internet Explorer and Mozilla supported more than 60 languages, as did the social networking site Facebook, while Google's translation facility was available for more than 50 languages.[110] However, this diversification is much more evident with major languages than with those used by smaller population groups. There are an estimated 7,000 languages in use worldwide today, and it is still difficult to find content online in many of those languages which are less widely used.

This linguistic challenge reflects a wider cultural challenge. The publication of formal Internet content, i.e. websites, is still dominated by a relatively small range of cultures in North America, Europe and Asia. Even where international languages are widely used, as in Africa, this does not mean that a significant proportion of websites are hosted in those countries.

The *WTDR 2010* notes that, in 2007, Africans accounted for 11 per cent of the world's population but only 2 per cent of Internet users, while 0.6 per cent of Internet content was held in African servers and less than 0.01 per cent in local African languages.[111] One corrective to this may be the democratisation of content production that has resulted from social networking. The language of content produced on social networking sites is more difficult to measure.

It is clear that the Internet has become more linguistically and culturally diverse since 2005, and that this process is continuing. The vast majority of content, however, is in a small number of languages, mostly world languages, and the small amount of content in minority languages available inevitably disadvantages those who primarily speak in them. Efforts to stimulate more local content may enable more diversity to be achieved. However, it will also become increasingly difficult to measure the extent of diversity as content moves beyond the formality of mainstream websites to user-generated Web 2.0 platforms.

SECTION 3—ASSESSMENT AND CONCLUSION

The overall picture of progress towards the WSIS targets is positive, but remains challenging. The core target, "to ensure that more than half the world's inhabitants have access to ICTs within their reach," has already been achieved at a global level and in almost every country, providing a platform on which it is possible to build more ambitious targets for the future. It is clear that there has also been extensive progress in enabling access to villages and to particular public facilities, although it is difficult to measure these in any detail.

Developed countries have high levels of achievement across the connectivity targets included in the WSIS list, and the evidence suggests that there has been rapid progress in middle-income countries. The biggest challenges are to be found in low-income countries and LDCs, and in Africa more than in other continents. Affordability remains an important constraint for individuals and households seeking to join the Information Society in such countries. The lack of fixed communications networks and the limited availability of electric power have restricted opportunities for the deployment of ICTs in public facilities. Low-income countries also have lower levels of ICT-related skills within their populations and have generated less content than those in other world regions. However, they have experienced rapid growth in mobile telephony and in the range of services available through mobile phones, and the advent of mobile Internet and mobile broadband suggests that some of the disadvantages which they have experienced to date may be more easily overcome within the next five years.

As with the "big picture" outcomes discussed in Chapter 2, it is difficult to apportion responsibility for the progress which has been achieved. The principal actors in extending connectivity have been private sector communications businesses, whose investments in both national backbones and local access networks are driven by anticipated commercial gains. Some Governments have also been directly involved in network investment, especially in recent years in the deployment of national broadband backbones, while the policy and regulatory frameworks established by Governments have been important determinants of the underlying environment for connectivity, access and affordability.

Governments have been more directly engaged in extending connectivity to public facilities and services (targets A to F), and here the record is more mixed. Some Governments have invested substantially in connectivity for education, health and Government offices; others have not. Suggestions to address these challenges in the *WTDR 2010* and elsewhere include attention to national and sectoral strategies (e.g. for e-health), public-private financial partnerships, the stimulation of local content development, the use of e-government services to drive demand for broadband access, and capacity-building of the national ICT skill base.

This report is primarily concerned with international and regional implementation of WSIS outcomes, and so with the impact of international and regional agencies. The role of these agencies in promoting connectivity is both direct and indirect. International financial institutions (IFIs) have contributed directly to the achievement of large-scale connectivity targets by investing in infrastructure deployment which might not have occurred without their backing. Examples in East Africa include the African Development Bank's investment in the Eastern Africa Submarine Cable System (EASSy) submarine cable and the World Bank's investment in Rwanda's broadband network.[112] International and regional agencies have also provided fora for the sharing of experience and good practice in building enabling environments for investment, and implemented consultancy projects concerned with policy design, regulation and ICT strategic plans. Multilateral agencies and bilateral donors have worked alongside Governments, sometimes through funding mechanisms, sometimes through capacity-building and consultancy support, to facilitate the deployment of ICTs in public facilities and services. Some of the work of international and regional agencies in these contexts is described in Chapter 5.

The principal challenge for assessing progress on the WSIS targets is the lack of clarity within those targets, which do not include clear indicators that can be used as proxies for connectivity goals. In addition, with the exception of large-scale usage and connectivity statistics of the kind reported in Chapter 2, only limited data are available through which to judge progress either over time or between countries. If the targets are to provide a useful basis for the comprehensive review of WSIS outcomes scheduled for 2015, they need to be supplemented by indicators which are readily measurable and which national statistical offices will be able to collect.

The *WTDR 2010* has made a thorough investigation into progress on the WSIS targets within the limits of available data. It also proposes a framework of indicators to support the targets as instruments for measuring progress towards achieving WSIS objectives between now and 2015. These proposed indicators are set out in Table 5 below. The ITU is leading a task force within the Partnership on Measuring ICT for Development which will integrate appropriate indicators with the core indicators which the Partnership has already agreed (see Chapter 2). This initiative should make it possible for the comprehensive review of WSIS outcomes in 2015 to give a more authoritative account of progress towards achieving the targets than has been possible at this half-way point.

One of the most important questions arising from this analysis is the extent to which the WSIS targets themselves should evolve in line with the changing communications landscape. Progress towards the achievement of the targets should, of course, first and foremost be measured against the objectives which were set in 2003/2005. From that perspective, considerable progress has been made, particularly in basic connectivity. Where targets set at WSIS have been reached, or seem likely to be reached in the near future, it is important that this achievement is fully recognised.

However, the capabilities of ICTs, and the potential of the "people-centred, inclusive and development-oriented" Information Society sought at WSIS, are not static. Targets that were appropriate in 2003 may have become less relevant, or may (as with mobile voice telephony) have been achieved more quickly than anticipated, creating the opportunity for further progress, which should be measured by new or revised targets. Given the rapid changes that have taken place in technology and markets, it makes sense to reinterpret WSIS targets in the light of the current communications landscape.

The review carried out in the *WTDR 2010* has proposed some amendments to the aspirations which are expressed in the existing targets, especially in the case of target J, for overall connectivity. These changes are concerned with addressing usage as well as connectivity and with moving beyond basic voice telephony to Internet and broadband. The *Report* suggests clarifying the universality of targets concerned with public facilities—that these apply to *all* villages, *all* hospitals and health centres, etc. Finally, the *Report* proposes to add a further target, to "connect all businesses with ICTs," which could make use of indicators which are currently collected by UNCTAD. Adopting these changes would add value to the comprehensive review in 2015.

Table 5: Indicators proposed in WTDR 2010

Target 1—villages access	
1	Percentage of rural population covered by a mobile phone network
2	Proportion of rural households with a telephone
3	Proportion of rural households with Internet access
Target 1—community access	
4	Percentage of localities with public internet access centres
5	Location of individual use of the internet
Target 2—educational institutions	
1	Proportion of schools with a radio for educational purposes
2	Proportion of schools with a television for educational purposes
3	Ratio of learners to computers
4	Proportion of schools with Internet access
Target 3—scientific and research centres	
1	Percentage of scientific and research centres with Internet access
2	Presence of a National Research and Education Network (NREN)
3	Number of NREN nodes
4	Percentage of universities connected to NREN
5	Percentage of scientific and research centres connected to NREN
Target 4—cultural and other public facilities	
A	Percentage of public libraries / cultural centres / museums with Internet access
B	Percentage of public libraries / cultural centres / providing users with Internet access

C	Percentage of public libraries / cultural centres / museums with a website
D1	Percentage of post offices with Internet access
D2	Percentage of post offices offering public internet access
Target 5—health institutions	
1	Proportion of public hospitals with Internet access
2	Proportion of health centres with Internet access
3	Proportion of hospitals using computers or the internet to deal with patient information
4	Proportion of health centres using computers or the internet to deal with patient information
Target 6—local and national government (e-government)	
1	Percentage of government employees using Internet
2	Percentage of government employees using computers
3	Percentage of government institutions with Internet access (and whether broadband)
4	Percentage of government institutions using corporate networks
5	Percentage of central government institutions with websites
6	Percentage of local government institutions with websites
7	Percentage of government institutions with online email contact information
8	Percentage of government institutions offering online services
Target 7—school curricula	
1	Proportion of ICT-qualified teachers in primary and secondary schools
2	Proportion of teachers trained to teach using ICTs
3	Proportion of schools with computer-assisted instruction
4	Proportion of schools with internet-assisted instruction
Target 8—radio and TV services	
1	Proportion of households with a radio
2	Proportion of households with a television
3	Proportion of households with multichannel television service
Target 9—content development and linguistic diversity	
1	Proportion of Internet users by language
2	Proportion of webpages by language
Target 10—access to ICTs	
1	Mobile cellphone subscriptions per 100 inhabitants
2	Proportion of individuals using a cellphone within last 12 months
3	Proportion of individuals using Internet within last 12 months
4	Proportion of households with Internet access (and whether broadband)

NOTES

[73] http [73] http://www.un.org/millenniumgoals/.

[74] http://portal.unesco.org/education/en/ev.php-URL_ID=42579&URL_DO=DO_TOPIC&URL_SECTION=201.html

[75] *Geneva Plan of Action*, article 6.

[76] ITU *World ICT/Telecommunications Development Report 2010: Monitoring the WSIS Targets (WTDR)*. Available from http://www.itu.int/dms_pub/itu-d/opb/ind/D-IND-WTDR-2010-PDF-E.pdf, p.99.

[77] *Geneva Plan of Action*, article 6.

[78] The ITU summarises these challenges in the *World ICT/Telecommunications Development Report 2010: Monitoring the WSIS Targets* [henceforth: *WTDR 2010*], p.3.

[79] *Ibid.*

[80] *WTDR 2010*, pp 153-173.

[81] *Ibid.*, p. xxxii.

[82] *Ibid.*, p. 215.

[83] See Nick Wood, "Global broadband subscribers hit 500m," *Total Telecom*, 20 September 2010. Available from http://www.totaltele.com/view.aspx?ID=458716.

[84] See *Ibid.*; Khidr Suleman, "Broadband subscriptions to hit 3.6 billion by 2015," *v3.co.uk*, 26 January 2011. Available from http://www.v3.co.uk/v3/news/2274438/broadband-mobile-telecoms-ovum; Nationmaster.com, People Statistics: Population in 2015 (most recent) by country. Available from http://www.nationmaster.com/graph/peo_pop_in_201-people-population-in-2015.

[85] *WTDR 2010*, pp. xxxiii.

[86] ITU, World Telecommunication/ICT Indicators Database. Available from http://www.itu.int/ITU-D/ict/statistics/index.html.

[87] *Ibid.*, p. 215.

[88] *Ibid.*, p. 21.

[89] *Ibid.*, p. 24.

[90] See, for example, Richard Shaffer (2007) "Unplanned Obsolescence," *Fast Company*, 1 September. Available from http://www.fastcompany.com/magazine/118/unplanned-obsolescence.html.

[91] See, for example, *info*Dev, Knowledge Maps: ICTs in Education. Available from http://www.infodev.org/en/Project.1.html.

[92] *WTDR 2010*, p. xxiv.

[93] *Ibid.,* p. 106.

[94] *Ibid.*, pp 29ff.

[95] International Federation of Library Associations (2010) *IFLA World Report 2010*, August, p. 10. Available from http://www.ifla-world-report.org/files/uploaded/ifla_wr/IFLA-WR-2010-Analysis-and-Conclusions.pdf.

[96] *WTDR 2010*, p. 86.

[97] *Ibid,*, p. xxvi.

[98] *Ibid,*, p. xxvii

[99] *Ibid.*, p. 106.

[100] WHO response to this consultation. Available from http://www.unctad.info/upload/WSIS5/Contributions/UNGIS/WHO.pdf.

[101] *WTDR 2010*, p. xxviii.

[102] *Ibid.*

[103] *Ibid.,* p. 126.

[104] *Ibid.*, p. xxviii.

[105] *Ibid.*, pp 137ff.

[106] See Wikipedia, World Wide Web Statistics. Available from http://en.wikipedia.org/wiki/World_Wide_Web#Statistics.

[107] See Mark Zuckerberg (2010) "500 Million Stories," *The Facebook Blog*, 21 July. Available from http://blog.facebook.com/blog.php?post=409753352130. According to alexa.com, Facebook's site was visited by some 40% of active Internet users each day in early 2011. Available from http://www.alexa.com/siteinfo/facebook.com, accessed on 12 March 2011.

[108] *WTDR 2010*, pp 175ff. See also Ben Parr (2010) "A YouTube Surpasses Two Billion Video Views Daily," Mashable, 17 May. Available from http://mashable.com/2010/05/17/youtube-2-billion-views/.

[109] http://www.internetworldstats.com/stats7.htm, accessed on 28 January 2011.

[110] *WTDR 2010*, p. 181.

[111] *Ibid.*, p. 176.

[112] See African Development Bank Group (2007) "East African Submarine Cable System reaches financial close-The African Development Bank Signs Loans for the EASSy Cable Project," 27 November. Available from http://www.afdb.org/en/news-events/article/east-african-submarine-cable-system-reaches-financial-close-the-african-development-bank-signs-loans-for-the-eassy-cable-project-4051/; IT News Africa (2008) "World Bank approves $24million for Rwanda's Broadband Networks," 7 October. Available from http://www.itnewsafrica.com/?p=1376.

CHAPTER 4

THE WSIS ACTION LINES

The WSIS action lines identify themes or aspects of Information Society development which are concerned with the application and impact of ICTs, rather than with their availability and access. Their origins lie in the preparatory process for the Geneva phase of WSIS, when participants discussed overall priority themes for the Summit. Eleven action lines (or 18, if Action Line C7 is divided into its component parts) provided the structure for both of the first summit meeting's outcome documents, the Geneva *Declaration of Principles* and *Plan of Action*, the former identifying principles to be pursued by the international community and the latter proposing ways in which those principles might be put into practice in each action area. At the Tunis phase, it was agreed that these should become action lines, providing agendas for action by the international community, including the UN Regional Commissions, in the period after WSIS. The 11 main and eight subsidiary action lines are listed in Table 6.

Table 6: WSIS Action Lines

Number	Action Line	Initial agreed facilitators
C1	The role of public governance authorities and all stakeholders in the promotion of ICTs for development.	ECOSOC / UNRCs / ITU
C2	Information and communication infrastructure	ITU
C3	Access to information and knowledge	ITU / UNESCO
C4	Capacity building	UNDP / UNESCO / ITU
C5	Building confidence and security in the use of ICTs	UNCTAD
C6	Enabling environment	ITU
C7	ICT applications	ITU / UNDP / UNRCs / UNCTAD
A	e-government	UNDP / ITU
B	e-business	WTO / UNCTAD / ITU / UPU
C	e-learning	UNESCO / ITU / UNIDO
D	e-health	WHO / ITU
E	e-employment	ILO / ITU
F	e-environment	WHO / WMO / UNEP / Habitat / ITU / ICAO
G	e-agriculture	FAO / ITU
H	e-science	UNESCO / ITU / UNCTAD
C8	Cultural diversity and identity, linguistic diversity and local content	UNESCO
C9	Media	UNESCO
C10	Ethical dimensions of the Information Society	UNESCO / ECOSOC
C11	International and regional cooperation.	UNRCs / UNDP / ITU / UNESCO / ECOSOC

These action lines can be viewed from two angles. On the one hand, they represent areas of activity within the development of the Information Society, in which the international community committed itself to making progress over the period between 2005 and 2015. More narrowly, they provide a framework for institutional arrangements for WSIS follow-up, through a series of action line processes which have been coordinated by different UN agencies. Those agencies initially selected for this role are identified in Table 6.

The primary review mechanism for the action lines has been through annual meetings held in May of each year, together with annual reports from those agencies charged with facilitating them which list some of the activities that they themselves have undertaken or which have been notified by other stakeholders through the annual meetings. Activities which fall within different action lines are also listed in the WSIS Stocktaking Database which is maintained by the ITU.[113] Much of the activity and development which has taken place in the thematic areas covered by the action lines, however, occurs outside these agencies and

this reporting framework. E-government, for example, has been widely implemented by Governments and become a significant part of both administration and service delivery in many countries during the past five years. While the work of international and regional agencies has contributed to this, no-one would suggest that the action line on e-government has been the principal driver of its development, or even that a substantial proportion of e-government activity has been reported through it. Even when an agency acts as action line facilitator, it may report only on some of the work related to that action line which it is undertaking through its established mainstream programmes.[114]

There is insufficient space in this report to do more than briefly summarise the accounts of activities reported in detail annually to the CSTD by action line facilitators,[115] and to give brief illustrative examples from these reports. The activities which are listed in them include many conferences and workshops, capacity-building programmes and consultancy projects, as well as development programmes and initiatives undertaken by Governments, international agencies and other stakeholders. A particularly valuable and detailed account of its action line facilitation and implementation work has been given by the ITU in the 2010 report *WSIS+5*, which was submitted as part of its response to the consultation for this review.[116] The UN Regional Commissions also play an important part in the practical implementation of action lines. Their programmes of work are summarised in Chapter 5.

SECTION 1—ACTION LINE FACILITATION AND THE WSIS FORUM

Responsibility for overall coordination of the action lines, and of annual clusters of action line meetings, was allocated after WSIS to the ITU, UNESCO and UNDP, with UNCTAD joining the group of coordinating agencies in 2009. Terms of reference for each action line were agreed in 2006, focused on their potential for multi-stakeholder cooperation, including sharing of experience, identification and dissemination of good practice, and facilitation of joint working across stakeholder boundaries.

Annual action line meetings were held in clusters around the time of World Telecommunication and Information Society Day[117] in May 2007 and 2008. However, they attracted limited participation and did not provide the focus for international multi-stakeholder cooperation that had been anticipated.[118] As a result, the facilitating agencies re-assessed action line coordination and agreed to locate this in future within a new and more wide-ranging annual event, the WSIS Forum. This Forum emphasises the cross-cutting nature of ICTs and Information Society work which is undertaken at an international level. It places action line meetings within a context of high-level panels and thematic workshops, providing more opportunities for dialogue between those who are working in different implementation fields and building links across the boundaries between the themes of different action lines.

As well as 15 action line meetings (some involving more than one action line), the 2010 WSIS Forum included a high-level plenary session, five high-level debates which addressed critical issues in WSIS implementation, interactive sessions, thematic workshops, "kick-off" meetings for new initiatives, knowledge exchanges and other meetings. The high-level plenary session was entitled *Turning Targets into Action: WSIS and the MDGs.* The five high-level debates concerned broadband infrastructure, broadband applications, social networking, the role of ICTs in disaster management, and cybersecurity. All sessions fostered multi-stakeholder participation, and sessions were also webcast in order to make them more available to remote participants.

These changes have been widely welcomed by participants. The first two WSIS Forums, in 2009 and 2010, had more substantial and diverse participation than the preceding clustered meetings, and enabled more discussion to take place about the broad themes of WSIS implementation and the Information Society as well as about the specific concerns of individual action lines. The overall coordinators of action line facilitation are optimistic that they will build further momentum as discussion about the Information Society moves forward towards 2015.

SECTION 2—SUMMARY OF ACTIVITIES BY ACTION LINE AREA

Three issues should be borne in mind in assessing the contribution which the action lines have made towards an Information Society and implementing WSIS outcomes.

Firstly, the list of action lines which was agreed in the *Geneva Plan of Action* has not encompassed every dimension of the Information Society at the time they were agreed, or (even less) today, following a further five years of developments in ICT technology, markets and behaviour and in the application of ICTs within development. Important development issues such as trade are not substantially included in them.

Secondly, the remits for individual action lines did not include every dimension of the theme or topic that was covered by their titles, but a selection of objectives within that theme on which text was proposed and consensus could be reached at WSIS. In some cases, such as the enabling environment, this selection of objectives was substantial and extensive. In others, such as e-agriculture, it was much less substantial and encompassed quite a small range of the issues that would (either then or now) be considered important in that field.

Thirdly, the implementation of WSIS objectives within each action line area is not the responsibility of the action line facilitators but of the multi-stakeholder community of actors that are involved within that field, whether or not they actively participate within the action line. The ways in which e-agriculture develops, for example, result from the activities of farmers, traders and agricultural businesses; communications network, service and content providers; intergovernmental and Governmental agencies concerned with ICTs and agriculture; NGOs and other actors which support farmers; and other stakeholders engaged in agriculture. Some of what happens in e-agriculture is planned, and some is reported through the action line, but much of it results from the dynamics of agricultural markets and from decisions taken by the wide range of stakeholders described. Developments are also affected by exogenous factors such as the recent economic downturn.

The action lines, therefore, merely provide a framework for sharing information and experience about some of the interventions which are being undertaken by participating stakeholders and for coordinating some joint activities within the fields with which they are concerned, where that is the wish of stakeholders. They do not have the mandate or resources to act as implementation agents for new activities. In practice, participation in action line activities has been relatively sparse. While some stakeholders have been involved in each thematic area, many organisations which play an important part in those areas do not involve themselves in action line discussions and coordination.

The following sections of this chapter briefly discuss each action line in turn. As mentioned earlier, they do not provide detailed accounts of action line activity, which can be found in the annual reports which facilitating agencies, including UN Regional Commissions, make to the CSTD,[119] and in other publications. Instead, each section includes:

- a summary of the principle underlying the action line and the mandate given to it in the WSIS outcome texts;
- a brief outline of some of the principal issues within that action line's thematic area, and of developments which have taken place within it since the Tunis summit; and
- a brief summary of the work which has been undertaken within the facilitation process for that action line or reported to it.

Information on the work of the UN Regional Commissions, including their work to implement the action lines, is included in Chapter 5.

Action Line C1—The role of Governments and all stakeholders in the promotion of ICTs for development

The central principle behind Action Line C1 is that the development of the Information Society requires and should permit multi-stakeholder cooperation and partnership, involving intergovernmental agencies, Governments, the private sector and civil society. [120] Goals and targets identified for it in the *Geneva Plan of Action* include:

- the development of national e-strategies built around multi-stakeholder participation;
- the establishment of public-private partnerships or multi-stakeholder partnerships as showcases for future action;
- the mainstreaming of ICTs in sustainable development; and
- the introduction of measures to promote ICT-enabled enterprise development.

International organisations and financial institutions were also asked to develop strategies (by 2005) "for the use of ICTs in sustainable development, including sustainable production and consumption patterns and as an effective instrument to help achieve the

goals expressed in the United Nations Millennium Declaration."[121]

This action line remit affirms the principle of multi-stakeholder participation which features prominently in the WSIS outcome documents and has been emphasised in the implementation of WSIS outcomes. The underlying case for multi-stakeholder engagement has been that the Information Society will arise from wide-ranging changes in social and economic behaviour rather than by the intervention of Governments. Both the development of ICTs, and measures to ensure that wider developmental outcomes are achieved from that development, need the participation of all stakeholder groups: intergovernmental and other international organisations to coordinate activity around the world and address global challenges; Governments to establish enabling frameworks for investment and development and to address constraints and promote initiatives at national level; private sector businesses that develop and deploy the technologies, services and content that are at the heart of the communications revolution; and civil society organisations, which represent citizens and consumers and closely observe the interface between technology and human development.[122]

Multi-stakeholder engagement in this context takes several forms. At a pragmatic level, it is apparent in the development of public-private partnerships, through which international organisations, Governments and private sector organisations have worked together, notably in the financing and deployment of major infrastructure projects. The involvement of participants from diverse stakeholder communities has been central to the development of the Internet in terms of coordination (for example, ICANN and the Regional Internet Registries), in standards development (for example, the Internet Engineering Task Force) and in the Internet Governance Forum, as well as in the deployment of infrastructure and services (led by the private sector). At other international and national policy levels, including the WSIS Forum, it requires new modalities of governance and international discourse, which are evolving over time. WSIS action lines themselves have been multi-stakeholder in character although most have not attracted participation from as many stakeholders as their facilitators would wish.

The relationship between the ICT sector and other development sectors continues to be debated within the framework of this action line. ICTs are general purpose technologies which have impact on almost every other policy domain and area of governance. Much emphasis has therefore been placed on "mainstreaming" ICTs into other areas of public policy, including the application areas discussed in Action Line C7. However, attention also needs to be paid to the ICT sector itself, and this has generally taken the form of national ICT strategies.

The *Tunis Agenda for the Information Society* encouraged Governments to make e-strategies "an integral part of national development plans and poverty reduction strategies, as soon as possible and before 2010."[123] National ICT strategies have also been strongly promoted by UN agencies, including Regional Commissions (see Chapter 5). They are seen as necessary not only for effective deployment of ICTs in the interest of national development, but also for attracting inward investment (especially into underserved areas) and for facilitating civil society involvement in implementing ICT activities. A report on progress concerning national strategies was published by the ITU and Regional Commissions in 2010, drawing on information provided through the WSIS Stocktaking Database. [124] This report indicates that 161 countries—84 per cent of UN member States—had met the WSIS target of having a national strategy in place by 2010, while another 14 countries had strategies in preparation. This was almost exactly double the number of national e-strategies that were in place in 2006. Some countries are now implementing their second or third such national strategy, building a cycle of policy development and practical experience.

National ICT strategies provide a framework for the coordination of work and integration of ICTs amongst Government departments, between the public and the private sectors, and (in developing countries) in partnership with international financial institutions and bilateral donors. Experience suggests that three important challenges need to be addressed in their development and implementation:[125]

- Firstly, they need to draw on expertise available throughout Government and the wider community. As well as multi-stakeholder involvement of the kind described above, this includes ensuring cooperation between experts and managers in the ICT sector and those in mainstream development sectors, such as health, education and enterprise development, where ICTs are expected to add developmental value.
- Secondly, they need to relate the potential of ICTs to

realities on the ground. ICTs have great potential to transform aspects of social and economic life, but this is constrained by limitations in complementary resources, such as electricity, and by human development constraints such as skill shortages and long-established behavioural norms.

- Thirdly, they need to respond to changes over time. ICT technology and markets are changing so fast that policies and strategies rapidly become outdated. For example, strategies developed at the time of WSIS are unlikely to have anticipated the scale of growth that has taken place since then in mobile telephony and personal access to communications. Strategies and policies need continual updating in order to ensure that they remain relevant to contemporary needs.

The UNDP notes that, although many countries now have a national ICT strategy in place, many still face problems in implementing their objectives effectively, especially at scale. As a result, the UNDP suggests, "e-government in particular has not yet proved to be the catalyst for improved efficiencies and service delivery, for enhanced transparency and accountability, and for increased citizens' involvement in policy- and decision-making processes" that it could be. It stresses the importance of a framework for cooperation and interoperability between different Government departments.[126]

In their 2010 report, the ITU and Regional Commissions indicate areas where existing national e-strategies could be improved, including their strategic orientation and their integration into national development plans and poverty reduction strategies. They also emphasise the need for more comprehensive e-strategies at a sectoral level, to take advantage of the potential of ICTs in areas such as those covered by Action Line C7.[127]

DESA facilitates Action Line C1 with the support of the ITU, ECOSOC and UN Regional Commissions. DESA's work has focused on analysing and supporting e-government initiatives. Its 2010 *UN E-Government Survey* provides a comprehensive analysis of achievements in individual countries and explores the relationship between e-government and issues such as stimulus funding, financial monitoring and public service delivery. DESA's Global Knowledge Repository on Electronic and Mobile Government facilitates knowledge-sharing in many different areas of Government ICT activity. DESA has also worked with the Inter-Parliamentary Union, through the jointly-established Global Center for ICT in Parliament, to promote awareness of Information Society issues among parliamentarians and so enhance the quality of governance.[128]

The ITU organises a number of annual and periodic conferences which provide an opportunity for Governments and other stakeholders to discuss critical issues in telecommunications. These include its regular Global Symposium for Regulators and associated Global Industry Leaders Forum, the World Telecommunication Policy Forum, and the ITU Telecom World and regional series of conferences and exhibitions. The ITU's quadrennial World Telecommunication Development Conference sets the framework for its four-year programme of development-related work, most recently in Hyderabad in 2010.

A wide range of other activities has been reported through this action line since 2005, reflecting the diversity and centrality of its principle and remit. The Council of Europe has been among agencies working on the potential of electronic democracy, for example, and organised a regional Forum for the Future of Democracy in Spain in 2009. Issues concerned with national ICT strategies, laws and regulations have been addressed by the ITU and other agencies including UN Regional Commissions and the World Bank. The ITU has continued to play a major role in the establishment of global technology standards, such as those for "next generation networks," which provide the underpinning infrastructure for e-government. Governments and private sector businesses have worked together on standardisation within the ITU framework, alongside work that has taken place in other governmental and private sector standardisation bodies and with the Internet Engineering Task Force. Multilateral agencies such as *info*Dev and bilateral donors have supported efforts to improve the regulatory environment through capacity-building initiatives and technical assistance programmes. All of these activities enhance the role of Governments and other stakeholders in the Information Society.[129]

Action Line C2—Information and communication infrastructure

The Geneva texts concerning Action Line C2 describe connectivity as 'an essential foundation for an inclusive Information Society.' Objectives identified in the *Geneva Plan of Action* include:

- the development of an enabling and competitive environment that will attract investment in infrastructure and services;

- universal access and spectrum allocation policies which address the failure of markets to provide access in all geographical areas;
- policies to facilitate access to the public facilities and locations identified in WSIS targets B to F;
- policies to enable full inclusion of disadvantaged social groups in the Information Society;
- measures to encourage the development of regional ICT backbones, Internet Exchange Points (IXPs), and improved access to global connectivity;
- the development and strengthening of national, regional and global broadband networks; and
- the promotion of joint use of 'traditional media' and new technologies.[130]

Communications infrastructure is complex. It involves a variety of different transmission media—fibre, copper cable, satellite, microwave and other wireless technologies—in a variety of different geographical tiers—global, regional, national and local—which have diverse ownership and on which capacity is traded in complex and variously regulated competitive markets. New infrastructure is constantly being developed and deployed, involving new technologies, architectures and modalities (e.g. 4G mobile, IP-based "next generation networks"). Historically separate infrastructures, such as those for broadcasting and telecommunications, are also merging into new converged communications networks. From the user's point of view, the scope and quality of connectivity depends on the quality of infrastructure which is available across these markets and in all these tiers, from the "local loop" which delivers access to her/his terminal devices to the international cable and satellite networks required to access content on the Internet.

As described in Chapter 2, rapid growth in global information and communications infrastructure has been witnessed from 2005 to 2010. This has included:

a) continued investment in international submarine cable—including the deployment of several cables along the last major unconnected coastline, that of east Africa—increasing capacity to manage burgeoning Internet traffic and providing greater scope for competition;

b) continued investment—from both private companies and public sources (Governments and international financial institutions), in both national backbone networks and in networks that reach more deeply into rural areas. At the end of 2010, for example, just under 350,000 route-kilometres of optic fibre cable had been laid in Africa, approximately doubling the extent of fibre that had been laid by 2005, with a further 42,000 route-kilometres in deployment;[131]

c) continued investment and deployment of mobile voice networks, which now cover approximately 85 per cent of the global population; and[132]

d) continued research and development of new wireless technologies, which promise to extend broadband mobile capability, and so increase Internet access, in rural areas of developing countries. Once all of the planned fibre mentioned in point b) above has been deployed, around 80 per cent of Africa's population should be within 50 kilometres of a fibre node, close enough for WiMAX (Worldwide Interoperability for Microwave Access) broadband local access connectivity.[133]

These developments represent real progress towards WSIS' Information Society objectives for infrastructure. There are, however, challenges and questions for the future which have been increasingly debated during the period since the Tunis summit.

- The WSIS outcome documents recognised the importance of broadband supplanting narrowband infrastructure. Perceptions of the importance of broadband have grown since 2005, both in international discourse and in national infrastructure planning. Governments, businesses and (increasingly) citizens in many parts of the world now expect future infrastructure and their own connectivity to be broadband. This requires high levels of investment.
- Mobile cellular networks have come to dominate personal communications worldwide. Until recently, many have doubted the capability of mobile networks to deliver Internet and broadband services to rural areas where fixed networks are not deployed. More recently, developments in wireless technology and upgrades to mobile network backbones have led to re-evaluation of the capabilities of mobile networks. The presumption in favour of broadband for the future makes this question even more important.
- The drive for broadband networks has also led to renewed investment by Governments in communications infrastructure, using their own resources, those of international financial institutions and/or collaboration with the private sector. The impact of this on regulation, the relationship between public and privately-owned infrastructure and future market development is uncertain.

- Consideration of infrastructure at a regional level has become more prominent as international and national networks are upgraded. Regional and sub-regional economic communities—such as the European Union in Europe and SADC, ECOWAS and the East African Community in Africa—are of increasing importance, and new communications networks provide an opportunity to enhance intra-regional trade and economic cooperation. Cross-border interconnection issues and access to international fibre networks are especially important for landlocked countries within regional communities. The African Union has emphasised the importance of harmonisation in infrastructure development and regulation on its continent,[134] and the ITU and European Commission have supported efforts at regulatory harmonisation in African regions.[135]

At the time of WSIS, and in the report of the 2004 Task Force on Financing Mechanisms (TFFM), there was significant concern about apparent reductions in communications infrastructure investment.[136] As a result, the *Tunis Agenda* stressed the importance of an enabling environment that would incentivise private investment and would stimulate public-private cooperation and other innovative financing mechanisms. It was particularly concerned about the deployment of broadband networks and the infrastructure needs of small island states and low-income countries that are less commercially attractive to investors. As noted in Chapter 2, investment levels rose significantly after WSIS, and investment has continued to take place through the recent economic downturn. Nevertheless, financing challenges remain important and are a focus of attention for international financial institutions and regional associations. A two-day open consultation to review experience of financing mechanisms since 2005 was organised by UNGIS in October 2009, alongside the ITU Telecom World conference and exhibition in Geneva.[137]

As well as physical infrastructure, a great deal of attention has been paid by international agencies since 2005 to the enabling environment for investment which is contained in policy and regulatory regimes that are established, largely, at national Government level. This enabling environment features in the remit for both this action line and for Action Line C6, and is discussed in the section concerning the latter (below). One aspect of it, however—that concerned with universal access—is more relevant to this heading.

Universal service and universal access strategies have been part of telecommunications regulatory regimes for many years, built around obligations imposed on operators to provide service in all regions and to all communities, and on the desirability of funding mechanisms to support deployment of networks where they are not commercially viable.[138] In the last 20 years, many developing countries have legislated for universal access funds based on levies paid by operating companies. Some of the established strategies for promoting universal access have come into question, however, during the past five years. Universal access funds, especially those financed through levies, have been criticised by communications businesses and some international organisations.[139] Problems have included slow disbursement of funds and the challenge of identifying where these can best be allocated given the very rapid development of technology and markets. The number of locations which lack mobile network coverage is diminishing, and, as indicated in Chapter 2, near to universal mobile coverage is anticipated by 2015. The option of upgrading universal access objectives from voice to broadband capabilities is therefore discussed by Governments and regulators, while some countries have used universal access funds to support community access points as well as investing in new infrastructure.

The ITU's work across many aspects of infrastructure is catalogued in its comprehensive publication *WSIS+5*.[140] This lists many workshops and conferences, including activities at regional and national levels, covering the whole range of Action Line C2 concerns. ITU's Telecommunication Development Bureau (BDT), in particular, has played a crucial role, alongside agencies such as the World Bank, in providing information and guidance to policymakers and regulators on issues ranging from national ICT strategies and national regulation to spectrum management and the deployment of online tools.

In 2007, in association with other international partners, the ITU initiated a series of *Connect the World* summits which seek to build regional consensus on objectives and identify financial and other resources. The *Connect Africa* summit was held in Kigali, Rwanda in October 2007 and the *Connect CIS* summit in Minsk, Belarus in November 2009. Examples of other regional conferences on infrastructure issues during 2009 included the Pacific ICT Ministerial Forum in 2009, which had the theme "Connecting the Unconnected," and a series of five Regional Development Forums,

one for each United Nations region. Alongside the *Connect the World* summits, the ITU launched six flagship initiatives in 2009. These have included work to develop a Wireless Broadband Partnership which seeks to mobilise financing and deployment of broadband infrastructure, and a Connecting Villages programme, which supports innovative approaches to basic connectivity in remote and rural areas.[141]

Disaster management has been an increasingly important theme for Action Line C2, especially after the December 2004 tsunami. The ITU organised a Global Forum on Effective Use of Telecommunications/ICT for Disaster Management in 2007, which has been followed by regional and sub-regional activities. The Partnership Coordination Panel on Telecommunications for Disaster Relief (PCP-TDR) provides a framework for joint activity by telecommunications and relief organisations, including the International Federation of the Red Cross and Red Crescent and Télécoms sans Frontières. The ITU has created an Action Plan for Standardization of Telecommunications for Disaster Relief and Early Warning. Many agencies have undertaken capacity-building and project work concerned with disaster mitigation and relief.

Since 2009, communications and development agencies have paid increasing attention to the role of broadband infrastructure as the foundation for future networks. The World Bank has published influential reports concerning the projected economic impact of broadband and on the development of broadband networks in Africa.[142] The ITU has argued that broadband should be considered "basic national infrastructure" and claimed that it is "the most powerful tool ever devised to drive social and economic development."[143] The ITU and UNESCO joined forces in 2010 to coordinate the Broadband Commission for Digital Development, whose proposed agenda for action seeks to promote broadband investment and its application to help achieve the MDGs and other development objectives. The Commission's report[144] was submitted to the UN General Assembly in September 2010, and is considered further in Chapter 6.

Action Line C3—Access to information and knowledge

The central principle of Action Line C3 is that "the ability for all to access and contribute information, ideas and knowledge is essential in an inclusive Information Society." Its remit covers a range of issues which affect the ability of individuals and organisations to gain access to information and knowledge. It proposes an open approach to both the generation and availability of content and software, the strengthening of public domain resources and availability of access points. Objectives for Action Line C3 include:

- the development of guidelines for the promotion of public information and public domain information, including digital public information services;
- the promotion of community access points;
- the promotion of awareness of diverse software models, including open source as well as proprietary standards; and
- the facilitation of free or affordable access to research information, such as that in scientific journals, and other knowledge resources.[145]

A substantial civil society network has formed around Access to Knowledge (A2K),[146] which has also been a priority for UNESCO and for some bilateral donors. Governments of developing countries are keen to enable easier access to global information resources, especially in technical areas. The following are amongst the issues within this theme that have been prominent since WSIS:

- Public access of information: access by citizens and organisations to information held by their Governments and other stakeholders, which they believe can be of value to them. This includes both the legal framework enabling the release of public information ("freedom of information") and the availability of public facilities which can be used by all to obtain access to information, irrespective of their personal communications resources. The other side of this coin, from a developmental point of view, is the opportunity which new ICTs afford Governments to improve the range and quality of their communications with their citizens.
- Privacy and data protection. As well as seeking information from Governments, citizens are concerned about the type, accuracy and security of information which Governments and businesses hold about them. This issue also forms part of the "trust agenda" encompassed by Action Line C5.
- Intellectual property. New ICTs, particularly the Internet, have posed major challenges to long-established intellectual property norms, particularly those concerning copyright. Intellectual property rules are intended to balance the interests of content producers and those of content users, and thereby to support both innovation and the creative

use of ideas and publications within society. The Internet opens access for end-users to a far richer and more diverse range of content than before, from sources around the globe, greatly increasing access to information and knowledge. The Internet and digitalisation of content have also enabled easy bypass of intellectual property rules, though this has raised issues concerning the balance of interests between content producers and content users, and the long-term viability of current intellectual property arrangements.

- Proprietary and open source software. Software is essential for end-users to access and analyse information. Proprietary software, which is developed and marketed by commercial businesses, is widely used but competes in many markets with software which has been developed collaboratively outside corporate structures and is available online. Open source software, whose source code is publicly available to developers, was widely advocated during WSIS, and the balance between proprietary and open source approaches remains a subject of debate.

Action Line C3 has attracted interest from a wide range of organisations, providing a framework for sharing of experience and discussion of issues including information literacy and the potential of new technologies to enhance access for disadvantaged groups such as those with disabilities. More than half of the projects notified to the WSIS Stocktaking Database by April 2010 fell within the remit of this action line.

UNESCO has a core mandate to promote inclusive Knowledge Societies which addresses the objectives of Action Line C3—from enabling equitable infrastructure access to issues such as freedom of information and extending access to scientific resources. In 1998, UNESCO established an Observatory on the Information Society to monitor developments in access to public information, electronic commerce, privacy and confidentiality and other issues. In 2005, shortly before the Tunis summit, it published an influential report, *Towards Knowledge Societies*, which emphasised the human dimension of the Information Society and the importance of enabling information to be transformed into knowledge which can contribute to social and economic progress.[147] An expert meeting on *Knowledge Societies: the way forward*, held in Paris in 2010, explored ways in which the nature of societies is changing with developments in ICT technology and markets, and the need for the policy and practice of Governments and intergovernmental agencies to respond to this.[148]

UNESCO initiatives reported through this action line include its World Digital Library and Memory of the World programmes, which are concerned with the dissemination of cultural knowledge. The World Digital Library was launched in 2009 to provide free web access to cultural artefacts, while the Memory of the World programme seeks to preserve and broaden access to the documentary heritage of cultures throughout the world. In 2009, the UNESCO Institute for Statistics (UIS) published a guide to measuring and monitoring information and knowledge societies in education, and it has played an important part in the work of the Partnership on Measuring ICT for Development's work to reach beyond measuring ICT inputs towards measuring societal outcomes.[149] UNESCO has also promoted the use of free and open source software. Its work to promote access to scientific journals is reported, alongside that of other agencies, in the section on Action Line C7 on e-science.

The ITU has worked with the Global Alliance for ICTs in Development's Global Initiative for Inclusive ICTs (G3ict) to facilitate training of policymakers concerned with access for those with disabilities, and has implemented other capacity-building initiatives in this field. In 2009, it set up the Joint Coordination Activity on Accessibility and Human Factors. The World Intellectual Property Organisation (WIPO) has been particularly concerned with the implications of the Information Society for the intellectual property regime and *vice versa*. WIPO Lex, a database that provides free online access to intellectual property legislation and treaties, was launched in 2010.[150] Many of the issues covered by this action line are also discussed within the Internet Governance Forum.

Action Line C4—Capacity-building

Connectivity and information are of limited value to those who lack the capabilities to make use of them. The central principle of Action Line C4 is that "Every person should have the opportunity to acquire the necessary skills and knowledge in order to understand, participate actively in, and benefit fully from, the Information Society and the knowledge economy." The challenge represented by this applies not only to populations as a whole (where it is related,

for example, to low levels of literacy and primary education) but also to some social groups, especially women and girls, linguistic minorities, and those with disabilities. Objectives for Action Line C4 identified in the *Geneva Plan of Action* include:

- measures to include ICTs in education and training at all levels within society, including distance and lifelong learning;
- the promotion of 'e-literacy' skills for all, with special attention to women and girls, to young people and to disadvantaged groups; and
- capacity-building initiatives for, amongst others, "leaders and operational staff in developing countries and LDCs;" "local communities, especially those in rural and underserved areas;" and information professionals.[151]

Capacity-building for the Information Society is required at a number of different professional levels within societies. These include:

- policy and strategy development for ICTs, at national, local and sectoral levels;
- the regulation of communications markets;
- the design and deployment of e-government services;
- the implementation of electronic commerce;
- ICT design, deployment and maintenance skills, including technology, hardware, software and content production and presentation;
- the development of ICT businesses and micro-enterprises; and
- the training of teachers and others to extend ICT skills more widely within communities.

International and regional agencies have undertaken a great deal of work with national Governments in these areas since 2005 through conferences and workshops, consultancy projects and training initiatives. This work has sought to build a framework for the future development of required professional skills at a national and local level.

However, capacity-building is not simply a matter of professional training. End-users also need ICT-specific skills if they are to take advantage of the communications opportunities that become available to them. At the very basic level, literacy and keyboard skills are generally needed to make use of standard terminals (with appropriate adaptations for those with accessibility problems due to disability or other reasons). Effective use of more complex ICTs, particularly computers and the Internet, requires more extensive skills, including research, analytical and software capabilities. Basic understanding of computer maintenance, including security issues such as virus control and spam management, is also important for those dealing with computers and the Internet.

Skills training at this level may be located within national educational systems, at least for the young, but is also provided by private sector businesses and civil society organisations. Particular attention needs to be paid to the skills of women and girls, who are often under-represented in technical education and in ICT use, and to upgrading the skills of existing members of the workforce to help them adapt as change occurs within the workplace.

Capacity-building needs are affected, at both professional and end-user levels, by continual change in technology and markets. Equipment and software have short lifecycles and, as a result, generic skills have more lasting value than those that are specific to particular hardware or computer programmes. For the same reason, the professional skills of decision-makers and ICT personnel require frequent updating to ensure that they are able to manage and exploit new technology and information resources. Meanwhile, new opportunities for capacity building are emerging from technology and market developments including the use of mobile phones, social networking and other Web 2.0 resources.

Action Line C4 has provided a framework for UN agencies and other stakeholders to report on the capacity-building work which they undertake within their own mandates and programmes, to discuss shared experience and areas of common concern, and to explore the implications of new developments in technology and markets. In 2009, the annual action line facilitation meeting focused on new and emerging trends that challenge established capacity-building paradigms, including the growing availability of open education resources and of Web 2.0 and social networking tools which allow more interactivity and collaborative learning. The 2010 facilitation meeting focused on "Digital Opportunity."

UN and other stakeholders have sought ways to share training resources and make these more widely available. One example of this is the Academy of ICT Essentials for Government Leaders, which was developed by the ESCAP Asian and Pacific Training

Centre for ICT for Development, has since been taken up by the ECA and is being introduced by other UN Regional Commissions. The Academy offers a modular training programme aimed at equipping Government officials to take advantage of the new opportunities that ICTs make available to their societies. An online virtual Academy opened in February 2011.[152]

The ITU undertakes a wide range of activities through its Human Capacity Building programme, including regional and international training, workshops, e-learning opportunities, and the sharing of expertise across the telecommunications sector. It took the opportunity of the 2009 WSIS Forum to launch the ITU Academy, which brings together its capacity-building activities into a streamlined and more easily accessible form for potential users. More than 120 courses were conducted during 2010, including online courses, with an estimated 3000 participants. Training interventions are delivered principally through the Academy's global network of more than sixty centres of excellence and Internet training centres in 62 countries. During 2009, the ITU also organised a series of regional Human Capacity Development Forums, to promote good practice within capacity-building and training.[153]

Another example of capacity-building work within the UN system can be found in work of the United Nations Public Administration Network (UNPAN), which is sponsored by DESA. This maintains an Online Training Centre which provides courses and training materials in public administration and management. More than 2500 people enrolled in its courses during 2010, an increase of 7 per cent over the number of participants in 2009.[154] The WIPO Academy also offers capacity-building courses on intellectual property issues online.[155]

Looking from outside the UN system, the Internet Society (ISOC) emphasised the importance of leadership training in its contribution to the consultation for this review. The Internet's continual evolution and expansion make it particularly important for decision-makers to keep abreast of changes that are taking place in ICT technology and markets. The Internet's distributed governance architecture means that leadership development is required in Government and business, in the Internet professional community and in civil society, amongst decision-makers who are primarily concerned with the Internet and those who are primarily concerned with other policy domains. ISOC's Next Generation Leaders programme is one initiative to address this leadership challenge.[156]

Action Line C5—Confidence and security

No matter how valuable ICTs may be to their lives and livelihoods, people are less likely to use them if they lack confidence in their security and reliability, if they fear the loss of privacy concerning private information or if they are concerned about the risk of fraud. The *Geneva Declaration of Principles,* therefore, recognised that "a global culture of cyber-security needs to be promoted, developed and implemented in cooperation with all stakeholders and international expert bodies." The objectives in the *Plan of Action* mandate for Action Line C5 include issues concerning:

- network security;
- cybercrime and other illegal activity;
- privacy, data management and consumer protection;
- spam;
- the authentication of electronic documents (required for e-business); and
- the security of online transactions.[157]

While most WSIS action lines are concerned with maximising the benefits that can be derived from ICTs and the Information Society, Action Line C5 is primarily concerned with problems that are associated with them. Problems of confidence and security are widely felt to have increased in importance since the time of WSIS, partly as a result of international political and economic developments, but especially because of the growing importance of ICTs in societies and societies' growing dependence on them. Major disruption to access to the Internet today, for example through a "distributed denial of service" attack, is likely to be far more damaging to Government and business activity than it would have been five years ago.

The ITU has summarised the resulting challenges as follows:

> "The Internet and ICTs have enabled interconnection between countries that was not possible before. Countries cannot easily close their borders to incoming cyber threats and cannot either contain those coming from within. Attempts to solve these challenges at national or regional levels are important, but they are undermined. Cybersecurity is as global and far-reaching as the Internet. Therefore solutions need to be harmonized across all borders. This necessarily entails international cooperation, not only at government level, but also with industry, non-governmental and international organizations."[158]

These challenges can be divided into five main groups.

- Network security issues: these issues are concerned with the integrity of communications networks and systems at both global and national levels. Network security can be jeopardised for technical reasons, because of unexpected natural or environmental problems, or because of hostile action by Governments or other actors. The increasing scale and complexity of networks has increased the level of risk associated with these threats since 2005. International and regional organisations seek to mitigate the risk of network failure and expedite recovery should it occur.
- National and international security issues: these issues are concerned with political, military and criminal threats to economic and social order that may be implemented through or against communications systems. They include terrorism, organised crime, money laundering and coordinated attacks on the integrity of national or business networks. These issues lie at the interface between communications and other policy domains, including defence and policing. There has been increased concern recently amongst Governments about the risk of terrorism and the threat of disruptive attacks on national communications networks, including "distributed denial of service" attacks aimed at preventing access to parts of the Internet environment. Civil society organisations have been concerned about the balance between individual rights and the requirements of national security.
- Commercial security issues: these issues are concerned with the integrity of transactions between Governments, businesses and citizens. Online transactions require new forms of authentication, which need to be enabled through legal and regulatory frameworks. As the Internet transcends international borders, online transactions also raise complex issues of taxation, intellectual property, fraud management and consumer rights.
- Security issues of consumers of online services: these issues are concerned about the security of personal data and about protection against loss through fraud and misleading transactions. Governments and businesses collect data on citizens and consumers, which can be regulated through data protection legislation. However, data are now often warehoused outside national jurisdictions and this has raised issues of conflicting international norms. The advent of social networking over the past five years has led to substantial changes in the ways in which personal information is available online, posing potential risks to consumers and enabling data-mining by businesses and others who obtain access to their data. Civil society organisations have been particularly concerned about the balance between privacy and opportunity represented by these changes.
- Spam and malware: spam (unsolicited bulk email) and malware (including the use of botnets that enable remote clandestine access to personal computers for malicious purposes) are major problems for both consumers and network managers. They are associated with organised crime and expose consumers to the risk of fraud. Spam today accounts for more than 90 per cent of email traffic, which has high costs to communications networks, not least in bandwidth use.[159]

Cybersecurity has been an increasingly important theme for Governments and other stakeholders since WSIS, prominent in the programmes of individual agencies as well as the agendas of the WSIS Forum and the Internet Governance Forum. A roadmap for ongoing work within Action Line C5 was published by the ITU in 2010,[160] and high level panels on cybersecurity were held during both the 2009 and 2010 meetings of the WSIS Forum.

In 2007, the ITU launched the Global Cybersecurity Agenda,[161] a framework for international cooperation structured around five pillars of activity which are concerned with legal frameworks, technical and procedural measures, organisational structures, capacity-building and international cooperation. The Agenda, which is advised by a multi-stakeholder Expert Group, seeks to coordinate and encourage collaboration between national and regional agencies. The Expert Group's approach was set out in a *Strategic Report* published by the ITU in 2008. In addition to its collaborative work, the ITU has undertaken workshops and published manuals, including a *National Cybersecurity Self-Assessment Tool*, a *Toolkit for Cybercrime Legislation*, and a guide to *Understanding Cybercrime* for developing countries. The Cybersecurity Gateway provides access to international resources in the field.[162]

Another important element in WSIS follow-up has been the International Multilateral Partnership against Cyber Threats (IMPACT). This partnership between the ITU and private sector companies is concerned

with technical measures to combat new and evolving cyber-threats. It provides research capability and has assisted 40 countries in addressing cybersecurity requirements. In addition, its Global Response Centre provides a real-time aggregated early warning system for Governments and ICT professionals.[163]

Child protection has been an issue of concern to many stakeholders. The Child Online Protection programme was launched by a group of international agencies in 2008 to promote online protection of children and young people by providing guidance on safe behaviour. Guidelines have been prepared jointly by agencies including UNICEF, the ITU and Interpol.

UN agencies have also worked collaboratively to address cybersecurity issues within the UN Delivery as One framework. Other international and regional agencies which have played a part in Action Line C5 include the Council of Europe, UNCTAD and the ECA. The Council of Europe's Convention on Cybercrime is open for signature by both its own member countries and others around the world. Its principles have been promoted through a Project on Cybercrime (2006-2009), now developed into a second phase as the Global Project on Cybercrime.[164]

Action Line C6—Enabling environment

Two principles were set out in the *Geneva Declaration* for what became Action Line C6—that "An enabling environment at national and international levels is essential for the Information Society" and that "ICTs should be used as an important tool for good governance." This encompasses a wide range of policy, legal and regulatory frameworks, including those for the ICT sector itself (such as technical standardisation and spectrum management; and regulation to promote competition, attract investment and address market failures), investment promotion and enterprise development, intellectual property rules, Internet governance and the impact of ICTs on such policy domains as the environment and public safety.

This wide range of issues led to an extensive mandate for this action line being agreed within the *Geneva Plan of Action*. This mandate calls on Governments to "foster a supportive, transparent, pro-competitive and predictable policy, legal and regulatory framework, which provides the appropriate incentives to investment and community development in the Information Society." Other issues mentioned in the mandate, some of which cut across those of other action lines, include:

- efficient and equitable spectrum management;
- implementation of national Internet Exchange Points (IXPs);
- consumer protection legislation;
- online privacy (see also C5 above);
- policies to promote entrepreneurship and innovation and to enhance the competitiveness of small- and medium-sized enterprises;
- Government adoption of e-commerce and support for internationally interoperable e-commerce standards;
- policies for the secure storage and archival of documents and electronic records; and
- development of internationalised domain names for the Internet.[165]

Much discussion concerning an enabling environment has focused on the restructuring of telecommunications. The mainstream paradigm of telecommunications policy since the 1980s has centred on competitive markets. Fixed network operators which were once state-owned monopolies have been liberalised and (at least partly) privatised in most countries around the world. New communications services such as mobile telephony and the Internet have been introduced in competitive markets. Independent regulatory authorities had been established in 156 countries by 2010 to promote and oversee competition, an increase from 106 in 2000 and 137 in 2004.[166]

This restructuring of the industry is widely credited with having stimulated investment, increased access and improved the affordability of telecommunications services. It is, however, complex and many markets are only partly competitive. The relatively small number of competing operators in, for example, backbone and mobile access markets, means that issues of market dominance remain important and require continued regulatory intervention. Fixed network operators have often retained powerful positions in their domestic markets, sometimes because they continue to control bottleneck assets such as international gateways. Interconnection between operators and service providers remains a challenge in many cases. In recent years, regulators have sought to introduce "open access" principles and to "unbundle" local loops, requiring infrastructure owners to make their networks available on fair terms to their competitors. The allocation of spectrum is a continuing technical and economic challenge. Alongside these regulatory challenges, communications markets have been

subject to rapid changes in business ownership. Today's markets may still be regulated at a national level, but the leading businesses within them are likely to be transnational enterprises (TNCs) with extensive experience and interests in other countries.

Changes in the architecture of networks and the nature of services, which have accelerated since 2005, have also led to new regulatory models. Digitalisation and network convergence mean that historic divisions between broadcasting and telecommunications have been breaking down, opening up the possibility that consumers will be able to access any content—telephony, internet, broadcasting or their combinations—on any digital terminal—television, radio, computer, or phone—from any service provider and over any communications network. Technology- and service-neutral licences are now preferred by many regulators to the more specific licences that were previously used to set out the conditions under which operators provide service to consumers and interact with competitors. Internet Protocol-based "next generation networks" have changed many of the architectural and economic foundations of telecoms traffic management. Broadband networks, new wireless technologies and innovations in spectrum management have all added to this fluctuating and complex competitive landscape.

Many of these economic and technical restructuring processes were underway before or during WSIS, but they have become even more extensive since the Tunis summit, leading to changes in the ways in which ICT policy and regulation are developed and implemented. International and regional bodies have been substantially involved in assisting national regulators to adapt, and in supporting harmonisation of policy and regulation at regional levels. The 2010 facilitation meeting for Action Line C6 focused on ways of achieving enhanced cooperation amongst stakeholders in broadband policy, and launched a roadmap for the future direction of action line implementation up to 2015.[167]

The ITU has been prominent for many years in promoting good practice in policy and regulation, analysing regulatory trends and exploring new areas of regulatory practice through publications, conferences, workshops, online resources and technical assistance. Its work in this area since 2005 is detailed in its report *WSIS+5*. Publications include the influential *Trends in Telecommunication Reform*, which focuses each year on a different issue at the forefront of regulatory practice and innovation. Recent volumes have addressed *The Road to Next Generation Networks* (2007) and the role of regulation in stimulating growth (2009). The annual Global Symposium for Regulators provides a forum in which regulators can share experience and explore future challenges together. Guidance, capacity-building and advice to regulators is provided through resources such as the *ICT Regulation Toolkit*, the second edition of which has been published online, in partnership with *info*Dev, since WSIS;[168] the World Telecommunication Regulation Database; the ICT Regulatory Decisions Clearinghouse, and the Global Regulators' Exchange (G-REX), an online discussion forum for regulators. Periodic meetings of the World Telecommunication Policy Forum also provide an opportunity for policymakers to exchange views on changing ICT issues. The 2009 Forum, held in Lisbon, Portugal, examined the implications of convergence and issued opinions on Internet-related public policy issues, the implications of broadband and next generation networks, ICTs and the environment, confidence and security issues, and capacity-building.[169]

Alongside these global activities, the ITU provides a great deal of technical assistance and advice at regional and national levels. In 2009, for example, it organised workshops and seminars around the world on issues ranging from climate change to cybersecurity and from broadband deployment to accessibility for those with disabilities. It has provided extensive support to regional regulatory associations, such as those in East, West and Southern Africa, and to national regulators addressing the complex challenges described above. The work of the World Radiocommunication Conference of the ITU has also been critical in moving forward the agenda on spectrum management.

Other international agencies have played a comparable role in other fields of policy and strategy development. UN Regional Commissions, notably ECA, ESCWA and ECLAC, have worked extensively with the Governments of their member countries in developing national ICT strategies, as described in Chapter 5. UNCTAD has played a comparable role in assisting Governments to develop plans for the knowledge economy. The World Bank and other IFIs provide not only expertise but also investment, while the World Bank's Multilateral Investment Guarantee Agency (MIGA) helps to reduce risk for private sector investors in uncertain markets.

Action Line C7—ICT applications

The seventh principle set out in the *Geneva Declaration* was that "the usage and deployment of ICTs should seek to create benefits in all aspects of our daily life," with particular attention to specific development sectors and to poverty reduction and internationally agreed development goals.[170] In all, eight sectors were identified under this principle in the *Geneva Plan of Action*, and action line facilitation processes emerged from these following the *Tunis Agenda* in 2005.

The eight application areas identified in the *Geneva Plan* are as follows.

- E-government (including issues of administrative efficiency and transparency, service delivery, and related international cooperation);
- E-business (including the promotion of e-business enabled trade, new applications and content development, and support for small and medium sized enterprises in the ICT sector);
- E-learning (including education, training and capacity-building);
- E-health (including health promotion, access to information, epidemiology, health care, and medical assistance in humanitarian emergencies);
- E-employment (including employment standards, work organisation and productivity, and teleworking);
- E-environment (including environmental monitoring, the use of ICTs in environmental protection, and the handling of e-waste);
- E-agriculture (including information dissemination and public-private partnerships); and
- E-science (including the provision of high-speed Internet access to universities and research institutes, electronic publishing, and the exchange of scientific information).

C7 is the WSIS action line which is most strongly focused on the mainstream development agenda. The *Geneva Plan of Action* summarised its objectives as follows:

> "ICT applications can support sustainable development, in the fields of public administration, business, education and training, health, employment, environment, agriculture and science within the framework of national e-strategies."

All eight of the action line processes which have taken place within C7 have provided opportunities for experience-sharing and coordination. The work which is reported through these processes falls into five main categories:

- Global and regional conferences to establish priorities and coordinate international action;
- Coordinated programmes of interventions to address specific development challenges;
- Publication of manuals, best practice guidelines, summaries of shared experience and statistical or other information;
- Training and capacity-building initiatives for Government officials and other stakeholders, including specialist workshops; and
- Consultancy projects to support the work of individual Governments.

However, as with other action lines, the work which is reported through C7 represents only a small part of what has actually occurred within these ICT and development fields since 2005.

The following paragraphs briefly summarise the development policy context of the eight action lines within C7, and illustrate the work which has been done within them. Trends in development policy towards ICTs in general and the future of the Information Society are discussed further in Chapter 6.

The core objective of international development policy and practice since 2000 has been the achievement of the Millennium Development Goals. The Millennium Declaration established eight goals for poverty reduction and improvements in health, education, gender equity and environmental welfare which the international community agreed that it would strive to achieve by 2015. Seven of these goals were accompanied by specific targets, for example, to reduce by two thirds the maternal mortality ratio, which could also act as proxy indicators of progress towards wider improvements in the field concerned. The eighth goal sought to develop a global partnership for development, and included the target to "make available the benefits of new technologies, especially information and communications." Progress towards the MDGs has been monitored by the UN, with its major reviews in 2005 and 2010. In his introduction to the 2010 review, the UN Secretary-General maintained that the MDGs are achievable with the right mix of national and international policies, but warned that progress had been "unacceptably slow" and that some "hard-won gains" were jeopardised by climate, food and economic crises.[171]

Like development policymakers and practitioners in other fields, ICT4D advocates and practitioners have been concerned to maximise the contribution which ICTs make to achievement of the MDGs. While the principal means of achieving goals in areas like health, education or the supply of clean water lie within those development domains, the supportive role of ICTs in achieving the MDGs has been consistently advanced by ICT4D practitioners and in international policy documents including the recent report of the Broadband Commission for Digital Development. The challenge has been to identify the most effective mechanisms for this contribution and to ensure the integration of ICTs, in ways that will leverage their effectiveness, in mainstream development practice. ICT4D initiatives are recent and much experience has been based on pilot rather than scaled-up activity. This, together with the rapid and continuing change in technologies and services available, has meant that the evidence base on ICT4D is less robust than in some other development domains. However, it has grown substantially since WSIS, enabling Governments and other development actors to make better informed judgements about the best ways to deploy ICTs for development objectives than was previously the case.

It is widely agreed that ICTs have strong positive macroeconomic value as well as offering potential contributions to poverty reduction. They have enabled the creation of new employment sectors, for example in business process outsourcing, and have contributed to changes in market dynamics, such as by reducing information asymmetries. Innovation in technology and markets, which is central to the vitality of the ICT sector, has long been seen as a stimulus for economic growth. Access to information and knowledge enable individuals more readily to take advantage of opportunities that arise for them.

The experience in the development sectors within Action Line C7 suggests that two distinct types of impact can be identified. On one hand, there is the impact of the spread of ICTs throughout society, resulting from the fact that more people now have access to ICT devices and services, and that they are making more extensive use of them to do what they wish to do in order to achieve personal, social or economic objectives. This could be described as the impact of the evolving Information Society. On the other hand, there is the impact of development interventions, by Governments and other actors, which are explicitly intended to make use of ICTs to achieve developmental gains. This includes the mainstreaming of ICTs in development programmes, and could be described as the impact of ICT4D.

Both types of impact have grown significantly since WSIS. In particular, the rate at which mobile telephony (and, to a lesser extent, other ICTs) have spread throughout developing societies has been much faster than was anticipated at the time of WSIS. This has increased opportunities for individuals and businesses, and introduced new modalities through which ICT4D interventions can be deployed. The advent of social networking and mobile Internet add to this effect. In addition, the number and range of ICT4D interventions is now much greater than it was in 2005. As a result, there is a much larger evidence base on which to draw for assessment of what has been effective and why it has been so. As importantly, ICTs are much more consistently deployed as part of mainstream development interventions in areas such as health, education and agriculture, contributing to administration, service delivery and engagement between programme managers and beneficiaries.

The relationship between these two types of impact is considered further in Chapter 6.

C7A—E-government

E-government is concerned with the use of ICTs for Government administration and with the relationship between Governments and other stakeholders, including businesses, civil society organisations and individual citizens. It can be divided into five main categories, which in practice are often intermixed. These are concerned with:

a) data collection and analysis;

b) internal Government administration;

c) the delivery of public information;

d) the delivery of public services; and

e) transactional services such as the payment of taxes and obtaining of certificates.

E-government experience has spread substantially since 2005. ICTs have become integral to most Government processes. Computerisation of many functions, which was exceptional in Government practice in many countries 20 years ago, is now the norm. In most countries, at least some Government departments now have websites and other electronic services offering information to their citizens (see

Chapter 3). More Governments are making more services, including transactions, available to citizens, either directly online or through intermediary facilities such as India's Common Service Centres.[172] However, transactional websites are much more available in developed than developing countries.

DESA, which leads the UN's work on e-government, has identified five stages in the progress of e-Government from the provision of a small range of basic services to a position in which it has become central to all Government activity:[173]

1. *Emerging e-government*—based around one or more static websites offering little or no interaction with citizens.
2. *Enhanced e-government*—offering more information about policy and governance, and access to archived official documents.
3. *Interactive e-government*—enabling citizens to download official forms online.
4. *Transactional e-government*—enabling citizens to engage directly with Government online, for example by paying taxes through interactive websites.
5. *Connected e-government*—in which Governments develop an integrated back-office infrastructure for e-government, and provide opportunities for online consultation and citizen engagement.

There have been some difficulties with e-government deployment. A relatively high failure rate has been reported for e-government projects, and programmes are often reported to have exceeded budgets or failed to achieve expected gains. This has been attributed to a "design-reality gap," i.e. a mismatch between the expectations raised in e-government design and the realities of achieving those objectives on the ground, where project implementation is hampered by inadequate electrical power, lack of training and slower-than-expected adoption of new services by citizens.[174]

More attention is now being paid to consultation processes involving operational officials and end-users in programme design and to the restructuring of organisational processes which is needed to take maximum advantage of e-government. In its 2009 report to the CSTD on this action line, DESA commented:

> "… there is still a disconnection between e-government supply and demand in most countries. In places where citizens may not be aware of the existence of e-government services, or prefer not to use them, governments would do well to ask them why. One explanation may be that the majority of e-services are designed as efficiency measures … with little input from the intended beneficiaries."[175]

DESA has played an important part in documenting e-government initiatives, publishing global *E-Government Surveys* in 2008 and 2010, in succession to earlier work on e-readiness. The 2010 *Survey* focused on leveraging e-government during the recent time of economic crisis, drawing particular attention to ways in which Governments have sought to use ICTs as part of economic stimulus and recovery programmes. Its findings indicated that, while developed countries still outperform developing countries, middle-income countries have accelerated their e-government deployment and have now surpassed some developed countries in e-readiness. Many countries, however, continue to find it difficult to integrate e-services between ministries, while the participation of citizens in governance processes ("connected e-Government," as defined above) is still poorly developed.[176]

DESA has also issued a series of publications assessing e-government practices, offering a knowledge base for Governments wishing to extend their activities in this field. In 2010, as noted under Action Line C1, the ITU and UN Regional Commissions published a review of the global status of national e-strategies, illustrated with examples from the WSIS Stocktaking Database, which includes e-government initiatives. Amongst other agencies, UNDP has been concerned with work to improve democratic practice, including parliamentary and election processes, and with institutional mechanisms related to privacy, security, censorship and the control of access to and use of ICTs. It is also concerned to help civil society organisations use ICTs to enhance their participation and that of citizens in governance processes.

C7B—E-business

E-business is concerned with the use of ICTs for business management as well as with commercial relationships between Government and business (G2B), between businesses (B2B), and between businesses and consumers (B2C). Transactional arrangements within e-business are referred to as e-commerce.

As with e-government, e-business practice has grown rapidly since WSIS. Computerisation of business administration is now the norm in large and medium-sized businesses worldwide and in almost all businesses in developed countries. The use of mobile phones by small businesses in developing countries is now widespread and continues to grow rapidly, though the use of computers and the Internet remains more limited, especially in micro-enterprises. ICTs have enabled significant changes in supply chain management and helped to reduce information asymmetries between primary producers, wholesalers/traders, retailers and consumers, improving the efficiency of markets. The value of these enhancements to businesses depends significantly on the extent to which they adapt their organisation and structure to take advantage of them. More evidence is needed about distributional outcomes—i.e. how far e-business is leading to gains in overall economic welfare, and how far it is merely redistributing success to businesses that make more or more effective use of ICTs at the expense of those that make less or less effective use of them.

The action line on this theme has been led by UNCTAD. Action line meetings have focused on a number of issues since 2005, including global supply chains (2007), e-commerce as a facilitator of the competitiveness of small and medium-sized enterprises (SMEs) (2008), ICTs, enterprises and poverty alleviation (2009) and ICTs and rural enterprises (a joint activity with Action Line C7 on e-agriculture in 2010). A panel debate on e-business was held during the 2009 WSIS Forum.[177]

A number of UN and other agencies, including UNCTAD, the World Customs Organisation (WCO) and the International Air Transport Association (IATA), have worked on different aspects of large-scale business facilitation such as trade, customs and international transport. The Universal Postal Union (UPU) has actively explored interaction between postal and new media services. The International Trade Centre (ITC) has taken a particular interest in the potential of mobile communications to support the work of SMEs. The United Nations Industrial Development Organisation (UNIDO) has focused on the small business community in partnership with private sector companies, such as Microsoft and Hewlett Packard, bringing their expertise to developing country environments.[178]

UNCTAD's annual *Information Economy Report* has been an important source of information about large-scale changes in e-business and new thinking in the international community. The 2010 *Report* focused on enterprise, with special attention to the relationship between micro-enterprise and poverty reduction. It recognised that ICTs offer considerable gains for business practice and profitability, but called for increased Government and intergovernmental action to create enabling environments for investment, and to build the capacity of small enterprises. It also noted that many businesses of the poor are rooted in subsistence needs rather than entrepreneurship, and that particular attention should be paid to these if they and those that depend on them are not to be disadvantaged as the Information Economy evolves.[179]

In its submission to the consultation for this review, UNCTAD points out that the action line remit does not include an explicit reference to the role of ICTs in the enterprise sector. It supports the suggestion that a new target should be added to the WSIS targets in the *Geneva* outcome documents, concerned with connecting all businesses to ICTs. This target could make use of indicators which are currently collected by UNCTAD.[180] Other important e-business issues which are not covered by the action line remit include the use of ICTs in trade facilitation, customs and logistics.

C7C—E-learning

E-learning is the subset of educational objectives which is concerned specifically with the transfer and acquisition of knowledge. Important issues arising from this include the availability and affordability of equipment to access information resources (such as computers and Internet access in schools), the quality of teacher training and availability of ICT-skilled teachers, the availability of appropriate educational content, and assessment of the cost-effectiveness of ICT-based solutions to educational challenges compared with expenditure on other resources and inputs (teaching staff, class size, books, calculators, laboratory equipment *etc*.). Studies of the educational outcomes of ICTs, summarised by *info*Dev in 2005, have found mixed outcomes and debate continues among educators about the most effective ways of utilising ICTs in education.[181] Access to ICTs in education also raises important issues of equity between boys/men and girls/women, between urban and rural areas, between prosperous and marginalised communities, and between those who study in private and public schools.

Detailed compilations and assessment of experience in e-learning in Africa and South Asia have been published by *info*Dev since 2005.[182] Computer equipment and Internet connectivity are expensive items for school budgets in developing countries, and there has been much discussion about the most effective ways of addressing this challenge. Widespread distribution of child-centred computers has been strongly advocated by some Governments and other stakeholders, while others believe that it is better to rely on a more gradual approach to expanding the use of ICT equipment in the classroom. The advent of mobile Internet may impact on this question.

UNESCO, which leads work on this action line, believes that e-learning is "a cornerstone to building inclusive knowledge societies."[183] ICTs contribute in many ways to education, including administration and record-keeping, teacher training and curriculum support, distance learning for both school and university age students and for those in later life, and enhancements to the information resources available to students. These issues are closely related to those addressed in the capacity-building theme of Action Line C4.

The 2008 meeting of the action line took the form of a two-day specialist workshop on low-cost devices for education. A session on mobile learning was held at the 2009 WSIS Forum. At the 2010 Forum the emphasis was on the potential of new methods of learning, including online social networks and other Web 2.0 resources, learning using mobile devices, and Open Educational Resources, i.e. materials which are made available online for use by teachers and students beyond the original beneficiaries intended by their developers.

In 2007 UNESCO launched a set of ICT Competency Standards for Teachers, following multi-stakeholder cooperation with ICT businesses and academic institutions. Materials for these standards continue to be developed and updated. It has also worked with a variety of partners in capacity-building for teachers and educationalists and in the development of an Open Education Management Information System, and has identified online resources which can be used for training purposes and for teaching in post-conflict and post-disaster contexts. In 2010, UNESCO published a survey of the potential of ICTs in early childhood education and an analysis/guidelines for national policies on ICTs in education. It has also worked with *info*Dev to foster online expert discussion about e-learning issues.[184]

UNCTAD's *Information Economy Report* for 2010 emphasised the relationship between education, ICTs and enterprise, arguing that synergies between these sectors and cooperation amongst policymakers working in them are essential to achieving substantive development outcomes from ICT4D.[185]

C7D—E-health

As in education, ICTs now play a significant role in many areas of health management and service provision. These include administration and record-keeping, logistics management (for example, in connection with the coordination of drug stocks), health promotion (such as campaigns to reduce the incidence of malaria or HIV and those to improve sanitation practice), the training of clinicians and diagnostic support for them (especially in rural areas), patient support (such as reminders to take medication), and even—where the infrastructure and financial resources are available—remote surgical procedures. These applications make use of the full range of communications devices and services which are now available, from computers to mobile phones, from fax machines to Internet. In rural areas, the most dramatic innovations in e-health since 2005 have stemmed from the expansion in mobile connectivity and use, which have enabled patients to seek medical advice at the point of need and health managers to provide improved diagnostic and other support to local clinical personnel.

Many of the challenges associated with e-health concern the training of personnel in the use of ICTs and assessment of the cost-effectiveness of different kinds of intervention. International agencies have encouraged the development of e-health strategies by Governments, though (as indicated in Chapter 3) these are more common in developed than in developing countries. An important issue for such strategies is the integration of ICTs with other health interventions, the aim being to mainstream e-health into the broad portfolio of health programmes and services.

The action line on this theme has been led by the World Health Organisation (WHO). In 2009, the WHO declared that future priorities for the action line would be the legal and regulatory environment for e-health and the improvement of systems for monitoring disaster and emergency response, which it said "requires collaboration between countries, effective and durable public-private partnerships, and investment across sectors."[186]

Developments in e-health are monitored by the WHO's Global Observatory for e-Health (GOe).[187] This was set up in 2005 to build an evidence base of experience, raise awareness amongst Governments and the private sector of opportunities to invest in the area, and build capacity in relevant reporting, analysis and research. It undertook an initial global e-health survey in 2005, with a second survey in 2008/9. This second edition explored policy issues as well as other e-health experience, and paid special attention to the emergence of the mobile applications of e-health, known as m-health. Data from the survey are being used to compile a series of studies on different aspects of e-health, including telemedicine, the management of patient information, m-health, legal frameworks for e-health, e-health foundation actions and e-learning, as well as a systematic review of e-health policies and e-health country profiles. An atlas of country profiles and a report on the opportunities presented by telemedicine have been published in 2010, and others will follow in 2011.

Other WHO programmes include the Health InterNetwork Access to Research Initiative (HINARI), which provides free or low-cost online access to medical journals for developing countries (through agreements with more than 150 publishers), and the Health Metrics Network, which has developed several editions of a framework guide to standards. More than 80 countries have now applied the Health Metrics Network frameworks and standards to assess their national health systems and identify potential improvements in effectiveness.[188]

The ITU published a report and guidance on *Implementing e-Health in Developing Countries* in 2008, and has organised a number of conferences, workshops and other activities around e-health. A particular focus for both the ITU and the WHO has been the use of ICTs in emergency response and disaster relief, the importance of which was highlighted by the 2004 Indian Ocean tsunami and the 2010 earthquake in Haiti.[189] Amongst work by other international agencies in this area, the World Meteorological Organisation (WMO) has developed a coordinated global information infrastructure, the WMO Information System, to monitor, avoid and mitigate weather-based natural disasters.

C7E—E-employment

The Information Society is sometimes described as one in which information, rather than land, capital or labour, becomes the most important factor of production. In such a society, information skills will be in high demand and are likely to offer higher returns to employees. Progress towards an Information Society is also associated with growth in the significance of the service sector at the expense of agriculture, raw material production and manufacturing.

The ICT sector generates employment in a number of ways, which vary between countries and regions. These include the manufacturing of ICT equipment (which is increasingly led by manufacturers in Asia), the development of software (much of it undertaken by global businesses, some using global networks of software developers), business process outsourcing (although this may represent a transfer of jobs from high-cost to lower-cost labour markets) and the marketing, wholesale and retail of equipment and software. At a smaller scale, they include support services, such as web design and the design of mobile phone "apps," equipment and software maintenance, the provision of access through telecentres and cybercafés, and the sale of capacity on mobile phones by street-level micro-entrepreneurs. The overall employment gain represented by these different activities is difficult to estimate, but is believed to be considerable.

Alongside these employment gains, the growth of the ICT sector leads to reductions in the need for employment in some other sectors whose work is displaced by new communications. This is most evident where services which have previously been undertaken by intermediaries (such as travel agencies) become self-provided online by end-users, and in product markets (such as music, books and newspapers) where goods can easily be virtualised and distributed on demand. The overall impact of these changes is also difficult to assess, but is currently much larger in industrial countries than in developing countries. The rate of both increases and reductions in employment resulting from ICTs seems likely to increase as ICTs achieve more widespread coverage and adoption.

The increasing use of ICTs as productive inputs has led to a number of other changes in employment practice and relationships. There has been increasing globalisation of employment markets, especially amongst creative workers, through call centres and business process outsourcing. More workers now work from home part or all of the time, and industrial countries have seen some increases in self-employment and portfolio working which are attributed to the increased scope for home-working. Gender

impacts of ICTs on employment are unclear, but may also be significant, while new forms of job advertising and recruitment have emerged online.

The action line on this theme involves a number of UN and other agencies. As an example of work done within this field, the World Bank in 2009 reported on a newly-launched ICT Skills Initiative for developing countries, intended to work within and outside the formal educational process, involving both training and work placements. An initial pilot programme was to be undertaken in Nigeria, with the aim of scaling up to other countries. UNIDO'S Learning Initiative for Entrepreneurs Programme, implemented in cooperation with Hewlett Packard, has set up training centres in 11 countries, trained more than 18,000 students and is now being extended to Brazil, China and India. Software development has been a particular focus for UNIDO's work with Microsoft in East Africa, including the development of employment opportunities for ICT graduates.[190]

C7F—E-environment

At the time of WSIS, significant attention was paid to the potential of ICTs to address environmental challenges, for example by improving the capacity for environmental monitoring and providing early warning of and assisting in recovery from natural disasters. The remit for the action line on e-environment focuses on this potential and on the problem of e-waste, i.e. the disposal of the increasing volume of redundant hardware that results from the growth in ICT use and rapid turnover of ICT equipment.

Since WSIS, much more attention has been paid to two further dimensions of the relationship between ICTs and the environment. One is the contribution which ICTs make to the carbon and other emissions that are believed to result in climate change, which is growing faster than the contribution of any other economic sector. Growing international concern about the threat of climate change has elevated anxiety about this issue. The other dimension is the potential value of ICTs in enabling efficiency improvements (and so carbon savings) in other industrial sectors such as power and transport.

Environmental issues and "green IT" were identified as important new themes for the Information Society in a number of contributions to the consultation for this review. These new themes are discussed in section 3 of Chapter 6.

The action line on e-environment has focused most attention on electronic waste. This is the fastest growing source of solid waste, partly because continuing rapid improvements in information and communications technology mean that equipment rapidly becomes obsolete and so has a short replacement cycle. Dumping of obsolete products, many of which contain toxic materials, is an increasing challenge. The overall disposal problem is now growing faster in developing countries, where environmental protection measures are often more difficult to enforce, than in industrial countries.

The Basel Convention is the main global instrument for addressing problems of electronic waste, [191] and its secretariat works with other international agencies in this field including the United Nations Environment Programme (UNEP). International activity on aspects of e-waste management is coordinated through the Mobile Phone Partnership Initiative (MPPI), launched in 2002 to address the challenges of recycling and disposal of mobile phones[192], and the multi-stakeholder Partnership for Action on Computing Equipment (PACE), launched in 2008 to develop guidelines and facilitate recycling and disposal of computers.[193] A joint initiative called Solving the E-Waste Problem (StEP) has been organised by the United Nations University, UNEP, UNCTAD and UNIDO, to assist in the development of safe disposal methods for redundant equipment.[194]

C7G—E-agriculture

Agriculture is a critically important economic sector and a major source of employment in many developing countries. It includes very diverse forms of production, from large, often multinational enterprises at one end of the scale to small, often subsistence farmers at the other. Changes in agricultural practice and productivity can have a very substantial impact on the livelihoods of citizens, especially in rural areas, and especially the rural poor. As women play an important part in agricultural production, changes in agriculture and productivity may also impact substantially on gender equity.

Fixed telephone networks and television (though not radio) have historically been largely absent from rural areas of low-income countries (see Chapter 2). In the past, this has restricted the scope for agricultural interventions built around ICTs. Even today, the limited availability of ICTs in rural areas constrains e-agriculture. However, the growth of mobile phone coverage since 2005 has greatly increased the ability of small farmers to gain access to information resources

and to use mobile phones as tools in decision-making, marketing, and other areas of activity. The expansion of phone coverage has also provided openings for e-agriculture interventions by Governments, private sector businesses and NGOs.

A good deal has been written about the potential for mobile phones to support farmers and other primary producers. Mobile phones are considered to have been particularly valuable in reducing information asymmetries in markets and in improving market efficiency by enabling producers to target the best sources of inputs and the best outlets in which to sell their produce. Mobile telephony has also proved a useful tool for disseminating information on farming practice and for monitoring crop and animal disease. Research in South Asia suggests that it can be particularly valuable in improving the quality of decision-making, for example when farmers are considering how much of what crops to grow and the necessary inputs to support their choice. While the voice telephony and SMS functions of second generation mobile phones have enabled farmers to make substantial gains, these are expected to increase as mobile Internet becomes more widely available in rural areas. [195]

The remit for the action line on e-agriculture that was agreed at WSIS included just two issues: the dissemination of agricultural information and the value of public-private partnerships.[196] In 2006, the UN Food and Agriculture Organisation (FAO) set up a multi-stakeholder e-Agriculture Working Group to support implementation of the action line. In the following year, it launched the e-Agriculture Community of Practice to share knowledge and experience and act as "a global initiative to enhance sustainable agricultural development and food security by enhancing the use of ICT in the sector." This Community plays an important part in action line implementation, providing "an international framework to facilitate the processes of capturing, managing, and disseminating the lessons learned through national and regional activities," as well as those of multilateral programmes. It also provides a basis for international development, validation and dissemination of conceptual models and methodologies in e-agriculture.[197]

The Community of Practice has three main components: a web-based forum for multilingual collaboration (www.e-agriculture.org), face-to-face events, and in-country interventions including capacity-building. By the end of 2010, its web platform had some 8,000 members, made up of development practitioners, representatives of farmers' organisations, policymakers and ICT specialists from more than 150 countries. Activities in 2010 included four fora on e-agriculture issues: 1) gender; 2) ICTs and rural livelihoods (conducted with GenARDIS and APC); 3) the role of ICTs in agricultural value chains, learning repositories in agriculture, food and environment; and 4) ICTs for rural economic development. FAO hopes to grow the Community in 2011 by adding a new web platform, with improved online interaction, to its existing knowledge-sharing functions. It is also seeking financial support to put the Community on a stronger organisational footing.[198]

C7G—E-science

The final sector to be covered in Action Line C7 is e-science. The remit for this action line concentrates on the potential of ICTs for the collection of data and for the coordination of research.[199] The critical role of ICTs in research, development and innovation underpins concerns about e-science.

Connectivity at university level has improved substantially since 2005, and this has also led to improvements in the integration of higher learning centres in developing countries with those in other world regions. An important issue where research coordination is concerned has been the development of National Research and Education Networks (NRENs), which act as communications resources for universities and other research institutions at national level. The establishment of NRENs has been proposed as an indicator of the connectivity of scientific and research centres for the purpose of measuring WSIS target C (see Chapter 3).

Efforts on the e-science action line have been led by UNESCO. Access to scientific knowledge has been a priority, with particular attention to the fields of agriculture, health and the environment. Work has also been undertaken on the systematisation and standardisation of scientific data collection, such as that on meteorology.

Another issue of concern within the action line has been access to scientific journals. The cost of these is prohibitively high for many developing country universities, and UNESCO has promoted initiatives to make scientific journals available to them at lower cost. Other initiatives in this area include the WHO's HINARI programme[200] and related initiatives of FAO and UNEP (see Chapter 5).

Action Line C8—Cultural diversity and identity, linguistic diversity and local content

The principle underlying Action Line C8 is that "The Information Society should be founded on and stimulate respect for cultural identity, cultural and linguistic diversity, traditions and religions, and foster dialogue among cultures and civilizations." Its mandate is concerned with diversity of content, the preservation of cultural heritage and the availability of the Information Society's benefits to all, irrespective of their cultural or linguistic background.[201] UNESCO's *Universal Declaration on Cultural Diversity* provides a reference text for much of the work that is undertaken within this action line.[202]

The Internet has enabled tremendous growth in the quantity and diversity of content available to people who have Internet access. Mobile telephony has also enabled increased access to content, partly through interactive conversations, but also through the use of SMS text services and of the audio and video capabilities of many mobile phones. Rapid growth in the use of mobile Internet is now taking place and likely to continue from 2011 to 2015.

Content is useful to people when it adds value to their lives, by providing information, interaction or entertainment. Accessing content can be expensive for those on low incomes, and their use of ICTs, particularly Internet, is therefore likely to depend on the relevance and attractiveness of what they can obtain, the ease and convenience with which that content can be retrieved, and its affordability. Some of this content will be global in character—as the popularity of global news, sports and entertainment websites shows—but the availability of local content, providing information that is directly relevant to people's lives, is generally considered an important stimulus to Internet use and an important way in which the Internet can contribute to social and economic development. Governments and other agencies have therefore sought to stimulate the production of local content.

Content in local languages is particularly important for those who do not speak or read an international, regional or national language such as English, Chinese or Kiswahili. As discussed in Chapter 3, the availability of content in diverse languages has improved significantly since 2005, with the Internet becoming more capable of delivering material in non-Latin alphabets. An important development in this context has been the introduction of internationalised domain names (IDNs) in Internet addresses. At a practical level, this has enabled millions of Internet users and potential users to access the Internet by using their own, non-Latin scripts. It also has important symbolic value as part of the Internet's transition from its origins—in an academic and research network mostly located in developed countries—to a global resource equally available to everyone worldwide. Work on IDNs has involved ICANN and other Internet agencies, UNESCO, the ITU, UN agencies such as ESCWA and the private sector, and led to the first IDNs being authorised in 2009.

Content does not just take the form of information or entertainment. Interaction between people, through voice telephony, email, instant messaging, etc., also provides content. Since 2005, the range of interactive content has increased greatly as a result of Web 2.0 applications such as social networking, blogs and audio and video content-sharing sites. This has had particular significance for links between home-country and diaspora communities, which have been strengthened and accelerated by new media. Applications such as mobile transactions, which are discussed in Chapter 6, can also be considered forms of content which have expanded during the years since WSIS and had significant developmental value.

Cultural diversity is important not just for functional reasons. The sustainability of cultural diversity is an important concern of UNESCO and UN Regional Commissions. The Internet, with globalisation of information that has accompanied it, has been seen both as a threat to cultural diversity and as a means to make content from under-represented cultures more widely available. Likewise, new ICTs have provided opportunities to make information and interactive communications more readily available to disadvantaged social groups. A workshop on "Indigenous Peoples and the Information Society" was held as part of the WSIS Forum in 2010. Other multi-stakeholder partnerships have focused on ways of making ICTs more accessible to those with disabilities and socially marginalised communities.

UNESCO's work in this field includes the implementation of standard-setting Conventions and Recommendations on issues like the protection and promotion of diversity of cultural expression, the promotion and use of multilingualism and universal access to cyberspace. Other examples of UNESCO's work include the establishment of the World Digital

Library, which digitises and makes available copies of selected materials from cultural institutions around the world, and the Open Training Platform, an online collaborative hub providing access to free development learning resources. The ITU's work in this field has included support for access and use of ICTs by indigenous communities. In 2008, it launched a special initiative on Assistance to Indigenous People, including activities concerned with ICT access, telecentres and online training. It has also developed a portal for indigenous people, including tailor-made applications in banking, commerce, environment, Government, health and learning.[203]

Action Line C9—Media

The *Geneva Declaration*'s ninth principle recognised the continued importance of what it calls "traditional media:" print media and broadcasting. The associated action line mandate seeks to promote legislation concerning the independence and plurality of media, to support freedom of expression but also combat "illegal and harmful content," and to reduce international imbalances in media infrastructure, technical resources and human capabilities.[204]

The action line has focused on the international rights framework, including freedom of expression, diversity of content and plurality of media ownership. It affirms that the broad principles of this framework apply equally to traditional and new media. These are also matters covered in the "ethical dimension" theme of Action Line C10 (below).

New media have had a significant impact on traditional media such as newspapers, books and broadcasting. Some commentators have argued that they will displace traditional media. Others have argued that they add new dimensions and new modes of access to the established range of media which are available. The following developments have been particularly noteworthy since WSIS.

- Many newspapers and other publications are now available online as well as in print form. Some of these are freely accessible, while others are located behind a "paywall" requiring user subscription.
- Online media, including these and other sources, have undermined sales of newspapers and reduced the level of advertising revenue available to them. This has raised concerns about the future diversity and plurality of traditional media.
- Traditional journalism has been supplemented by "citizen journalism," i.e. contributions to news and public comment made by non-professionals through blogs, social networking sites such as Twitter, video sharing sites such as YouTube, SMS and MMS use of mobile phones, etc. The availability of these non-professional inputs has changed the character and broadened the sources of information available to traditional news media.
- Broadcasting content has become available on a wider range of platforms, including mobile phones and computers. Broadcasters have begun to make back catalogues and recent programmes available online for timeshift listening and viewing. Community radio has continued to grow around the world, and Internet-only broadcasters have also entered the market.
- Most national broadcasting markets are in transition from analogue to digital broadcasting, or expect to be so in the near future.

Action Line C9 has been facilitated by UNESCO. Participants in the action line have focused attention on the ways in which continuing technological and market changes affect the media environment. Subgroups have considered freedom of expression, press freedom and legislation to guarantee media independence and plurality, media development and capacity building, media literacy, information access through community media, and gender-related aspects of the media. UNESCO reports that "action line participants have explored how media production, distribution and consumption will be affected by social and market changes, including the impending switchover from analogue to digital broadcasting and the rise of online content generation by end-users."[205]

The development of free, independent and pluralistic media, and associated capacity-building, are important elements of UNESCO's International Programme for the Development of Communication (IPDC).[206] In 2009, this programme established more than sixty media development partnerships in developing countries, with a further 83 projects initiated in 2010. In the same year, UNESCO launched 23 new projects concerned with community media in Africa, Asia and Latin America, together with the Commonwealth of Learning and the World Association of Community Radio Broadcasters (AMARC). Other important aspects of UNESCO's work in this area have included the establishment of Media Development Indicators,

which have been used to assess the state of media development and freedom in different countries, and leadership of a programme to establish Community Multimedia Centres in Africa. In 2010, it published guidelines on user-generated content and media and information literacy, while an international expert group began to consider media and information literacy indicators. An Internet publication entitled *Freedom of Connection—Freedom of Expression: the Changing Legal and Regulatory Ecology Shaping the Internet* was prepared by the Oxford Internet Institute and published in November 2010.[207]

The ITU has also played an important role in this area by supporting the switchover from analogue to digital broadcasting, on which it has published guidelines and provided technical assistance to developing countries, and the development of Internet Protocol TV (IPTV).[208]

Action Line C10—Ethical dimensions of the Information Society

The tenth principle of the *Geneva Declaration* proposes that the Information Society "should foster justice, and the dignity and worth of the human person." ICTs, ICT content and the Information Society should therefore develop in accordance with human rights and fundamental freedoms, while action should be taken against abusive, illegal and exploitative uses of ICTs. The associated mandate states: "All actors in the Information Society should promote the common good, protect privacy and personal data and take appropriate actions and preventive measures' against 'illegal and other acts motivated by racism, racial discrimination, xenophobia and related intolerance, hatred, violence, all forms of child abuse, including paedophilia and child pornography, and trafficking in, and exploitation of, human beings."[209]

The ethical dimension of the Information Society is concerned with the relationship between Governments, businesses and citizens, rights and responsibilities, and the use of ICTs to bypass laws, regulations and social norms. Like Action Line C5, it is particularly concerned with negative aspects of the Information Society. Its underlying principle is that Knowledge Societies should be consistent with universal values as presented the Universal Declaration of Human Rights, and should inhibit the abusive use of ICTs.

Issues that arise within this area of WSIS follow-up include the following groups of issues: The first group deals with the relationship between ICTs and the internationally agreed framework of rights set out in the Universal Declaration of Human Rights and the International Covenants on Civil and Political Rights and on Economic, Social and Cultural Rights. Specific issues included in this group include freedom of expression, censorship in various forms (including the filtering of Internet content for political or cultural reasons), and a variety of constraints which are legislated in different territories concerning racism and "hate speech," political expression, pornography, copyright and intellectual property, defamation and the sale of restricted goods. The second group deals with issues concerning online anonymity, privacy and data protection. The third group deals with issues concerning access to personal communications and Internet usage records by security agencies and the police. The fourth group deals with the criminal use of the Internet, in particular use for organised crime, money laundering and child pornography.

Three aspects of the development of ICTs since 2005 have significantly affected this area of activity:

- The rapid growth of participation in the Information Society has enabled many more people to engage in online debate, but also increased users' vulnerability and the potential gains to be made through criminal or fraudulent activity online.
- The advent of social networking has greatly expanded the range of interactions in which people participate online, changing perceptions of privacy and leading them to make hitherto private information—often unknowingly—available to Governments, employers and others in the community.
- SMS and social networking sites, including Twitter, have enabled new forms of immediate interaction which have been used to organise collective activity of various kinds, including political protest, which represents an extension online of the freedom of association rights included in the rights regime.

Action Line C10 has been facilitated by UNESCO. Discussions in the action line have been primarily concerned with means of promoting universal values and principles for the Information Society and of preventing abuses of ICTs. UNESCO's own work in this area since WSIS has included the organisation of a series of Info-Ethics Conferences in Africa, Latin America, Europe and the Asia-Pacific region. Its Information for All Programme has set up a working group to consider a possible code of ethics for the Information Society, and it has organised training

workshops in relevant issues for Government officials. In 2010, UNESCO sponsored an international conference on information ethics in Africa, which focused on research and on the future development of African information ethics curricula.[210]

Human rights dimensions of the Information Society, which are central to the questions raised within this action line, have been widely addressed by international non-governmental organisations such as the Association for Progressive Communications, and have been extensively discussed within the Internet Governance Forum. Child protection aspects of the Action Line C10 agenda have been particularly prominent in these discussions. They are also discussed in connection with Action Line C5 above.

Action Line C11—International and regional cooperation

The final principle adopted in the *Geneva Declaration* relates the Information Society to wider global policy objectives, including the Millennium Declaration and other internationally agreed development goals, and affirms the need for "effective international and regional cooperation among Governments, the private sector, civil society and other stakeholders, including the international financial institutions." It draws specific attention to the role of the ITU in technical areas of the Information Society and to the need for financial and other support for 'economies in transition'. The associated mandate commends the inclusion of ICT projects in requests for donor assistance, the use of public-private partnerships, and the mainstreaming of ICTs in the work of international and regional organisations.[211]

Action Line C11 is in practice integrated with Action Line C1. Aspects of its remit related to the ICT sector are discussed above under Action Lines C1 and C6. Aspects concerned with the Millennium Development Goals are discussed under Action Line C7 and in Chapter 6. Overall coordination of international and regional action is discussed in Chapter 5.

SECTION 3—ASSESSMENT AND CONCLUSION

The annual reports of WSIS action line facilitators provide a useful listing of activities which have been undertaken by those agencies that report to or participate in them.[212] They identify many conferences, workshops and capacity-building initiatives, programmes and projects which have been undertaken to support one or other aspect of an action line theme. This gives an indication of what particular agencies are doing in particular areas of work, but it does not provide a sufficient framework for assessing progress towards a "people-centred, inclusive and development-oriented Information Society." There are four main reasons for this.

Firstly, much of the progress towards achieving WSIS objectives which has occurred since 2005 has resulted from changes in the communications landscape rather than from interventions which are explicitly intended to promote the WSIS goals. The changes in the communications landscape include, among others, the growth in adoption of ICTs by citizens, businesses and other social actors, the integration of ICTs in business and Government practice, and the introduction of new media channels such as social networking. Meanwhile, interventions to foster and facilitate progress towards the WSIS goals need to be placed within this broader context of adoption and use, described in Chapter 2, and of the evolving relationship between ICTs and social and economic change. As indicated in Chapters 3 and 4 above, this broader change is difficult to measure, but understanding its importance is fundamental to our understanding of progress towards the Information Society.

Secondly, the action line and stocktaking processes record a fraction of the activities which are implemented by ICT and development agencies—those activities which stakeholders involved have chosen to report through those platforms. They do not capture the much larger number of initiatives which are not reported through them, but which also contribute towards fostering the WSIS outcomes—many of which are undertaken in part because the Summit itself raised awareness and engagement with ICTs. Most of these are undertaken by stakeholders that do not participate within the action line or stocktaking processes, including those that operate at the national rather than at the international or regional level.

Thirdly, because ICTs are general purpose technologies which are becoming more pervasive in society and mainstreamed in much development activity, their presence may actually receive less notice now than before. Computer databases and modern communications are now intrinsic to the management

and delivery of most Government, development and business initiatives, but few of these would be recognised as ICT4D interventions by those involved. Instead, ICTs are being included because they are the most appropriate means to meet the needs of the programme or project concerned. This unremarked presence of ICTs as a normal part of the design and delivery of development activity symbolises both the mainstreaming of ICTs in development and the transition to Information Society thinking in Government and programme/project management.

Finally, it should be remembered that the action line remits are concerned with only some of the issues that fall within the themes they represent. In the case of e-agriculture, for example, two aspects of ICTs are included in the remit that was agreed at WSIS—the dissemination of information on farming practice and the potential for public-private partnerships. No mention is made of other ways in which ICTs are known to contribute to agricultural productivity and livelihoods, such as the wider availability of information on market prices and consequent reduction in information asymmetry within markets, improvements in the efficiency of supply chains and export management, veterinary monitoring, mobile transactions, etc. Some of the action lines, therefore, provide only a partial view of their thematic areas. At this stage, halfway towards the comprehensive review in 2015, it would be appropriate for action line facilitators to review their action lines, as the ITU and other agencies within the Partnership on Measuring ICT for Development have done.

The experience of the action lines is valuable, but it does not provide sufficient basis on its own for the comprehensive review of progress towards the Information Society required in 2015. That will also need to draw on the substantial body of literature from intergovernmental organisations, research institutes, academic and civil society sources which has been published since 2005, some of which is listed in the bibliography of this review. This is discussed further in Chapter 7.

The WSIS action line process has been in transition during the past two years. When experience of the original approach to action line meetings was reviewed in 2008, it was generally felt that the process has been disappointing in a number of respects. Action line meetings which were held in 2007 and 2008 were less well attended and attracted a less diverse group of participants than had been hoped. The structure of meetings, held over a two or three week period in Geneva, made it difficult for stakeholders to attend, particularly those from developing countries, from the private sector and from civil society. With no financial resources of their own, action line meetings were unable to initiate substantive new activities, though facilitators sought to use meetings to share experience and bring potential partners together in ways that might achieve collaborative outcomes.[213] Most of the action lines did not achieve any significant continuity or momentum in the period between their annual meetings.

UNESCO summarised the case for revitalising the action lines in a report on its own work to follow up the WSIS outcomes which was published in 2010.

> "If they are to be worthwhile, consultation meetings must add value that goes beyond what participating organizations can achieve alone. That value can be derived in several ways: from the exchange of experience and lessons learned from existing practices, from the establishment of synergies and joint activities between different participants, and/or from the opportunity to develop thinking about aspects of the Knowledge Societies and of changes in the information and communication environment. Future meetings must be more than routine exchanges of information if they are to add this value."[214]

Concern about these limitations led the coordinators of the action line process, namely, the ITU, UNESCO, the UNDP and UNCTAD, to consult in 2008 about alternative ways of coordinating action line activity. That consultation led to the introduction of a more structured WSIS Forum from 2009, which has provided a space for holding broader discussions of Information Society outcomes as well as maintaining a framework for meetings of the action lines. The Forum is generally felt by participants to have been a substantial improvement on the earlier clustered meetings. UNCTAD, for example, states in its response to the consultation for this review that it has "fostered greater exchange of information, interaction among different stakeholders and offered a good platform for networking."[215]

Some agencies would like to see this new approach deepened through the organisation of more joint meetings of action lines, where experience could be shared between different specialist communities. Some of these have enriched the WSIS Forum in 2009 and 2010, including joint discussions between

Action Lines C1 and C6 and between the e-business and e-agriculture action lines within C7. UNESCO has suggested a number of other innovations, including extended workshops on detailed aspects of action line remits, focusing debate and enabling more substantive discussion than takes place at present.[216]

Other suggestions for improvements in the action line process were made during the consultation for this review, by UNCTAD and the Association for Progressive Communications.

UNCTAD identified four main problems from its experience with Action Line C7 on e-business. They were deficiencies in 1) coordination between facilitators and with other stakeholders between annual meeting of action lines; 2) well-defined targets for the action line or action lines, particularly concerning ICTs and enterprise; 3) specific expectations for the facilitation process itself; and 4) financial resources which would enable action lines to reach out to other stakeholders through contact mechanisms other than their annual meetings.[217]

To address these, UNCTAD has suggested five changes to the current process: 1) clarification of the role of action line facilitators and the expectations placed upon them; 2) support for developing country participation in the WSIS Forum, to make that event more inclusive of developing country perspectives; 3) more interaction between facilitators of different action lines, which would encourage more cross-cutting discussion and experience-sharing; 4) more resources for the work of the Partnership on Measuring ICT for Development and for the collection of relevant data; and 5) the inculcation of a culture of regular review of policy objectives, including those of national ICT strategies, to ensure that they continue to be relevant to national needs.

From a civil society perspective, the Association for Progressive Communications (APC) has suggested a number of changes in the dynamics of action lines which it believes are necessary if they are "to become a more constructive platform for shared learning, collaboration, networking and monitoring of the Geneva Action Plan and Tunis Agenda."[218] It would like to see action line processes become:

- more participatory, by putting clear mechanisms in place for the effective engagement and inclusion of all interested parties, particularly those from developing countries;
- more proactive, by coordinating initiatives across agencies and stakeholder communities;
- more analytical, by addressing a small number of specific issues in detail;
- more evaluative, by monitoring activity related to WSIS outcomes; and
- more informative, by facilitating exchange of information between participants.

The action line and stocktaking processes provide a snapshot of initiatives that are being undertaken, particularly by UN agencies, rather than a comprehensive overview of interventions or of developments towards the Information Society. The WSIS Forum provides an opportunity for more cohesive discussion of WSIS outcomes than was available during the first three years after WSIS, and has considerable potential to add value and increase understanding of the broader aspects of Information Society development. Further innovations in the meeting's structure are planned for 2011, which should offer additional value to participants and address some of the suggestions made in previous paragraphs. However, challenges remain for developing the Forum, in particular the need to secure greater inclusion from developing country, private sector and civil society participants. The WSIS Platform of Communities, which has been developed by UNESCO, and the WSIS Stocktaking Platform, which has been developed by the ITU, can complement the Forum by stimulating discussion and interaction between stakeholders in the periods between annual meetings.

NOTES

[113] http://www.itu.int/wsis/stocktaking/scripts/search.asp.

[114] See, for example, UNESCO, *Towards Inclusive Knowledge Societies*, pp. 22-25.

[115] Reports are available from http://www.unctad.org/Templates/Page.asp?intItemID=4242&lang=1.

[116] Available from http://www.unctad.info/upload/WSIS5/Contributions/UNGIS/ITU.pdf.

[117] 17 May.

[118] See UNESCO, *Towards Inclusive Knowledge Societies*, para. 2.5.6.

[119] Reports are available from http://www.unctad.org/Templates/Page.asp?intItemID=4242&lang=1.

[120] The principles underpinning each Action Line can be found in the *Geneva Declaration*, section B.. The full remit for each Action Line appears in the *Geneva Plan of Action*, section C.

[121] *Geneva Plan of Action*, paragraph 8.

[122] The WSIS definition of the roles of the various stakeholder groups that it identified can be found in Chapter 1.

[123] *Tunis Agenda*, paragraph 85.

[124] ITU (2010) *National e-Strategies for Development: Global Status and Perspectives*.

[125] See, for example, DESA response to this consultation. Available from http://www.unctad.info/upload/WSIS5/Contributions/UNGIS/DESA.pdf. UNCTAD, *Information Economy Report*, 2010, chapter 5. Available from http://www.unctad.org/en/docs/ier2010_embargo2010_en.pdf.

[126] UNDP, Global GIF Meeting - Rio de Janeiro, Brazil 4 - 6 May 2010, "Background." Available from http://ictdegov.org/e-gov/gif2010/.

[127] ITU (2011) *National e-Strategies for Development: Global Status and Perspectives*. Available from http://www.itu.int/ITU-D/cyb/estrat/estrat2010.html.

[128] DESA response to the consultation. Available from http://www.unctad.info/upload/WSIS5/Contributions/UNGIS/DESA.pdf.

[129] Reports on the activities reported above can be found in relevant agencies' contributions to this review, http://www.unctad.info/en/CSTD_WSIS5/Contributions/.

[130] See *Geneva Declaration*, section B2; *Geneva Plan of Action*, paragraph 9.

[131] Data from Hamilton Research Ltd, Africa Bandwith Maps. Available at http://www.africabandwidthmaps.com/.

[132] See chapter 3.

[133] Hamilton Research, Africa Bandwith Maps.

[134] African Union, *ICT in Africa – Information Sheet N5: Harmonization of ICT Policies in Sub-Sahara Africa (HIPSSA)*. Available from http://www.africa-union.org/root/au/Conferences/2010/January/summit/informationsheet/5%20INFORMATION%20SHEET%205%20-%20HARMONIZATION%20OF%20ICT%20POLICIES%20IN%20SUB-SAHARA%20AFRICA.pdf.

[135] ITU, *West African Common Market Project: Harmonization of Policies Governing the ICT Market the UEMOA-ECOWAS Space – Licensing*. Available at http://www.itu.int/ITU-D/treg/projects/itu-ec/Ghana/modules/Licensing.pdf.

[136] Task Force on Financial Mechanisms for ICT for Development, *Report of the Task Force on Financial Mechanisms for ICT for Development*. Available from http://www.itu.int/wsis/tffm/final-report.pdf.

[137] http://www.ungis.org/Default.aspx?tabid=621.

[138] See *info*Dev, *ICT Regulation Toolkit*, module 4. Available from http://www.ictregulationtoolkit.org//en/SectionPDF.3126.html.

[139] See *e.g.* GSM Association, *Universal Access: how mobile can bring communications to all*. Available from http://www.ungis.org/Default.aspx?tabid=621.

[140] http://www.itu.int/itu-wsis/docs/WSIS+5.pdf, henceforth ITU *WSIS+5*.

[141] These initiatives are reported in ITU *WSIS+5*, see above.

[142] Yongsoo Kim *et al.* (2010) *Building Broadband Strategies and Policies for the Developing World* (World Bank, January). Available from http://siteresources.worldbank.org/EXTINFORMATIONANDCOMMUNICATIONANDTECHNOLOGIES/Resources/282822-1208273252769/Building_broadband.pdf; Mark Williams, *Broadband for Africa*, at http://www.infodev.org/en/Document.526.pdf.

[143] http://www.itu.int/en/broadband/Pages/vision.aspx.

[144] http://www.broadbandcommission.org/report1/report1.pdf.

[145] *Geneva Declaration*, section B3; *Geneva Plan of Action*, paragraph 10.

[146] http://a2knetwork.org/.

[147] http://unesdoc.unesco.org/images/0014/001418/141843e.pdf.

[148] UNESCO's work in connection with WSIS is summarised in its publication *Towards Inclusive Knowledge Societies*, http://unesdoc.unesco.org/images/0018/001878/187832e.pdf.

[149] UNESCO, *Measuring and Monitoring the Information and Knowledge Societies: a Statistical Challenge* (UNESCO 2003). Available from http://www.uis.unesco.org/ev.php?ID=5504_201&ID2=DO_TOPIC.

[150] On these and other initiatives within Action Line C2, see responses to the consultation for this review at http://www.unctad.info/en/CSTD_WSIS5/Contributions/ and annual reports to the CSTD at http://www.unctad.org/Templates/Page.asp?intItemID=4242&lang=1.

[151] *Geneva Declaration*, section B4; *Geneva Plan of Action*, paragraph 11.

[152] http://www.unapcict.org/academy.

[153] http://www.itu.int/ITU-D/hcb/.

[154] http://www.unpan.org/ELearning/OnlineTrainingCentre/tabid/1456/language/en-US/Default.aspx.

[155] http://www.wipo.int/academy/en/.

[156] http://www.isoc.org/leaders/; see also Internet Society response to this consultation. Available from http://www.unctad.info/upload/WSIS5/Contributions/OtherStakeholders/Internet_Society.pdf.

[157] *Geneva Declaration*, section B5; *Geneva Plan of Action*, paragraph 12.

[158] ITU, *WSIS+5*, p. 20.

[159] "Spam Volume Increased by 10% from May to July" (2010) *Spamfighter News*, 20 August. Available from http://www.spamfighter.com/News-14973-Spam-Volume-Increased-by-10-from-May-to-July.htm.

[160] http://www.itu.int/itu-wsis/docs/WSIS-AL-Roadmap_E.pdf.

[161] http://www.itu.int/osg/csd/cybersecurity/gca/.

[162] http://groups.itu.int/Default.aspx?tabid=841. On this and other ITU work, see ITU, *WSIS+5*.

[163] http://www.impact-alliance.org/home/index.html.

[164] http://www.coe.int/t/DGHL/cooperation/economiccrime/cybercrime/default_en.asp.

[165] *Geneva Declaration*, section B6; *Geneva Plan of Action*, paragraph 13.

[166] ITU, Regional Profile. Available from http://www.itu.int/ITU-D/icteye/Reporting/ShowReportFrame.aspx?ReportName=/TREG/SeparateRegulator&ReportFormat=HTML4.0&RP_intClassID=1&RP_intLanguageID=1&RP_intYear=2010.

[167] ITU (2010) *Action Line Roadmaps*. Available from http://www.itu.int/itu-wsis/docs/WSIS-AL-Roadmap_E.pdf.

[168] http://www.ictregulationtoolkit.org/en/index.html.

[169] On these and other ITU activities, see ITU, *WSIS+5*.

[170] *Geneva Declaration*, section B7.

[171] http://www.un.org/millenniumgoals/pdf/MDG%20Report%202010%20En%20r15%20-low%20res%2020100615%20-.pdf.

[172] http://www.indg.in/e-governance/cscscheme/common-service-centres-scheme.

[173] *UN E-Government Survey* 2008 (ST/ESA/PAD/SER.E/112), p. 16. Available from http://unpan1.un.org/intradoc/groups/public/documents/un/unpan028607.pdf.

[174] See Richard Heeks, *Implementing and Managing E-Government* (Sage Publications 2006).

[175] http://www.unctad.org/Templates/Download.asp?docid=11384&lang=1&intItemID=4821.

[176] United Nations Department of Economic and Social Affairs *United Nations E-Government Survey 2010* (United Nations). Available from http://unpan1.un.org/intradoc/groups/public/documents/un/unpan038851.pdf.

[177] See the summaries of annual meetings of Action Line clusters (2006-2008) and the WSIS Forum (2009ff), for example, http://www.itu.int/wsis/implementation/2010/forum/geneva/.

[178] See responses to the consultation. Available from http://www.unctad.info/en/CSTD_WSIS5/Contributions/.

[179] http://www.unctad.org/en/docs/ier2010_embargo2010_en.pdf.

[180] http://www.unctad.info/upload/WSIS5/Contributions/UNGIS/UNCTAD.pdf.

[181] *info*Dev, *Knowledge Maps: ICTs in Education*; see also the EduTechDebate launched by *info*Dev and UNESCO. Available from http://www.infodev.org/en/Article.669.html.

[182] http://www.infodev.org/en/Project.7.html; http://www.infodev.org/en/Project.103.html; http://www.infodev.org/en/Project.8.html.

[183] Progress made in the implementation of and follow-up to the outcomes of the World Summit on the Information Society at the regional and international levels—Report of the Secretary-General (UNGA A/65/64 e/2010/12), p. 21.

[184] UNESCO reports are available from http://www.unctad.org/Templates/Page.asp?intItemID=4242&lang=1.

[185] http://www.unctad.org/en/docs/ier2010_embargo2010_en.pdf.

[186] Submission by WHO on their efforts in 2009 to implement the outcome of the WSIS. Available from http://www.unctad.org/sections/wcmu/docs/ecn232010_WHO.pdf.

[187] http://www.who.int/goe/en/.

[188] WHO response to this consultation. Available from http://www.unctad.info/upload/WSIS5/Contributions/UNGIS/WHO.pdf.

[189] See also Chapter 5 for more information on the ITU's work in this area.

[190] UNIDO annual report on WSIS implementation, 2011, at http://www.unctad.org/Templates/Page.asp?intItemID=4242&lang=1.

[191] http://www.basel.int/text/17Jun2010-conv-e.pdf.

[192] http://www.basel.int/industry/mppi.html.

[193] http://www.basel.int/industry/compartnership/.

[194] http://www.step-initiative.org/.

[195] Notable articles include Robert Jensen (2007) "The Digital Provide: Information (Technology), Market Performance, and Welfare in the South Indian Fisheries Sector," in *Quarterly Journal of Economics (*Vol. 122, No. 3). Available from http://qje.oxfordjournals.org/content/122/3/879.full.pdf+html. Jenny Aker (2010) "Information from Markets Near and Far: The Impact of Mobile Phones on Agricultural Markets in Niger," *American Economic Journal: Applied Economics*. Harsha de Silva and Dimuthu Ratnadiwakara (2010) "ICT Policy based on a Transaction Cost Approach: Some Lessons from Sri Lanka," *International Journal of ICT Research and Development in Africa* (Vol. 1, No. 1, Jan–Mar).

[196] *Geneva Plan of Action*, paragraph 21.

[197] http://www.e-agriculture.org/members.

[198] FAO response to this consultation. Available from http://www.unctad.info/upload/WSIS5/Contributions/UNGIS/FAO.pdf.

[199] *Geneva Plan of Action*, paragraph 22.

[200] http://www.who.int/hinari/en/.

[201] *Geneva Declaration*, section B8; *Geneva Plan of Action*, paragraph 23.

[202] http://unesdoc.unesco.org/images/0012/001271/127160m.pdf.

[203] ITU response to this consultation. Available from http://www.unctad.info/upload/WSIS5/Contributions/UNGIS/ITU.pdf.

[204] *Geneva Declaration*, section B9; *Geneva Plan of Action*, paragraph 24.

[205] UNESCO response to this consultation. Available from http://www.unctad.info/upload/WSIS5/Contributions/UNGIS/UNESCO.pdf.

[206] http://www.unesco.org/new/en/communication-and-information/intergovernmental-programmes/ipdc/

[207] UNESCO response to this consultation.

[208] See ITU, *WSIS+5*.

[209] *Geneva Declaration*, section B10; *Geneva Plan of Action*, paragraph 25.

[210] UNESCO response to this consultation.

[211] *Geneva Declaration*, section B11; *Geneva Plan of Action*, paragraph 26.

[212] http://www.unctad.org/Templates/Page.asp?intItemID=4242&lang=1.

[213] For example, through the e-Agriculture Community of Practice, see above.

[214] UNESCO, *Towards Inclusive Knowledge Societies*, pp. 27-28.

[215] UNCTAD response to this consultation. Available from http://www.unctad.info/upload/WSIS5/Contributions/UNGIS/UNCTAD.pdf.

[216] UNESCO has experimented with this approach in Action Line C7 on e-learning.

[217] UNCTAD response to this consultation. Available from http://www.unctad.info/upload/WSIS5/Contributions/UNGIS/UNCTAD.pdf.

[218] APC response to this consultation. Available from http://www.unctad.info/upload/WSIS5/Contributions/OtherStakeholders/APC.pdf.

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CHAPTER 5

WSIS THEMES AND INTERNATIONAL AND REGIONAL ACTIVITIES

This chapter is divided into two main sections. In addition to the action lines, the *Tunis Agenda for the Information Society* addressed three broad themes which have formed part of WSIS follow-up since 2005. Work to follow up one of these themes, the measurement of ICTs and ICT4D, including the work of the Partnership on Measuring ICT for Development and the WSIS Stocktaking Database, has been described in Chapter 2. Section 1 of this chapter discusses work which has been undertaken to follow up the broad themes of Internet governance and financing mechanisms for ICTs and ICT4D. Section 2 of the chapter then describes the work which has been undertaken on a general level by international and regional organisations, including UN agencies, in their efforts to implement WSIS objectives.

SECTION 1—WSIS THEMES

Internet governance

The *Tunis Agenda* recommended the introduction of two main follow-up processes concerned with Internet governance: the establishment of an Internet Governance Forum and a process of "enhanced cooperation" on Internet public policy issues. Both of these outcomes were subsequently initiated by the UN Secretary-General, and both are currently under review two separate processes which are being conducted by the CSTD and DESA.

The Internet is central to the development of the Information Society, and was at the heart of discussions at WSIS, where Internet governance was a particular concern for many participants. A multi-stakeholder Working Group on Internet Governance (WGIG) was established by the UN Secretary-General between the first and second phases of the Summit, to explore issues of Internet governance that were not resolved during the Geneva phase. Its report, and the issues surrounding it, became major themes for discussion during the second summit phase.

The *Tunis Agenda for the Information Society* included two main outcomes concerned with Internet governance. Firstly, it asked the UN Secretary-General to establish an Internet Governance Forum which would provide a space for multi-stakeholder discussion of internet public policy issues, though without decision-making powers. Secondly, it called for a process of "enhanced cooperation … to enable Governments, on an equal footing, to carry out their roles and responsibilities, in international public policy issues pertaining to the Internet, but not in the day-to-day technical and operational matters, that do not impact on international public policy issues."

The term "Internet governance" is used to refer both to the governance of the Internet itself (sometimes called "narrow Internet governance") and to the interface between the Internet and other public policy domains (sometimes called "broad Internet governance"). Because of the way in which the Internet has developed, it has largely relied upon Internet-specific governance entities for its "narrow" governance. These global and regional Internet-specific bodies are multi-stakeholder rather than intergovernmental in character. They fall into three main categories:

- Standards bodies: these include the Internet Engineering Task Force (IETF), which develops the core protocols of the Internet (TCP/IP) and protocols and standards that depend on these; and the World Wide Web Consortium (W3C), which develops protocols and standards for the Web. The technical interface between the Internet and telecommunications networks is also an important interface between the IETF and the Telecommunication Standardization sector of the ITU (ITU-T).
- Coordination bodies: these are responsible for the management of domain names and numbers and other technical coordination functions. They include the Internet Corporation for Assigned Names and Numbers (ICANN) at the global level, five Regional Internet Registries (RIRs) at the continental level, and registries for top level (gTLD) and country level (ccTLD) domains.
- Discussion fora: these include the Internet Society (ISOC), the Internet Governance Forum (IGF) and regional IGFs that have emerged since WSIS as spaces for multi-stakeholder discussion of Internet governance and related public policy issues.

Because the Internet has become pervasive in many societies, it interfaces with a wide range of other governance issues and, therefore, with other international and regional governance bodies. Important issues at these interfaces include the management of critical Internet resources (such as the domain name system), access and connectivity, the impact of the Internet on development, trade, security and cybercrime, content development and intellectual

property, content controls and freedom of expression, and the underlying structure for e-government and e-commerce. These issues are addressed by many non-Internet organisations at international level (from the World Intellectual Property Organisation to Interpol), and by Governments and other mainstream agencies at national level, as well as by Internet governance entities. They are discussed in Internet fora (such as the IGF), in wider ICT fora (including the WSIS Forum) and in development agencies. Decisions concerning them are made in a variety of different intergovernmental, Governmental, and non-governmental agencies.

The Internet Governance Forum (IGF)

The Internet Governance Forum (IGF) was established by the UN Secretary-General in 2006, on the recommendation of WSIS, with an initial mandate of five years. It has held five annual meetings: in Athens, Greece (2006), Rio de Janeiro, Brazil (2007), Hyderabad, India (2008), Sharm el-Sheikh, Egypt (2009) and Vilnius, Lithuania (2010). Meetings have been coordinated by a small secretariat which has been funded by voluntary contributions, by a multi-stakeholder Advisory Group (MAG) which is appointed by the UN Secretary-General, and by consultation meetings and processes which are attended by individuals from all stakeholder communities. The UN General Assembly renewed the IGF's mandate for a further five years in December 2010, and the sixth meeting is scheduled to be held in Nairobi, Kenya in September 2011.

The IGF's mandate derives from paragraphs 72 and 73 of the *Tunis Agenda for the Information Society.* This invites the Forum, amongst other things, to:

- discuss public policy issues related to key elements of Internet governance, in order to foster the sustainability, robustness, security, stability and development of the Internet;
- facilitate discourse between bodies dealing with different cross-cutting international public policies regarding the Internet, and discuss issues that do not fall within the scope of any existing body;
- facilitate the exchange of information and best practices in Internet governance, and support stakeholders in their efforts to promote the availability and affordability of the Internet in developing countries;
- strengthen and enhance the engagement of stakeholders in Internet governance mechanisms and contribute to capacity-building on internet governance, again with particular reference to developing countries;
- identify emerging issues; and
- help to find solutions to issues arising from "the use and misuse of the Internet, of particular concern to everyday users."

Paragraph 73 of the *Tunis Agenda* recommended that the IGF should, "in its working and function … be multilateral, multi-stakeholder, democratic and transparent." Its intended purpose was to build on the existing structures of Internet governance, with special emphasis on fostering complementarity between stakeholder communities. It was to have no powers to make decisions, but instead to provide a space within which all those concerned with the development of the Internet could interact, exchange ideas and develop thinking which they could then take forward into other fora where decisions about the Internet are made.

Participants in the Forum since 2005 have come from all stakeholder groups, including intergovernmental and international organisations, Governments, Internet technical and professional entities, private sector businesses and civil society organisations. Meetings, which consist of plenary sessions and a wide range of workshops, are open to all and participants take part in them as individuals rather than as representatives of stakeholder communities. A strong ethos of multi-stakeholder participation has developed in the IGF, and a number of contributors to the consultation for this review stressed the very high value which they attach to multi-stakeholder engagement.[219] Particular effort has been made to facilitate remote participation in meetings. In 2010 over 1450 participants physically attended the meeting in Vilnius, while 1300 more participated remotely, many of them through 32 remote hubs which were set up to facilitate engagement in the process. Almost 50 per cent of the total of physical and virtual participants were from developing countries.[220]

Each annual IGF meeting has an overall theme: that for 2010 was on "Developing the Future Together." Plenary sessions and workshops focus on issues such as security, openness and privacy, access and diversity. Development and capacity-building have been important cross-cutting themes. Sessions on critical Internet resources have been included in meetings since 2008 and a full session on Internet governance for development was introduced in 2010.

Each meeting also explores emerging issues, which have included social networking (2009) and cloud computing (2010), and provides an opportunity to take stock of progress in Internet governance in general and in the process of the IGF itself.

In addition to workshops and plenary sessions, a number of "dynamic coalitions" have been formed by participants to develop thinking in specific areas of Internet public policy, including child online safety, accessibility and disability, the Internet and climate change, and Internet rights and principles.

In recent years, a number of IGF-type meetings have been initiated in different regions and some individual countries. These have taken the multi-stakeholder model of the IGF as a basis for the discussion of Internet public policy issues within their geographical areas, and have also developed regional input to the global IGF. Regional meetings in 2010 were held in Europe (EuroDIG), East and West Africa, Latin America and the Caribbean, and the Asia-Pacific region. National meetings were held in countries of Eastern and Western Europe, the Russian Federation, East Africa and the United States of America. These national and regional IGFs are regarded by many participants as an important innovation which has added value both to the IGF process and to understanding of Internet governance issues and the perspectives of different stakeholder groups in the localities concerned.

A number of contributors to the consultation for this review regarded the IGF as the most significant or one of the most significant achievements of the WSIS process. This was particularly true of non-governmental respondents, which were enthusiastic about its multi-stakeholder character and saw this as an example of what could be achieved through multi-stakeholder engagement in other areas of WSIS follow-up. APC, for example, said that it has "contributed to an increased … understanding among participants of IG issues and how, and why, they are important to different stakeholder groups and people from different parts of the world," and that it has "enriched … understanding of internet public policy issues, actors, spaces and challenges."[221] ICC-BASIS, which represents the private sector, described the IGF as "highly successful."[222]

In its response to the consultation for this review, DESA noted that the IGF has overcome some initial scepticism and developed a complementary role with other organisations, acting "like an incubator for ideas and policy initiatives that will be brought to maturity elsewhere." "In this way," DESA continues, "the IGF prepares and helps shape decisions that are taken by other institutions." The wide range of participation in the Forum and the wide range of issues that it covers add valuable perspectives which are not always present when specialist issues are discussed in other contexts.[223]

In July 2010, ECOSOC invited the Chair of the CSTD to establish a working group to compile and review inputs from all Member States and other stakeholders on improvements to the IGF in line with the mandate set out in the *Tunis Agenda*. A working group has met on two occasions and will report to the CSTD at its 14th session in May 2011.

Enhanced cooperation

The *Tunis Agenda for the Information Society* recognised "that all governments should have an equal role and responsibility for international Internet governance and for ensuring the stability, security and continuity of the Internet" and that they should develop public policy for the Internet "in consultation with all stakeholders." It called for "enhanced cooperation in the future, to enable Governments, on an equal footing, to carry out their roles and responsibilities, in international public policy issues pertaining to the Internet," but exempted from this "the day-to-day technical and operational matters, that do not impact on international public policy issues."[224] The WSIS outcome documents asked the UN Secretary-General and relevant organisations to begin working towards enhanced cooperation in the Summit's aftermath.

The five key points of the approach which WSIS adopted in relation to enhanced cooperation have been summarised as follows:

- All governments should have an equal role and responsibility for international Internet governance.
- Governments should do this in consultation with stakeholders.
- Such cooperation must include the development of public policy principles associated with the coordination and management of critical Internet resources.
- This should be done using relevant international organisations.
- Organisations responsible for managing the Internet should facilitate this.[225]

There has been considerable discussion over the years since WSIS concerning the scope of enhanced cooperation, the best ways of engaging Governments

and other stakeholders, and of developing appropriate frameworks. Following an initial consultation process in 2006, the UN Secretary-General invited DESA to continue consultations with all stakeholder groups. In 2008, responding to an invitation from the Secretary-General, eleven prominent Internet governance and intergovernmental agencies reported on their efforts to reach out to other stakeholders, highlighting capacity-building programmes, conferences and workshops. In his subsequent report, the Secretary-General noted that most of the respondent organisations "interpret enhanced cooperation as a process to facilitate and contribute to multi-stakeholder dialogue, through formal or informal cooperative arrangements."[226]

In July 2010, ECOSOC invited the UN Secretary-General to convene open and inclusive consultations involving all member States and all other stakeholders with a view to assisting the process towards enhanced cooperation. The request emphasised the importance of a balanced representation of all stakeholders, in their respective roles and responsibilities, as set out in the *Tunis Agenda.* DESA held open consultations on the process towards enhanced cooperation with member States and all other stakeholders from September to December 2010. Stakeholders were invited to participate in two ways: online and/or by attending a face-to-face meeting in New York in December 2010. The outcome of these consultations will be contained in a report of the Secretary-General for consideration by the General Assembly at its 66th session through ECOSOC.

Financing mechanisms

The second broad theme arising from WSIS to be considered here concerns financing mechanisms for ICTs and ICT4D. Work resulting from discussions on this theme takes place within several of the action lines which have been discussed in Chapter 4, notably those concerning stakeholder participation and international cooperation (C1 and C11), infrastructure (C2) and the enabling environment (C5). Some additional work, reported here, has been undertaken by other agencies, including UNGIS and the CSTD.

The question of financing mechanisms was prominent during the first phase of WSIS. Within the context of existing international agreements on development finance, the *Geneva Plan of Action* urged the Governments of developed countries, international development agencies and international financial institutions to "be responsive to the strategies and priorities of ICTs for development, mainstream ICTs in their work programmes, and assist developing countries and countries with economies in transition to prepare and implement their national e-strategies." Developed countries, in particular, were urged to "increase their efforts to provide more financial resources to developing countries in harnessing ICTs for development," and the private sector was also urged to respond to this "Digital Solidarity Agenda." The Governments of developing countries, meanwhile, were encouraged to "increase their efforts to attract major private national and foreign investments for ICTs through the creation of a transparent, stable and predictable enabling investment environment."[227]

The *Geneva Plan of Action* requested that the UN Secretary-General initiate a Task Force to review the adequacy of existing financing mechanisms, and this was subsequently established with the support of UNDP. The main conclusions of its report, which was published in December 2004[228], were adopted by WSIS and incorporated in the *Tunis Agenda for the Information Society*.[229] The *Agenda* identified a number of areas which WSIS participants felt required further attention from development actors, including:

- regional backbone infrastructure, especially in economically disadvantaged regions;
- the development of broadband capacity;
- international and access markets in LDCs, landlocked developing countries (LLDCs) and small island developing states (SIDS);
- capacity-building for regulators and policymakers; and
- the development of poverty-related ICT applications and content.

The *Agenda* recommended a number of "improvements and innovations" to ensure that financial resources for ICTs and ICT4D "become adequate, more predictable, preferably untied, and sustainable." These "improvements and innovations" included:

- increased multi-stakeholder cooperation, especially for regional backbone infrastructure;
- coordinated programmes to reduce investment risk and transaction costs for businesses entering less commercially attractive markets;
- the development of improved universal access mechanisms;
- improved access to existing financing mechanisms for developing countries, including effective use of debt relief;

- more scope for developing country trust funds and generation of seed capital; and
- reductions in the cost of international connectivity.

Finally, the *Agenda* welcomed the establishment of a voluntary Digital Solidarity Fund which could provide resources for specific project activities.[230]

Implementation of the recommendations made in this section of the *Tunis Agenda* falls within the remits of several action lines which are described in Chapter 4, notably those concerned with multi-stakeholder partnership and international cooperation (C1), infrastructure (C2) and the enabling environment (C5).

Overall investment in communications networks in developing countries increased in the period immediately following WSIS, and has continued at a substantial level even during the economic downturn. The principal contribution to this has come from the private sector, in particular from foreign direct investment in developing country markets, but national Governments and IFIs such as the World Bank and the African Development Bank (see below) have also played an important role. Basic mobile connectivity now extends to the majority of rural areas in developing countries and is expected to reach almost comprehensive coverage of populations by 2015 (see Chapter 3), though continued attention is needed to remote and rural areas, particularly some LDCs in Africa. As basic connectivity nears ubiquity, however, attention is increasingly turning to broadband infrastructure, including both national backbone and local access networks. Issues concerned with investment and its outcomes in terms of connectivity and access are discussed in Chapter 2.

In October 2009, at the time of the Telecom World conference and exhibition organised by the ITU in Geneva, the UN Group on the Information Society (UNGIS) hosted an open consultation forum on "Financial mechanisms—meeting the challenges of ICT for development."[231] This reviewed experience of investment in infrastructure and services since the report of the UN Task Force on Financing Mechanisms and the subsequent inclusion of outcomes from its work in the *Tunis Agenda.* Effective interagency cooperation to follow up this consultation heads the list of UNGIS focus activities for 2010/11, and an interactive session on this theme was included in the WSIS Forum for 2010.

The CSTD selected "Improvements and innovations in existing financial mechanisms for ICT" as one of its priority themes for the 13th session. The CSTD concluded that financing of ICT4D remains a significant challenge for the international community, particularly in ensuring that affordable ICT access is available in areas of low population density in developing countries. It identified a number of ways in which the international community and national Governments could complement private sector investment in order to address the remaining access gap, to develop local content and applications and to meet capacity needs. These included support for infrastructure sharing, as a means to reduce the cost of network deployment; public investment in "more 'socially desirable' forms of ICT content and applications, such as e-learning and e-government;" promotion of diverse financing mechanisms, including microfinance as well as large scale financing initiatives; and involving local users in the development of ICT projects, to enhance sustainability. The CSTD also urged Governments and other development actors to review the objectives and experience of universal service/access funds and to consider the potential of social networking and user-generated content for information-sharing.

SECTION 2—INTERNATIONAL AND REGIONAL ACTIVITIES

Section 2 of this chapter describes the work of a number of international and regional actors in implementing WSIS outcomes. While some of this activity takes place within the action lines discussed in Chapter 4, these do not cover the range of relevant activities undertaken by different agencies, only some of which report to action lines, nor do they give a broad picture of how individual agencies have responded to the challenges of WSIS implementation. This chapter seeks to add something of that perspective by summarising the work of the UN Regional Commissions and drawing attention to that of some other international and regional stakeholders. It cannot, however, address these in a comprehensive way within the space available. It therefore focuses on the activities of UNGIS member agencies and other organisations which have reported to the CSTD through its annual review process and in the consultation process for this review.

This section chapter is divided into four parts:

- Section 2A summarises the work of the UN Group

on the Information Society, which has the mandate to coordinate implementation of WSIS follow-up within the UN system.

- Section 2B reviews the work of the UN Regional Commissions, and illustrates the role of some other regional organisations.
- Section 2C gives a brief overview of the work of some global UN entities which have played a significant part in WSIS outcomes and reported on their activities through UNGIS and the ECOSOC/CSTD review process concerning WSIS outcomes.
- Section 2D draws attention to the work of a small sample of other international and regional organisations which have played a significant part in work to implement the WSIS outcomes, giving very brief introductions to their work. This sample of organisations has been selected to illustrate the range of activity which is being undertaken rather than as part of any comprehensive survey.

It is important to place the contribution of international and regional organisations in context. As discussed in Chapter 2, the progress which has been achieved in extending access to ICTs—a major factor in the implementation of WSIS outcomes—is primarily a result of market dynamics, which in turn have resulted from the willingness of private sector businesses to invest in infrastructure and service provision in emerging markets. In 2010, for example, it was reported that the industry would be investing US$72 billion in broadband infrastructure alone.[232] Private sector investment has therefore been the major driver of growth in the availability of ICT networks and services. Interventions by Governments and intergovernmental organisations have worked alongside the private sector in three main ways.

- Some Governments invest in infrastructure themselves, either independently or through public-private partnerships, using either their own resources or those of international financial institutions to finance participation. A variety of different public-private finance models have been adopted for this purpose.
- Most Governments, often with the support of international financial and development institutions, have sought to create an enabling environment for communications which is attractive to investors, opening their markets to external finance and establishing regulatory frameworks which promote competitive markets in the interest of consumer welfare while reducing regulatory risk.
- Many Governments and international agencies have sought to leverage development and other gains from the infrastructure that has been deployed, through a variety of programmes and other interventions which are summed up in the term "ICT4D."

A comprehensive and independent review of the private sector contribution to ICT access and development is beyond the scope of this review, but would be very useful ahead of the comprehensive review scheduled for 2015.

Many international and regional organisations took part in WSIS and have since played their part in implementing WSIS outcomes, either through participation in inter-agency activity or in their own programmes of work.

- At an intergovernmental level, these include United Nations entities (both Regional Commissions and agencies with global responsibilities such as UNESCO and the FAO), the international financial institutions (including global institutions like the World Bank and regional institutions like the African Development Bank and Inter-American Development Bank), multilateral and bilateral donors, regional and quasi-regional policy and coordination bodies (such as the African Union, the Council of Europe and the Organisation for Economic Cooperation and Development (OECD)), and *ad hoc* international fora concerned with specific policy issues. There has also been interaction on Information Society issues between these intergovernmental agencies and other UN summit processes.
- As well as these agencies with wide-ranging responsibilities, there are many specialist ICT-related international and regional entities, some of which are intergovernmental, others open to wider stakeholder participation. Some of these antedate the Summit, such as the Asia-Pacific Telecommunity and the Internet Corporation for Assigned Names and Numbers (ICANN), the ICT-focused development agency *info*Dev, and regional associations of regulators such as WATRA in West Africa and REGULATEL in the Latin American region. Others have emerged from WSIS or been closely associated with its outcomes, such as the Global Alliance for ICT and Development (GAID)—which succeeded the UN ICT Task Force—and the Internet Governance Forum (IGF). Some have emerged more recently, such as the Broadband Commission for Digital Development.

- The *Tunis Agenda for the Information Society* described multi-stakeholder participation as "essential to the successful building of a people-centred, inclusive and development-oriented Information Society."[233] Many non-governmental agencies played an important part in WSIS and have continued to take part in post-WSIS implementation, including private sector fora such as the BASIS (Business Action to Support the Information Society) group within the International Chamber of Commerce (ICC)—the successor to the Coordinating Committee of Business Interlocutors which was active during WSIS—and the GSM Association (GSMA); research and development foundations such as the Open Society Institute (OSI), the Global Knowledge Partnership (GKP) and the M.S. Swaminathan Research Foundation; non-governmental development and advocacy groups such as the International Institute for Communications and Development (IICD) and the Association for Progressive Communications (APC); and Internet community entities like the Internet Society (ISOC) and the Worldwide Web Consortium (W3C).

It is not possible in this report to analyse the work of these agencies in depth. Coordination between them in the implementation of WSIS action lines has been described in Chapter 4, and more detailed accounts of their activities can be explored in their annual reports to the CSTD[234] and other documents which are cited in the bibliography. This chapter draws on reports from organisations which were submitted in response to the consultation process for this review. This includes only a small number of Governments and non-governmental agencies. A more comprehensive assessment of the work of organisations outside the UN system, particularly NGOs and other civil society organisations, would make a valuable contribution to the comprehensive review scheduled for 2015.

2A The UN Group on the Information Society (UNGIS)

The establishment of a UN Group on the Information Society was recommended in the *Tunis Agenda on the Information Society*, and UNGIS was formally established by the UN Chief Executives' Board in April 2006. Its purpose is to facilitate implementation of WSIS outcomes by fostering consistency and synergies between the work of different UN agencies, ensuring that all the WSIS outcomes are addressed by the appropriate agencies within the UN system, and encouraging mainstreaming of ICTs within their work. It is intended to complement and support the work of individual agencies but not to oversee them. In 2009, UNGIS' mandate was extended to include strengthening the UN role in facilitating developing country access to new and emerging technologies.[235]

Twenty nine international organisations now take part in UNGIS, including the OECD, the World Bank and the World Trade Organisation (WTO) as well as UN entities. It can also consult with other agencies and non-governmental stakeholders about its work.

UNGIS is chaired in annual rotation by the ITU and UNESCO, with the UNDP and UNCTAD acting as vice-chairs (the latter since 2009) and the United Nations Economic Commission for Africa (ECA) as an additional rotating chair for 2010/11. From May 2010 to May 2011, it is chaired by UNESCO. Meetings are normally held around the time of World Telecommunication and Information Society Day (17 May), which also coincides with the WSIS Forum.

UNGIS lacks independent resources, which limits its ability to undertake its own initiatives. However, it supports three collaborative initiatives which are concerned with specific WSIS objectives. One of these is concerned with child online protection, a subject which is also discussed within the Internet Governance Forum and falls within the remit of WSIS Action Lines C5 and C10. The second is concerned with the promotion of open access to scientific knowledge, which falls within the mandates of Action Lines C3 and C7 (e-science). During 2010, UNESCO launched a mapping exercise on open access to scientific knowledge in support of this initiative. The third collaborative initiative is to support national "science, technology and innovation policy" (STIP) reviews and ensure that these meet national development priorities. UNGIS also interacts with the Partnership on Measuring ICT for Development, the WSIS Stocktaking Database of ICT-related activities, and the WSIS Platform of Communities. It seeks to strengthen links between WSIS, the UN Development Assistance Framework (UNDAF) and the UN Development Group.[236]

As noted in section 1 above, in October 2009, UNGIS hosted an open consultation forum on "Financial mechanisms—meeting the challenges of ICT for development." Effective interagency cooperation to follow up this consultation heads the list of UNGIS focus activities for 2010/11, and an interactive session on this theme was included in the WSIS Forum for 2010.

UNGIS is also engaging on ICTs and development within the framework of the UN Conference on Least Developed Countries.[237]

2B Regional implementation

Within the United Nations system, the key role in implementing WSIS outcomes at a regional level is played by the five UN Regional Commissions—ECA (Africa), ESCAP (Asia and the Pacific), ESCWA (West Asia), ECLAC (Latin America and the Caribbean), and ECE (Europe, which for these purposes includes both Central Asia and North America).

Each of these Regional Commissions provides annual reports on its activities in implementing WSIS outcomes to the CSTD. Much of their work in this area, as in other policy domains, revolves around building consensus between Governments (and other stakeholders), facilitating regional cooperation and/or harmonisation of policies and regulations, implementing joint programmes of activity that are expected to be of regional value, collaborations in training and capacity-building, sharing experience, and the provision of expertise to Governments and other stakeholders. Full accounts of the ICT-related conferences and workshops, programmes, projects and initiatives which have been implemented by the Regional Commissions over the past five years can be found in their annual reports to the CSTD.[238] The following paragraphs provide an overview of the most important aspects of the Regional Commissions' post-WSIS work and their expectations for the future.

Each region also has many other intergovernmental and multi-stakeholder regional bodies, some of which are continental in scale, while others are sub-regional. Some of these bodies deal with a wide range of public policy issues, while others are explicitly concerned with ICTs or with the interface between ICTs and other sectors such as regional trade or development. Within each region there are also active business and civil society associations. Although some of these are mentioned below, is not possible to cover the work of all of them in the space available for this report. A comprehensive survey of the work of regional and sub-regional entities outside the UN system would make a valuable contribution to the review of WSIS outcomes which is to be undertaken in 2015.

Africa

Africa is the world region that has historically had the lowest level of ICT penetration, and has therefore been a particular focus of international activity to address the digital divide.

The UN Economic Commission for Africa (ECA) works with a wide range of different actors within Africa, at continental, regional and sub-regional levels. Many of these have developed their own activities and initiatives within the ICT sector and in pursuit of WSIS goals. Examples of other important international and regional African organisations in this context include:

- the African Union, which is the coordinating forum for issues of political and economic importance across the continent and which seeks to support integration in pursuit of social, economic and political development;[239]
- the regional international financial institutions—the African Development Bank, the Development Bank of Southern Africa, and the sub-regional banks for East Africa and West Africa;
- the Regional Economic Communities (RECs), such as the Common Market for Eastern and Southern Africa (COMESA), the East African Community (EAC), the Economic Community of West African States (ECOWAS), and the Southern African Development Community (SADC);[240]
- the African Telecommunications Union (ATU) and other continental and regional associations of telecommunications stakeholders;[241]
- regional associations of communications regulators such as ARICEA (associated with COMESA), WATRA (associated with ECOWAS) and CRASA (associated with SADC);
- regional Internet and ICT sector bodies such as AfriNIC (the Regional Internet Registry for Africa) and AfrISPA (the continental association of Internet Service Providers);
- ICT-focused educational and research bodies such as Research ICT Africa and the UbuntuNet Alliance for Research and Education Networking; and
- civil society organisations such as the Association for Progressive Communications (which also has member organisations on other continents), the regional Panos affiliates and Open Society Initiatives or Foundations in Southern Africa, Eastern Africa and West Africa, and the Association of African Universities.

Many multilateral and bilateral donors from outside the continent are also active in Africa, working with regional entities, national Governments and other stakeholders

to stimulate investment and/or to promote the use of ICTs for development purposes.

Private investment in African ICT infrastructure has been extensive and widespread during the period since 2010, engaging investors and operating companies from within the continent, from Asia, Europe and other regions. Many of these private businesses have businesses in many countries on the continent, and can therefore be regarded as continental or sub-regional as well as national actors.

The UN Economic Commission for Africa (ECA)

The ECA's flagship programme for ICTs in Africa since 1996 has been the Africa Information Society Initiative (AISI). As early as the mid-1990s, the ECA took the view that building the Information Society in Africa would be central to the continent's development, helping to "accelerate its development plans, stimulate growth and provide new opportunities in education, trade, health care, job creation and food security, helping Africans to leapfrog stages of development and raise their standard of living."[242]

AISI's vision was "that Africa should build, by the year 2010, an Information Society in which every man, woman, child, village, public and private office has secure access to information and knowledge through the use of computers and the communication media." One of the principal mechanisms for promoting this has been the encouragement of National Information and Communication Infrastructure Plans (NICIs) within each member State. These plans, which address both infrastructure itself and the enabling environment around it, have been sponsored by the ECA in many countries. By 2007, 34 African countries had developed national policies, 15 of them sponsored by the ECA, with a further six ECA-sponsored plans under development. Today, 43 countries in Africa have national ICT plans or policies in place, with a further four under development. A number of Governments are implementing their second ICT strategies, and others are updating existing strategies to meet the rapidly changing communications environment in their countries. Nevertheless, there is still some way to go towards achieving the AISI vision of universal access to information and knowledge, and more national ICT strategies need updating to match contemporary contexts.

The ECA played an important part in coordinating Africa's contribution to WSIS and subsequently developed the continent's inputs to the WSIS process into a regional plan, which was launched in 2006. ARAPKE, the African Regional Plan on the Knowledge Economy, [243] was described as "Africa's roadmap on ICT for the next ten years." It identified priorities in nine areas of activity—the enabling environment, infrastructure and access, e-strategies and policies, local Government, Information Society indicators, capacity-building, research and development, digital solidarity and internet governance—and nine aspects of multi-stakeholder partnership. Eleven individual projects have been supported by ARAPKE, including the ICT broadband and SchoolNet initiatives of NEPAD, and a number of activities aimed at education and capacity-building.

The ECA has been active in many of the WSIS action lines, either on its own initiative or in partnership with other international agencies. In 2007, for example, it undertook a six-country study of ICTs, trade and economic growth; worked on a regional assessment of e-health needs with the World Health Organisation (WHO) and the Canadian Government; and launched the African e-Learning Initiative to provide online courses in ICT policymaking. During 2008, it worked with the United Nations Global Alliance for ICT and Development (GAID, see below) to survey African outcomes from WSIS, and put in place a series of academic research networks. In 2009, it undertook initiatives concerned with ICTs in commerce and e-government, and worked with national Governments on the development of legislation, the fostering of local language content and open source software. Throughout the period since WSIS, it has worked with sub-regional organisations to build awareness of ICTs among parliamentarians and promote the use of ICTs as tools for democratic governance and transparency.[244]

The ECA organised the first African follow-up conference to WSIS—*Tunis + 3*—jointly with GAID during 2009. This identified four substantive challenges and constraints on WSIS follow-up:

- lack of funds to implement ICT policies and plans;
- the continued absence of necessary legislation for e-business in most countries;
- lack of digital literacy, discouraging participation in the Information Society; and
- poor integration or unavailability of ICT applications.[245]

It is now convening a task group to develop e-government indicators within the Partnership on Measuring ICT for Development.

The African Union (AU)

The ECA is just one of the continental agencies which works on ICTs in Africa. The continent's priorities for ICT have also been an important area of focus for the African Union (AU). The *Connect Africa* summit of African leaders held in Rwanda in October 2007—organised by the AU in conjunction with the ITU, the World Bank and other agencies—adopted the following five goals for Africa's ICT future, which emphasise broadband connectivity and services:

- To interconnect all African capitals and major cities with broadband and strengthen Africa's global connectivity by 2012.
- To connect African villages to broadband ICT services by 2015, implementing shared access facilities such as telecentres and village phones.
- To put in place regulatory measures that will promote affordable access to broadband services, including technology neutral licensing.
- To support the development of ICT skills required for the knowledge economy, through the establishment of a network of ICT centres of excellence.
- For each country to adopt national e-strategies, including cybersecurity frameworks, and to deploy at least one flagship e-government service and other ICT-enabled services by 2012, "with the aim of making multiple e-government and other e-services widely available by 2015."[246]

One of the vehicles for African Union activity in the ICT field has been the New Partnership for Africa's Development (NEPAD). NEPAD was established in 2001 to enhance Africa's growth, development and participation in the global economy through a number of different areas of development activity. Its e-Africa programme—previously the NEPAD e-Africa Commission—seeks to develop policies, strategies and projects for ICT development across the continent as a whole.[247] Among its programme activities are the following:

- The NEPAD ICT Broadband Infrastructure Network for Africa aims to connect all African countries to one another and to the rest of the world through submarine and terrestrial cable networks.
- The NEPAD e-Schools Initiative aims to use ICTs to improve teaching and learning capabilities in African schools.

"Information and Communication Technologies in Africa" was the theme of the AU summit held in Addis Ababa in early 2010, providing an opportunity for the continent's Heads of State to review progress since the *Connect Africa* meeting in 2007. This discussion focused on the contribution of ICTs to economic growth, the harmonisation of ICT regulation and the challenges of cybersecurity.[248]

The African Development Bank

The African Development Bank (AfDB) is the principal international financial Iinstitution on the continent, responsible for working with national Governments and other continental and regional organisations to support infrastructure projects and other interventions aimed at enabling lasting and large-scale economic growth.

The AfDB's ICT Operations Strategy, which was agreed in 2008, aims to increase its role in supporting access to ICT infrastructure, stimulating private sector investment and thereby enhancing the quality of governance, service delivery and developmental outcomes (including achievement of the MDGs). The Bank recognises that its past investments in the sector have been fragmented, and the Strategy seeks to introduce a more cohesive and sustained approach. During the first phase of implementation, up to 2010, the Bank has concentrated on opportunities for financing regional and national infrastructure and on improvements in the enabling policy and regulatory environment. In the medium term, the Bank aims to stimulate demand for ICT networks and services by promoting e-government, to support connectivity for public services such as health and education facilities, and to address the varied and specific needs of the diverse range of countries on the continent.[249] In 2011, in conjunction with the World Bank, it is conducting a series of sectoral studies of how ICTs can help to transform performance in a number of social and economic sectors on the continent.[250]

The Asia-Pacific region

The Asia-Pacific region is the most populous of the UN world regions, with some 4.75 billion inhabitants in 2008, approximately 70 per cent of the global total. It includes very diverse countries, ranging from those with populations of over one billion to small island states with populations in the tens of thousands. It includes countries with very high levels of development and prosperity but also low-income LDCs. It includes global leaders in ICT innovation and manufacturing, but also countries which have very limited ICT infrastructure and low levels of adoption. The UN Regional Commission (ESCAP) is therefore

concerned that a digital divide is growing in terms of Internet access and the availability of broadband networks.[251]

As in Africa, there are a large number of regional and sub-regional organisations which are involved in the communications sector and in WSIS follow-up. These include (amongst others):

- regional and sub-regional intergovernmental agencies such as the Association of South East Asian Nations (ASEAN) and the Pacific Island Forum Secretariat;
- regional offices of UN and other agencies, such as that of the ITU;
- large-scale telecommunications sector associations such as the Asia-Pacific Telecommunity,[252] which was founded by ESCAP and the ITU in 1979 as a focal organisation for Governments to work with the communications sector in the region;
- sub-regional associations of Governments, regulators and businesses concerned with ICTs, such as the Pacific Islands Telecommunications Association (PITA);[253]
- research institutes such as LIRNE.asia; and
- regional and sub-regional civil society associations such as the M.S. Swaminathan Research Foundation.

A Regional Inter-Agency Working Group on ICT coordinates the work of ESCAP, the ITU, the Asia-Pacific Telecommunity and other organisations.

The UN Economic and Social Commission for Asia and the Pacific (ESCAP)

In 2006, ESCAP responded to the WSIS outcome documents by adopting a *Regional Action Plan towards the Information Society*, which was developed on the basis of inputs made during ESCAP's involvement in the WSIS process and following consultation with more than 600 regional participants. This Regional Action Plan aims to "build an inclusive Information Society" around four key aims:

- to put the potential of ICTs at the service of development, particularly educational development;
- to promote their use to achieve the internationally agreed development goals;
- to address new and emerging Information Society challenges; and
- to promote multi-stakeholder cooperation.[254]

ESCAP has also established a Committee on Information and Communications Technology with four objectives:

- the integration of ICT issues in development policies and programmes;
- the transfer and application of ICTs at regional and sub-regional levels;
- the development of human and institutional capacity in ICT use; and
- the use of ICT applications in disaster risk reduction.

In 2008, this Committee held an experts meeting on "WSIS+5 and Emerging Issues in Asia and the Pacific," following which it selected four priorities for its work in 2010-2011. These are:

- providing access to ICTs in rural areas;
- enhancing Pacific connectivity;
- using ICTs for disaster risk reduction; and
- monitoring WSIS implementation.[255]

ESCAP's programme on "Strengthening ICT polices and applications to achieve MDG and WSIS goals in Asia and the Pacific" seeks to raise awareness of the issues and opportunities arising for ICT-facilitated development and to support appropriate national strategies. It is concerned in particular with the Governments of LDCs and small island developing states (SIDS), and provides a platform through which they can build upon lessons learned by the region's ICT leaders such as China, India and the Republic of Korea.

Work on disaster risk reduction has been a particular priority for the region since the tsunami of December 2004. In 2009, the Regional Inter-Agency Working Group on ICT agreed to build capacity in disaster risk management, including sharing of information within the region. ESCAP has responded to other critical international challenges facing its region by commissioning work on green ICTs and by exploring the implications of past and present economic downturns.

In 2006, ESCAP initiated APCICT, the Asian and Pacific Training Centre for Information and Communication Technology for Development, which seeks to build policy and implementation capacity in the region. As well as facilitating national and thematic capacity-building initiatives, APCICT has developed a comprehensive training curriculum, the *Academy of ICT Essentials for Government Leaders*, which has ten modules that offer capacity-building opportunities for policymakers in the Asia/Pacific region, and is being translated into a number of regional languages. The programme has

been initiated in 17 countries within the region and, in 2009, APCICT also launched a Virtual Academy to provide a distance learning option. The Academy has held 83 events and reached over 7000 participants, in addition to which it provides advice to Governments and training institutions on capacity-building in ICT4D. The ECA has introduced the Academy in Africa and efforts are underway to bring it into use in ECLAC and ESCWA regions.[256]

ESCAP reviewed progress in implementing the WSIS outcomes within the Asia/Pacific region in a report to its ICT Committee in November 2010.[257] That report highlighted the growth in mobile communications throughout the region, and the scope which this provides for the development of poverty-related applications such as mobile banking and m-health. Broadband access has also grown impressively in some ESCAP countries, but experience with broadband has been much more variable than that with mobile, while connectivity in the Pacific region, where many small countries are scattered across the ocean, remains a challenge. In its review, ESCAP expressed concern that, while the WSIS target for ICT coverage (target J) had been statistically achieved within the region, "this does not necessarily guarantee the deepening of usage. In particular, relevant and meaningful content and applications continue to be a challenge in the region in order to achieve the MDGs."[258] In responding to these and other challenges, ESCAP emphasises the importance of regional cooperation, especially with respect to the expansion of affordable broadband capacity and the integration of Pacific island states into the dynamic growth evident elsewhere in the region. It also notes the growing importance of mobile banking, especially its potential for facilitating international remittances, and has commissioned a study of the enabling environment required to take this forward.

Western Asia

ESCWA is the Regional Commission which covers Western Asia, i.e. the countries of and to the north of the Arabian Peninsula, plus Egypt and Sudan. With 14 member States, it has the smallest membership of all the UN Regional Commissions. Member countries include affluent societies in the Gulf Cooperation Council region, but also some low-income developing countries and countries suffering civil strife. Within its region, ESCWA works with other international agencies (such as the ITU), with regional political entities (in particular the Arab League) and economic entities (such as the Arab Institute of Training and Research in Statistics), and with private sector enterprises (including Cisco, Alcatel-Lucent and Talal Abu-Ghazaleh International).

The UN Regional Commission for Western Asia (ESCWA)

ESCWA developed its first Regional Plan of Action for Building the Information Society in 2005, before the end of the second phase of WSIS.[259] This Plan included ten programmes and 38 regional projects, and contributed to the agreement of an Arab ICT Strategy in 2007. The Plan has since been updated twice, in 2007 and then following a regional meeting in Damascus in June 2009 at which 275 participants discussed a wide range of WSIS follow-up activities. This regional meeting was organised jointly with the ITU, UNESCO, GAID, the Arab League and other international actors. The Regional Plan is supported by an Information Society Portal for the ESCWA Region (ISPER).[260]

The 2009 review meeting also adopted the *Damascus Proclamation for the Promotion of the Arab Knowledge Society for Sustainable Economic and Social Development,* which addressed all stakeholders in the region. It urged Governments to accelerate the implementation of national ICT strategies, create an enabling environment for Information Society development and stimulate investment in the sector. It called on the private sector to invest in infrastructure, particularly across regional boundaries, and work collaboratively with Governments. It urged NGOs to raise awareness and build capacity in ICT policy issues, promote Arabic content and empower women, the young and marginalised groups. Finally, it invited regional entities to work collaboratively in capacity-building and other regional programmes.

Two issues of great importance for the region have been the enhancement of the Internet's capacity to handle the Arabic language and alphabet, and the development of Arabic content. The internationalisation of domain names was recognised during WSIS as an important part of enabling the Internet to be equally available to people from all cultures, and considerable effort has been put into the development of internationalised domain names (IDNs) by Internet governance entities since 2005. ESCWA has played a prominent part in this, alongside other stakeholders including ICANN, the Internet Engineering Task Force (IETF), the ITU and Internet businesses. It was notable that the first internationalised domain names to go

online, launched during the 2009 Internet Governance Forum, were in Arabic.

Detailed information about the ICT sector in the region, including comparisons between different countries, is published in ESCWA's biennial *Regional Profile of the Information Society in Western Asia*, the most recent edition of which appeared in September 2009.[261]

ESCWA has worked extensively with the Governments of member States to develop national ICT strategies, and has published *Guidelines for the Formulation and Implementation of ICT Strategy* and other studies designed to help Governments to achieve this. These include studies of national strategies and implementation modalities (2005 and 2007), models for cyber legislation in ESCWA countries (2007), regional infrastructure (2005), broadband implementation (jointly with Alcatel-Lucent, 2007), and *Building Trust in E-services in the ESCWA region* (2009). Workshops and conferences have built on these and other publications in an effort to share experience and disseminate good practice.

ESCWA has initiated a number of projects to enhance the inclusiveness of the Information Society within its region. These include the Smart Community Project, aimed at job creation in rural communities; a programme (shared with other UN Regional Commissions) to develop "Knowledge Networks through ICT Access Points for Disadvantaged Communities," and a programme of Networking Academies in Iraq.

ESCWA recognises that more work is needed to address the imbalance in ICT access and applications within its membership and achieve the "people-centred, inclusive and development-oriented Information Society" called for in the WSIS outcome documents. It sees the need for more cooperation between Governments in the region and amongst stakeholders, particularly where public-private partnerships are concerned. In ESCWA's view, the region also "lacks, and could greatly gain from, cross-border infrastructure endeavours such as the installation of a fibre optic regional backbone." Finally, it sees the need for action to build confidence in e-services amongst populations in the region, in order to facilitate more effective exploitation of ICTs' potential for social and economic development.[262]

Latin America and the Caribbean

ECLAC is the Regional Commission for Latin America and the Caribbean, another region which includes very diverse countries, ranging from Brazil with a population of around 200 million to small island states with populations in the tens of thousands. Because of their different political and linguistic heritages, there are distinct sub-regions in South and Central America and in the Caribbean, with a variety of different sub-regional associations concerned with broadcasting, telecommunications and regulation. There are also significant differences in the nature of the communications markets and in the businesses which are active in these different sub-regions. Support for ICT activities in Latin America and the Caribbean has been provided by the Government of Canada and by the @LIS 2 (Alliance for the Information Society) programme of the European Union.[263]

The UN Regional Commission for Latin America and the Caribbean (ECLAC)

ECLAC has addressed the challenges of WSIS through a series of regional action plans known as eLACs. The purpose of these Plans has been to provide:

"a platform for public, private, civil and academic action in all of the region's countries, and [to set] the stage for dialogue and cooperation among regional and international organizations, as well as with other regions. At the same time, it serves as a catalyst for intraregional cooperation and supports efforts to identify and design public policies by means of technical evaluations."[264]

The first regional plan, *eLAC 2007*, was drawn up as a short-term action plan in the aftermath of the second WSIS summit. It established 30 goals in five priority areas—access and digital inclusion, capacity building and knowledge creation, transparency and efficiency, policy instruments, and the enabling environment. The scope of this initial plan was expanded in its successor, *eLAC 2010*, which was adopted by ECLAC Member States in 2008. This plan fostered the integration of ICTs in all development sectors and increased the number of specific goals to 83, with six priority areas—education, infrastructure and access, health, public management and e-government, the productive sector, and the adoption of appropriate policy and strategy instruments. It also raised the targets which had been included in the original plan in areas such as school connectivity. The third regional plan, *eLAC 2015*, was adopted by Member States in 2010 and sets out a regional agenda for the period up to the ten-year review of WSIS outcomes in 2015.[265]

ECLAC's work in this field is supported by an Observatory for the Information Society in Latin America and the Caribbean (OSILAC),[266] which has been financially supported by the International Development Research Centre. The Observatory reported to ECLAC on progress on the *eLAC 2007* document ahead of its revision in 2008. In 2009, it launched an online database of information obtained from household ICT surveys within the region.

All three of the successive *eLAC* plans have emphasised the social impact of ICTs, regarding them as "tools for social development." One priority throughout the evolving regional policy process has been to address the digital divides between and within countries in the region. In doing so, the second regional plan, *eLAC 2010*, proposed that "bandwidth should be conceived as a public interest service," and that efforts to increase bandwidth availability "should therefore be a priority on national development agendas." ECLAC advocates the provision of broadband access "as a public good."

ECLAC's 2010 monitoring report on progress towards achieving eLAC goals described mixed progress across its range of six priorities:[267]

- It reported increased equality of access to mobile services, but highly unequal access to the Internet, with a widening gap in broadband access both within the ECLAC region and between it and other world regions. In this context, it advocated broadband policies that would increase investment and integration at a regional as well as national level, reduce tariffs, and foster shared access facilities, such as telecentres, to provide mass access.
- In education, it reported progress in incorporating ICTs in classrooms and in the availability of digital content, but continued constraints resulting from insufficient connectivity and uneven teacher training.
- It urged greater attention to ICTs in health within the region, noting that "The shortcomings or absence of specific e-health policies and the lack of coordination between many initiatives and the national strategy have limited the scope and continuity of these initiatives."
- It saw significant but uneven progress in the provision of e-government services, and "huge scope for improving efficiency in the operations of Governments by introducing new technologies."
- It identified modest progress in innovation and the development of human capital, but noted that this also resulted in uneven and insufficient progress in ICT access and use by firms, particularly small and medium-sized enterprises (SMEs).
- In the overall political context, it suggested that "In many cases, despite having political backing, the bodies responsible for implementing the various Information Society initiatives lack the institutional framework and authority to implement cross-cutting programmes affecting diverse sectors of the economy and society."

ECLAC's latest plan of action, *eLAC 2015*, has established eight lines of action, with a series of core priority objectives, as set out in Table 7:

TABLE 7: eLAC 2015 PRIORITIES

Line of action	Priority
Access for all	Achieve a leap towards universal broadband access
E-government	Achieve transactional and participatory e-government
Environment	Use ICT to mitigate climate change and improve disaster and emergency response
Social security	Use ICT to ensure access, security and continuity of health care
Productive development	Achieve access to ICT for all microenterprises and SMEs and promote innovation
Enabling environment	Promote the use of ICT for regional integration
Education	Provide universal access to ICT for education and expand their use
Institutional structure	Promote coordination at national level

Regional working groups are being established to guide progress in each area. The universalization of broadband is seen as critical to the next five-year phase of implementation.

Europe

The Economic Commission for Europe (ECE) region reaches beyond continental Europe to include countries in North America and parts of Central Asia. Many of its member countries are high-intensity ICT users, with important ICT production and creative sectors and very high rates of telecommunications, Internet and broadband adoption and use. These include eight of the ten leading countries in the ITU Information Development Index. However, the region also includes a number of low-income countries in which the Internet and broadband are not yet widely prevalent. As a result, according to the ECE:

> "Although transition countries are catching up with western developed countries in fundamental dimensions of the digital divide (e.g. in the use of mobile phones and access to dial-up Internet), they are still lagging behind in broadband Internet. Thus, the digital divide in the UNECE region has become the largest and fastest growing in the world, apart from Western Asia."[268]

The region has a number of other regional entities and activities which play a significant part in the ICT sector and in implementation of WSIS outcomes. These include:

- the Council of Europe, which focuses on the development of common legal standards, human rights, democracy and cultural cooperation on behalf of its 47 member States, and which has played a particularly prominent part in international work on Internet governance and cybercrime;
- the European Union, an economic association and single market of 27 member States, which presents a coordinated position on trade and economic issues in international fora and is one of the world's largest development donors;
- the annual European Dialogue on Internet Governance (EuroDIG), which brings together European experts from different stakeholder communities in a forum that discusses Internet governance challenges from a European perspective and contributes towards the global IGF.

The UN Economic Commission for Europe (ECE)

Much of the ECE's work on WSIS implementation concerns the needs of its lower-income member States. Central Asia is one of the most disadvantaged regions within its remit, and, because of its location, the ECE's work within this sub-region has natural synergies with the work of ESCAP. The ECE and ESCAP have worked together within the framework of the UN Special Programme for the Economies of Central Asia (SPECA) on programmes to address digital inclusion, including "Knowledge Networks through ICT Access Points for Disadvantaged Communities," and on a programme of capacity-building for ICT policymaking in five Central Asian countries and Azerbaijan. The ECE has also initiated a Eurasian Telecentre Network to support organisations which are implementing public access points in the subregion.

The ECE has paid particular attention to the enabling environment for new technology and innovation, including regulatory issues such as spectrum management. It is also particularly concerned with the relationship between ICTs and trade. The UN Centre for Trade Facilitation and Electronic Business (UN/CEFACT),[269] which it manages, maintains and develops the UN Electronic Data Interchange Standard (UN/EDIFACT), which facilitates international information exchange in a number of areas of economic cooperation. As well as developing recommendations in its field, the Centre is concerned to build capacity and to increase the participation of transition economies in ICT-enabled trade. It works with ESCAP to implement the UN Network of Experts for Paperless Trade in Asia Pacific (UN NExT). The ECE is also working to develop the environment for intelligent transport systems, and standards for statistics and metadata.[270]

As well as this work, the ECE draws attention to the following activities:

- The Aarhus Convention[271] has established international standards and procedures for information and participation of citizens and other stakeholders in environmental decision-making. Implementation of the Convention includes a number of digital tools which provide models for possible replication in other contexts.
- The ECE has worked with the Council of Europe and the Association for Progressive Communications in a multi-stakeholder partnership to develop a draft code of good practice for information and participation in Internet governance.[272]

2C International implementation: United Nations agencies

As noted earlier in this chapter, UNGIS coordinates the work of 26 UN entities and three other intergovernmental organisations which are concerned with the implementation of WSIS outcomes in their areas of responsibility. There is insufficient space in this report to provide a detailed account of these agencies' activities, though some of the work which they undertake is illustrated in the accounts of action line activities in Chapter 4. More detailed accounts of their work can be found in the UN Secretary-General's annual reports on implementation of WSIS outcomes, in the contributions submitted by UNGIS agencies for those reports, and in their publications which are listed in the bibliography.[273] The following paragraphs summarise the work of the four lead agencies responsible for WSIS facilitation, as reported through the consultation process for this review, together with a brief summary of the work of some other UNGIS agencies.

The International Telecommunication Union (ITU)

The ITU is the UN specialized agency responsible for information and communication technology issues and "the global focal point for Governments and the private sector in developing networks and services."[274] It had lead responsibility, on behalf of the UN, for organising WSIS.

Since 2005, the ITU has worked with UNESCO, the UNDP and UNCTAD as lead agencies for WSIS follow-up and facilitation. It chairs UNGIS in rotation with UNESCO, co-convenes the annual action line meeting process and the WSIS Forum that now surrounds this, and acts as sole facilitator of three action lines and co-facilitator of a further five. It plays a leading role in the Partnership on Measuring ICT for Development and maintains the WSIS Stocktaking Database. Recently it shared with UNESCO coordination of the secretariat of the Broadband Commission for Digital Development. All of these activities draw on the work of its three Sectors and Bureaux, which are concerned with Telecommunication Development, Radiocommunication and Telecommunication Standardization.

The ITU's extensive work to follow up the WSIS outcomes is coordinated by a WSIS Task Force, chaired by the ITU's Deputy Secretary-General, and is described in detail in its 2010 publication, *WSIS+5*, which was submitted as part of its contribution to this review.[275] The following paragraphs give a brief synopsis of this work, together with examples which are intended to illustrate its scale and range.

The ITU publishes the annual *World Telecommunication/ICT Development Report* (*WTDR*) and collects and publishes detailed statistical information on the deployment and use of ICTs in its *World Telecommunication/ICT Indicators Database.*[276] The 2010 edition of the *WTDR*, on *Monitoring the WSIS Targets*, produced in conjunction with other agencies in the Partnership on Measuring ICT for Development, is the most authoritative current source on that subject and was the major source for Chapter 3 of this report. Other important publications include an annual series on *Trends in Telecommunication Reform* and studies, manuals and guidelines on subjects as diverse as national ICT strategies, cybersecurity and child online safety.

The mission of the ITU's Telecommunication Development Bureau (BDT) commits it to "assist countries in the field of information and communication technologies …, in facilitating the mobilization of technical, human and financial resources needed for their implementation, as well as in promoting access to ICTs."[277] The work which it undertakes to implement this mission includes conferences and workshops, consultancy missions and projects, experience-sharing, research, analysis and publications. The BDT's 2011-2014 operational plan,[278] which was agreed by the World Telecommunication Development Conference in 2010, programmes activities in five areas. These are concerned with:

- infrastructure and technology development;
- cybersecurity, ICT applications and IP-based network-related issues;
- the enabling environment;
- capacity-building and digital inclusion; and
- Least Developed Countries (LDCs), countries in special need, emergency telecommunications and climate change adaptation.

Examples of the ITU's work in conjunction with Governments and other international and regional entities, across the range of WSIS objectives, include the following.[279] Many of these, and some other activities, are described in the discussion of action lines in Chapter 4.

- A series of regional *Connect the World* conferences was initiated with the *Connect Africa* conference which

was held in Rwanda in 2007 (see above), followed by an event for the CIS region in 2009. Six global *Connect the World* initiatives were launched in 2009 to extend positive experience across global regions. These focus on wireless broadband partnerships, connecting villages, connecting schools and communities, ITU academy partnerships, mobile health, and cybersecurity. The *Connect a School, Connect a Community* initiative, for example, has supported the development of national school connectivity plans (and WSIS target B).

- Comprehensive research work has been undertaken on requirements for implementation of ICT broadband infrastructure in Africa and other continents.
- Work has been undertaken to promote the harmonisation of ICT policies and regulation in sub-Saharan regions of Africa, the Caribbean region and Pacific island states.
- Five ITU Regional Development Forums were held in 2009, with the aim of bridging the gap in standardisation between regions and fostering implementation of next generation and broadband networks in developing countries.
- A multi-agency Partnership Coordination Panel on Telecommunications for Disaster Relief and Mitigation has been established on the initiative of the ITU.
- A Global Cybersecurity Agenda was launched by the ITU in 2007 to provide a framework for international response to growing cybersecurity threats.
- Training materials have been developed to assist policymakers and regulators in ensuring that they can meet the needs of the ICT sector and its users in a period of rapid technological and market change, including convergence. Annual events such as the Global Symposium for Regulators have become influential fora for discussion of changing regulatory requirements.
- Conferences, workshops and capacity-building projects have taken place across the whole range of WSIS action lines.

The United Nations Educational, Scientific and Cultural Organisation (UNESCO)

UNESCO established a Communication and Information Sector within its work in 1990 and subsequently adopted the aim of "building inclusive knowledge societies through information and communication" as one of its five over-arching objectives. By "knowledge societies," UNESCO means:

> "… societies in which people have the capabilities not just to acquire information but also to transform it into knowledge and understanding, which empowers them to enhance their livelihoods and contribute to the social and economic development of their societies."[280]

UNESCO focused on emphasising these dimensions of the Information Society during the WSIS process. Its subsequent work to implement WSIS objectives is summarised in a report, entitled *Towards Inclusive Knowledge Societies*, published in 2010.[281]

Following WSIS, UNESCO took responsibility for facilitating or co-facilitating six action lines: access to information and knowledge (C3), e-learning and e-science (both C7), cultural diversity and identity, linguistic diversity and local content (C8), media (C9) and ethical dimensions of the Information Society (C10). Its work in relation to these is discussed in Chapter 4. UNESCO also acts as co-chair of UNGIS, in rotation with the ITU.

The development of Knowledge Societies forms an integral part of all UNESCO's work towards human development which is rooted in education, free expression and human rights as well as in the appropriate use of technologies. Two programme areas are particularly central to this work.

The Information for All Programme (IFAP), founded in 2001, has provided a vehicle for UNESCO's work to facilitate WSIS objectives concerned with building national information policy frameworks, observing and sharing experience between different national contexts, and capacity-building with diverse stakeholder groups. Its strategic plan for 2008-2013 identifies a number of areas for pursuit of these objectives, including:

- the development of a comprehensive information and knowledge policy framework, with five priority areas: information for development, information literacy, information preservation, information ethics, and the accessibility of information;
- development and maintenance of an observatory on the Information Society;
- assistance to Governments in developing national information policy frameworks and mainstreaming information into national public policy agendas; and
- increased multi-stakeholder cooperation across these fields.[282]

The International Programme for the Development of Communication (IPDC) has provided a vehicle

for UNESCO's work to promote freedom of expression, develop community media and train media professionals, addressing the interface between traditional and new media.[283] Over the past 30 years, this programme has committed more than US$100million to 1,200 projects in 140 countries. One recent initiative has been the publication of a set of Media Development Indicators which facilitate assessment and comparison of the communications environments in different countries.

UNESCO's Institute for Statistics (UIS) participates in the Partnership for Measuring ICT for Development and has led the identification and introduction of a series of ICT/education indicators for the Partnership. These core education indicators rely on information that can be supplied by schools and other educational institutions. The Institute has also produced a more extensive set of indicators which can be used to give a fuller picture of educational outcomes as and where they become available. It published a guidebook to the use of these indicators in 2009. [284]

In support of its programmes and other activities, UNESCO has established partnerships with other international organisations (such as the Internet Corporation for Assigned Names and Numbers, ICANN), businesses (including Cisco, Microsoft, Sun Microsystems and the Talal Abu-Ghazaleh Organisation), development agencies (such as the Global e-Schools and Communities Initiative, and the Global Initiative for Inclusive ICTs which is concerned with access for those with disabilities), and some 300 non-governmental organisations.[285]

The online WSIS Platform of Communities,[286] launched by UNESCO on behalf of UNGIS and WSIS Forum partners in 2009, now has more than 1400 registered participants. It has provided a space for consultation and planning of the WSIS Forum, and has initiated debates about specific aspects of ICTs and ICT4D. It has the potential to develop into a means of strengthening relationships within action line communities between annual meetings, and to develop input into the comprehensive review of WSIS outcomes scheduled for 2015.

The United Nations Development Programme (UNDP)

The UNDP played a significant part in developing thinking on ICTs and development during the 1990s. It believes the focus of the "ICT revolution" has now shifted from infrastructure and connectivity towards the deployment and use of ICTs.

In the period around WSIS, the UNDP developed a multisectoral framework to harness ICTs as both enablers of development and as enhancers of human, community and organisational capacity. This focused on ICT policies and strategies, enhancing Government capacity and public services, strengthening citizen participation, promoting entrepreneurship, and building the policy linkages between local and global issues. Through this approach, it aimed to advance economic opportunity and poverty reduction, provision of basic services, access to ICTs and building the capacity to measure and report on their contribution to development.[287] The UNDP's Asia-Pacific Development Information Programme (APDIP) played a prominent role in building expertise on ICT issues within its region in the period up to 2007, including the publication of primers and guidance materials for policymakers and practitioners in a variety of development fields.[288]

The UNDP's current focus within ICT4D is on e-governance, including work with both Governments and civil society organisations to deliver better public services and enhance citizen participation. It locates this work in three main areas of activity:

- the use of ICTs to improve the efficiency, transparency and accountability of public services (including citizen involvement in governance processes);
- the mainstreaming of ICTs into areas such as democratic processes (elections, parliaments, *etc*.); and
- issues such as privacy, censorship and the control of information and communications access.

It also pays particular attention to mobile governance.[289]

United Nations Conference on Trade and Development (UNCTAD)

UNCTAD has played an increasing role in WSIS implementation over the last decade, where its mandate focuses on globalisation and development, both of which are key themes associated with the Information Society, and it contributed on these throughout discussions at the Summit. It has joined the ITU, UNESCO and UNDP as one of the coordinating agencies for the WSIS action lines, and acted as facilitator or co-facilitator for the work of four of them. It is the facilitator for Action Line C7 on e-business. UNCTAD also hosts the secretariat of the CSTD.

UNCTAD's extensive work in support of WSIS action lines was illustrated in Chapter 4. In addition, it

provides technical assistance in the review of national ICT policies and in the development of statistics on the knowledge economy. Its *Manual for the Production of Statistics on the Information Economy*[290] serves as the basis for regional training courses, which are often delivered in conjunction with other members of the Partnership on Measuring ICT for Development. Other programme work to support WSIS objectives includes capacity-building in ICT and Law Reform. This helps to build the expertise needed by Governments to enact legislation that will facilitate e-commerce and to enable regional harmonisation of legislation so as to manage cross-border transactions effectively.[291]

UNCTAD's flagship publication in this field is its annual *Information Economy Report*, which monitors global trends in ICTs as they affect the economic progress of developing countries, focusing each year on a different aspect of this theme. The theme of the 2010 report was *ICTs, Enterprises and Poverty Alleviation*. [292] This identified and assessed the changing relationship between ICTs and microenterprises, particularly the enterprises of the poor, and sought to identify ways in which these could be supported by Government intervention. Its analysis focused on the mutual dependence of policy concerned with infrastructure, enterprise and human capacity development, and it offered recommendations to international organisations, Governments and other stakeholders on the enabling environment for economic gains to be achieved through ICT investment and applications.

United Nations Department of Economic and Social Affairs (DESA)

DESA plays a prominent role in WSIS follow-up. It is the lead facilitator for Action Lines C1, C7 (e-government) and C11, and administrator of the secretariat units for the Internet Governance Forum (IGF) and the Global Alliance for ICT and Development (GAID). It also plays an active part in the Partnership on Measuring ICT for Development.

DESA works with other UN agencies to promote policy dialogue, support capacity-building and knowledge management, and to stimulate interest and activity in e-government. A number of its initiatives and publications are discussed in Chapter 4, and detailed accounts of its work can be found in its annual reports on WSIS implementation and follow-up.[293]

During the years since WSIS, DESA has organised many regional workshops on various aspects of the Information Society, providing opportunities for Governments to learn from one another, especially in the context of e-government, and to form e-government networks. More than 50 advisory and technical assistance missions have been undertaken, addressing various aspects of ICTs and Government, including content, citizen engagement and participation, online services and institutional frameworks for the management of e-government.

Since 2005, DESA has published three editions of the *United Nations Global E-Government Survey*, formerly the *Global E-Government Readiness Report*. The 2010 edition focused on *Leveraging e-government at a time of financial and economic crisis*, and emphasised the potential role of e-government in enhancing transparency, efficiency and citizen participation.[294] DESA works with the Inter-Parliamentary Union to maintain the Global Centre for ICT in Parliament and support the World e-Parliament Conference. It is working with other agencies in the Partnership on Measuring ICT for Development to identify e-government indicators that can be used by national and international organisations to measure progress in this field.

The Global Alliance for ICT and Development (GAID)

GAID was established in 2006 following the World Summit and the end of the mandate of the UN ICT Task Force, as a multi-stakeholder forum concerned with ICTs and development which could stimulate discussion and advise the UN Secretary-General. It aims to assist the mainstreaming of ICTs into the broader UN development agenda, to bring together organisations engaged in ICT4D, to raise awareness of relevant policy issues, and to act as a forum for new ideas in the field. DESA is responsible for overseeing the work of GAID. In 2008, it agreed that its priorities for the period to 2010 should be access, connectivity, content and education, all of which are important WSIS themes. Current GAID focus areas are education, entrepreneurship, governance and health. [295]

GAID's fifth annual global forum was held in Abu Dhabi in December 2010, with the theme of "ICTs for achieving the MDGs: moving from advocacy to action." Sessions focused on the constraints which participants felt were inhibiting adoption of ICTs and the contribution which they could make towards progress on the MDGs. During 2010, GAID also focused on the development and dissemination of its MDG eNabler, "a free web-based set of ICT-based tools and resources designed to assist Governments

and all development practitioners in their work towards achieving the MDGs."[296] GAID's website has an online community of over 1900 members who can take part in discussions on ICT and development issues.

In its contribution to this review, DESA emphasised the potential for GAID to act as a platform to promote policy reform and multi-stakeholder partnerships for investment in ICTs and development. It hoped that stakeholders would engage more intensively with the Alliance and thereby enable full use to be made of the knowledge and resources in its network.[297]

The Food and Agriculture Organisation (FAO)[298]

The FAO is the UN specialized agency concerned with agriculture and food security. In 2006, it set up a multi-stakeholder e-Agriculture Working Group to support implementation of the WSIS action line on e-agriculture, and the following year launched the e-Agriculture Community of Practice to share knowledge and provide a framework for enhancing the use of ICTs within the sector.[299] The FAO serves as the secretariat for this Community, coordinating activities and programmes, and also maintains its web-based knowledge-sharing facility. This Community, which has about 8,000 members, has provided the basis for the FAO's work on Action Line C7 and is reported further in Chapter 4.

Current work which the FAO is pursuing through the Community includes the development of a conceptual framework on the impact of ICTs in rural development, implementation of a variety of professional fora and conferences, virtual fora on diverse agricultural and rural livelihoods issues, and publications on these themes. In the coming year it intends to work with the International Institute for Communication and Development (IICD) to create frameworks that will guide planning and implementation of development investments that make use of ICTs, and to monitor and evaluate their impact on rural livelihoods.

The United Nations Children's Fund (UNICEF)[300]

UNICEF is the UN organ which focuses specifically on the lives of children and their relationships with the communities and societies in which they live, including lack of access to ICTs and thereby effective exclusion from the Information Society for poor and marginalised groups. Even in industrialised societies, it notes, such exclusion can seriously reduce life opportunities for children and young people. It urges Governments to act in ways that will support greater access to ICTs and build the necessary skills within the community to make full use of them.

UNICEF has worked with local partners to implement Internet access initiatives for children in countries including India and South Africa. It has developed and implemented a number of different media and e-group activities which use information technology to help young people to contribute their views to public fora and decision-making processes. In areas with little or no connectivity, it has supported the use of SMS as a rapid communications tool, and it has worked with other agencies on the use of communications in emergency response. In February 2009, UNICEF hosted a Web4Dev Conference, which highlighted innovative uses of technology for development.

The protection of children and adolescents against Internet-enabled abuse and against certain forms of Internet content (including pornography and racism) is another priority for UNICEF. It has worked on child safety issues with a variety of partners, including the Berkman Center at Harvard University, seeking to promote "a culture of digital responsibility" and to foster young people's ability to judge, navigate and consume digital content and services.

The World Health Organisation (WHO)[301]

The WHO is the UN specialised agency concerned with health issues. Its priorities in ICTs and health include improving health information systems, facilitating health information and knowledge, promoting the adoption of international standards for exchange of health data, strengthening systems for monitoring disasters and communicable diseases, and enabling appropriate alert mechanisms. It facilitates WSIS Action Line C7 on e-health.

The WHO urges its member States to establish national e-health organisations which can take a strategic overview of requirements at the interface between health and ICTs. In 2009, just over half of reporting member States had e-health policies in place. It strongly supports m-health which, it believes, is particularly suitable for health communication and public health programmes. It works with other agencies to support the use of ICTs in emergency response and in public health reporting.

The WHO's Global Observatory for eHealth, established in 2005, monitors progress on e-health around the world. The findings of its first two global surveys of e-health, conducted in 2005 and 2009,

are being used to develop a series of eight thematic publications, issued during 2010 and 2011, which are described in Chapter 4.

The WHO is particularly concerned with improving access to health information, in partnership with the private sector. Its HINARI programme (Access to Research in Health), which was launched in 2002 and now includes more than 150 publishers, provides free or low-cost online access to health journals for local non-profit institutions in more than 100 developing countries. The WHO's Global Health Library brings together national and regional initiatives to increase access to health information and to establish standards for health statistics and informatics.

The WHO considers that the global economic downturn has had a significant negative impact on investment in infrastructure, products and services. It believes that this reinforces the need for all stakeholders to work together, share models and build consensus around policy issues and possible solutions for e-health, which it expects to have growing importance within overall efforts to achieve better health outcomes around the world.

The World Intellectual Property Organization (WIPO)[302]

WIPO is the UN agency responsible for "developing a balanced and accessible international intellectual property (IP) system, which rewards creativity, stimulates innovation and contributes to economic development while safeguarding the public interest."[303] It has been involved in work to follow up a number of WSIS action lines where these intersect with the intellectual property regime, in particular with copyright where it seeks to balance the interests of content creators and users. It notes that "The traditional model of returning value to creators and their business associates is rapidly changing in the light of the convergence of digital technology and the distributional power of the Internet." This has created the need both for WIPO to monitor and research the changes that are taking place and to create spaces in which awareness of those issues can be raised and they can be discussed between Governments and other stakeholders. WIPO's Development Agenda has been one framework in which this has been pursued.

Aspects of the WSIS outcomes with which WIPO has engaged include intellectual property and e-health, IP liability and the role and responsibilities of intermediaries such as Internet Service Providers, the relationship between proprietary and open source software, the preservation of digital content, and the development of public domain access.

The World Bank

The World Bank has been at the forefront of thinking about the Information Society since the mid-1990s. Its *World Development Report* for 1998/9, on *Knowledge for Development*, was influential in stimulating discussion about ICT issues within the international development community, and put information technology at the heart of much of the Bank's work.[304] Since then, its ICT Sector Unit (GICT) has provided Governments with expertise on policy and regulatory issues, made financial resources available to support infrastructure and e-government projects, and advised other parts of the Bank on mainstreaming ICTs within their programmes.[305] Over the years, the World Bank has supported ICT sector reforms in 95 countries and provided US$750 million in loans for ICT-related projects, not including ICT components of projects in other development sectors.

The Bank's current ICT sector strategy dates from 2001 and has recently been re-assessed. This strategy has had four pillars: 1) broadening and deepening sector and institutional reform; 2) increasing access to information infrastructure; 3) building human capacity in the use of ICTs at various levels; and 4) supporting the development of ICT applications in various development domains.

The Bank believes that this strategy has been successful in terms of sector reform and access, but that more could be done to achieve its goals for human capacity and ICT applications. A new ICT sector strategy has now been proposed,[306] partly to address these challenges but also because the Bank believes that the rapid changes taking place in ICTs present new opportunities, specifically to promote broadband access, develop IT-based service industries, and exploit ICTs as a "transformational enabler" for social and economic development. The Bank has also published research which suggests a strong link between broadband investment and macroeconomic growth, and calls for both infrastructure investment and the stimulation by Governments of demand for the services that broadband can provide.

The Bank's proposed new ICT strategy, on which it consulted during the first half of 2011, revolves around three directions, which are described as follows:

- Connect: expand affordable access to voice, high-speed Internet and information and media networks.
- Innovate: use ICT for innovation across the economy and promote the growth of IT-based service industries.
- Transform: support ICT applications to transform efficiency and accountability of services for increased development results.

2D Development agencies, civil society, business and multi-stakeholder organisations

One of the most significant outcomes of the WSIS process, for many organisations that took part, was the opportunity it created for multi-stakeholder dialogue. The *Geneva Declaration of Principles* declared that "building an inclusive Information Society requires new forms of solidarity, partnership and cooperation among Governments and other stakeholders, i.e. the private sector, civil society and international organizations" and that "realizing … the ambitious goals of this Declaration—bridging the digital divide and ensuring harmonious, fair and equitable development for all—will require strong commitment by all stakeholders."[307] The *Tunis Agenda* called repeatedly for multi-stakeholder cooperation in areas such as the development of new financing mechanisms for ICTs, Internet governance, cybersecurity and capacity-building. This has remained a consistent value in post-WSIS work, both in the developmental and Information Society areas covered by the WSIS action lines and in the work of the Internet Governance Forum.

The multi-stakeholder approach has been strongly welcomed by non-governmental actors. The Internet Society, for example, stated in its contribution to this review that "there can be no doubt that the innovations and openness that the WSIS brought to all the organizations and stakeholders involved is one of the most important achievements of the Summit and its follow-up," and commends the opportunity it has given for Governments to learn from the experience of the private sector and civil society.[308] In its contribution, ICC-BASIS urged that WSIS implementation partners should "continue to build the multi-stakeholder interactive model across all post-WSIS activities to enrich communications and dialogue regarding key policy issues that enable the WSIS goals at national, regional and international levels."[309]

This report is largely concerned with the work which has been undertaken by international and regional organisations and which is reported through the action line mechanisms established following the Summit in 2005. While the action lines are multi-stakeholder in character, however, they are not the principal means by which non-governmental agencies participate in international work concerned with the development of the Information Society. Relatively few NGOs report through them or make contributions to formal WSIS review processes such as the consultation for this report. As a result, it is not possible to include a detailed review of the contributions of development agencies and non-governmental organisations as well as intergovernmental agencies in this report. The following paragraphs illustrate the scale and range of the contribution which is made by international and regional non-governmental organisations through six diverse examples of development, business and civil society organisations. A comprehensive review of non-governmental contributions to WSI implementation, at national as well as international and regional levels, would add significant value to the overall review of WSIS follow-up in 2015. This is discussed in Chapter 7.

Example 1: the development community—infoDev[310]

The development agency *info*Dev illustrates the work of international development agencies within the ICT4D environment for the purpose of this report. Although located in the World Bank, it works as "a neutral convenor of dialogue" and "a coordinator of joint action" on behalf of a number of bilateral and multilateral donors that are interested in continuing to work in various ways on ICT4D issues. It forms partnerships with public and private sector organisations, and sponsors research and innovation activities.

At present, *info*Dev focuses on work in three thematic areas: innovation (including business incubators), connectivity (enabling access for all) and transformation (mainstreaming ICTs as a tool for development and poverty reduction). Influential examples of its work to date include:

- the publication of two editions of an *ICT Regulation Toolkit*, which has become a standard capacity-building resource for communications regulators around the world;
- analysis of the role of ICTs in education, including research into the impact of ICTs in educational programmes in Africa, south Asia and the Caribbean;

- research and analysis of the potential for business process outsourcing in developing countries;
- research into the scope for extending financial services through mobile phones; and
- research, analysis and direct support of ICT business incubation projects.

Since WSIS, a number of bilateral donors have brought to an end programmes of work which were explicitly concerned with promoting ICT4D and the ICT sector, in favour of mainstreaming ICTs within their other work. UNCTAD is among agencies that have expressed concern that this may adversely affect the sector's contribution to development.[311] Agencies like *info*Dev provide a mechanism by which bilateral donors can feed into the international community's response to WSIS outcomes, including the specific needs of the ICT sector.

Example 2: the private sector—the International Chamber of Commerce (ICC)[312]

The ICC is a leading advocate of business interests in public policy worldwide, and it initiated what is called "Business Action to Support the Information Society" (BASIS) in 2006, to serve as "the voice of global business in the international dialogue that has … emerged on how information and communication technologies … can better serve as engines of economic growth and social development." It builds on the experience which business actors gained during WSIS when they worked collectively through the Coordinating Committee of Business Interlocutors (CCBI).

BASIS plays an active part in public policy fora on Information Society and ICT4D issues, including the WSIS Forum, GAID and the IGF, focusing on four main themes: liberalisation of the communications sector, innovation and entrepreneurship, ICTs for development, and multi-stakeholder Internet governance. It seeks to raise awareness of business interests, concerns and expertise among other stakeholder groups, including both Governments and civil society, and thereby facilitate multi-stakeholder outcomes including public-private partnerships.

While BASIS itself is not involved in programme activity, a number of businesses in the ICT sector have engaged in programme and project work through charitable foundations or corporate social responsibility programmes.

Example 3: the Internet technical and professional community—the Internet Society[313]

The Internet Society (ISOC) is a global non-profit organisation that was founded in 1992 to "provide leadership in Internet-related standards, education and policy." It has a global membership of some 44,000 individuals and 100 organisations who can, if they wish, take part in the work of 80 national chapters. It provides an institutional home for two entities which are responsible for Internet infrastructure standards, the Internet Architecture Board and the Internet Engineering Task Force, and has regional bureaus in Africa, Asia, Europe, Latin America and the Caribbean, and North America. It seeks to present perspectives from the Internet technical and professional community in relevant public policy fora, including the IGF, on "the open development, evolution and use of the Internet for the benefit of people throughout the world." It also seeks to build the capacity of Internet professionals, and to extend understanding of the Internet in the wider world community.

ISOC established three strategic initiatives for the period 2008–2010. These focused on:

- enabling access, specifically concerned with technical capacity-building, policy and regulation, and access in underserved communities;
- "InterNetWorks," concerned with cross-boundary network issues and the promotion of the open collaborative Internet development model; and
- trust and identity, concerned with maintaining and building the confidence amongst businesses and user communities that is essential if they are to collaborate effectively and place their trust in Internet resources.

In its response to the consultation process for this review, ISOC emphasised the value which it believes has come from the multi-stakeholder character of WSIS and post-WSIS follow-up, in particular "the opportunity for Governments to learn about and broaden their understanding of the Internet institutions and civil society organisations" and "the benefits of the cross-fertilization among the different stakeholder groups."[314]

ISOC has worked within a number of WSIS action lines, notably those concerned with infrastructure (C2), where it has emphasised the value it sees in the Internet's heritage of open standards; and capacity-building (C4), where it seeks to build both technical and leadership capacity. Its Next Generation Leaders

programme provides a framework to "help prepare young professionals from around the world to become the next generation of Internet technology, policy, and business leaders."

Example 4: a non-governmental development agency—the International Institute for Communications and Development (IICD)[315]

IICD is a non-profit foundation, based in The Netherlands, which has specialised in ICTs as a tool of development activity. It works with local partners in nine countries in Africa and Latin America: Bolivia, Burkina Faso, Ecuador, Ghana, Malawi, Mali, Republic of Tanzania, Uganda and Zambia, to address development goals in education, health, governance and livelihoods by making use of ICTs, including traditional media (such as radio and television) as well as new media (such as mobile phones and Internet). It is concerned especially with the role which these media can play in increasing the information available to the poor, enabling them to take advantage of opportunities and to influence the decisions that affect their lives.

A prominent part of the development of many IICD programmes is a roundtable process in which stakeholders from within a country and sector come together to explore and develop ideas of how ICTs can most effectively be used to meet their development objectives. These roundtable processes help to build awareness of the opportunities of ICTs while also placing them within a context of what is realistically achievable, and help to ensure local ownership of programme and project design and implementation. IICD also seeks to leverage its experience by sharing knowledge, by supporting national Governments in their efforts to include rural populations and the poor in national ICT strategies, and by helping them to incorporate ICTs in national development plans, Poverty Reduction Strategies and efforts to achieve the Millennium Development Goals.

Like other non-governmental agencies in this field, IICD works alongside bilateral and multilateral donors, contributing detailed and varied experience to the growing knowledge base of ICT4D deployment.

Example 5: civil society advocacy—the Association for Progressive Communications (APC)[316]

The APC is a network of about 50 civil society organisations in 35 (mostly developing) countries around the world, which are concerned with information and communications and with related rights and public policy issues. It describes its mission as being "to empower and support organisations, social movements and individuals in and through the use of information and communication technologies … to build strategic communities and initiatives for the purpose of making meaningful contributions to equitable human development, social justice, participatory political processes and environmental sustainability." Its overall vision is of a world in which "All people have easy and affordable access to a free and open internet to improve their lives and create a more just world."

The APC's strategic priorities for the period up to 2010 were:

- advocacy for affordable universal Internet access;
- work to make technology more environmentally sustainable;
- the use of emerging technologies for social change;
- building the "information commons" ("an open online space which is collectively built and where information and knowledge is freely shared");[317]
- work on issues concerned with internet rights; and
- governance, especially Internet governance.

Its work is organised into three programme areas, which are concerned with:

- communications and information policy, in which it engages at global, regional and national levels;
- women's networking support, in which it seeks to promote gender equity through the design, implementation and use of ICTs and the policy frameworks around them; and
- strategic technologies and network development, in which it seeks to support civil society organisations in making effective use of ICTs.

The APC played a major role within civil society participation during WSIS and has continued to do so in WSIS follow-up processes, including both those concerned with ICT4D and those concerned with Internet governance. It believes that the value of WSIS follow-up lies in "the potential to bring together different interested parties to discuss critical issues which are not necessarily being fully addressed elsewhere" and in "the opportunity to explore the interfaces between different policy issues and the diverse perceptions which different stakeholders hold about them, and the challenges they represent for the future."[318]

The APC initially acted as a co-facilitator of three of the WSIS action lines, and its programmes include initiatives across many action line themes. For example, it has worked to promote regulatory reform, affordable tariffs and open access regulation, especially in relation to international connectivity in Africa, and broadband access networks in Africa and Latin America. It has worked with the ECE and the Council of Europe to develop a code of practice on information and participation in Internet governance.[319] In 2009, it developed a "pro-poor" ICT access resource kit for advocacy on universal access,[320] and published the second edition of a comprehensive guide to ICT policy issues for civil society organisations.[321]

The APC publishes an annual *Global Information Society Watch* volume, in association with the development agency Hivos, each of which reviews a particular theme of WSIS implementation. These volumes have addressed participation (2007), access to infrastructure (2008), access to online information and knowledge (2009), and environmental sustainability (2010).[322]

Example 6: research networks—LIRNEasia[323] and Research ICT Africa (RIA)[324]

Independent research plays an important part in understanding the development of the Information Society and ways in which ICTs are being used by Governments, businesses, organisations and citizens. A wide range of research is undertaken by international organisations, including agencies whose work is described within this chapter, as well as by academics, but the role of independent research institutes has also been significant.

LIRNEasia is a research and policy advice centre, whose mission is "to improve the lives of the people of the emerging Asia-Pacific by facilitating their use of ICTs and related infrastructures; by catalysing the reform of laws, policies and regulations to enable those uses through the conduct of policy-relevant research, training and advocacy." It was responsible for designing a new approach to assessing the Telecommunications Regulatory Environment (TRE) through the perceptions of stakeholders in the ICT sector. It has conducted influential research on the use of telecommunications by low-income groups "at the bottom of the pyramid," the use of mobile telephony, and mobile applications such as mobile payments and m-health. Its 2010-2012 research programme focuses on knowledge based economies, with particular reference to agricultural value chains; teleuse at the bottom of the pyramid, a quantitative study of the use of ICTs by those with low incomes; and the development of indicators to measure the knowledge economy.

Research ICT Africa (RIA) is LIRNEasia's counterpart in Africa and, like it, has been supported by the International Development Research Centre. It is a network of more than 20 specialist ICT researchers throughout the continent, which has played an important part in collating information about the changing ICT sector on the continent and the impact this is having on societies and economies. RIA's work has been built around a number of core research programmes, in particular assessment of changes in the national policy and regulatory environments across the continent, TRE studies of perceptions of regulatory frameworks amongst sector stakeholders, and multi-country surveys of household and SME use of ICTs in Africa. (A new household survey is being undertaken in 2011.) It has also undertaken important research on issues such as mobile transactions and innovative business and regulatory practices in Africa. As well as researching and publishing their findings, both LIRNEasia and Research ICT Africa have been committed to building research capacity within the ICT sector on their continents.

NOTES

[219] See, for example, responses to this consultation from APC, the Internet Society, ICC-BASIS and UNESCO, http://www.unctad.info/en/CSTD_WSIS5/Contributions/.

[220] IGF 2011 submission to the CSTD. Available from http://www.unctad.org/Templates/Page.asp?intItemID=4242&lang=1.

[221] APC response to this consultation. Available from http://www.unctad.info/upload/WSIS5/Contributions/OtherStakeholders/APC.pdf.

[222] ICC response to this consultation. Available from http://www.unctad.info/upload/WSIS5/Contributions/OtherStakeholders/ICC_BASIS.pdf.

[223] http://www.unctad.info/upload/WSIS5/Contributions/UNGIS/DESA.pdf.

[224] *Tunis Agenda*, articles 68–69. See also articles 70 and 71.

[225] Nitin Desai (2006) "Report on Consultations on Enhanced Cooperation," September. Available from https://wiki.tools.isoc.org/@api/deki/files/1481/=ReportEnhancedCoop.Edit.04.07.2008.pdf.

[226] E/2009/92. Available from http://unpan1.un.org/intradoc/groups/public/documents/un-dpadm/unpan035383.pdf.

[227] *Geneva Plan of Action*, section D2.

[228] http://www.itu.int/wsis/tffm/final-report.pdf.

[229] *Tunis Agenda*, paras 3-28.

[230] This Fund was subsequently established with support from some national and local governments. More information on the Fund is available from http://www.dsf-fsn.org/cms/component/option,com_magazine/func,show_magazine/id,11/Itemid,194/.

[231] http://www.ungis.org/ThematicMeetings/OpenConsultationsonFinancialMechanisms.aspx.

[232] "Broadband investment 'to hit $72bn in 2010,'" *GlobalTelecomsBusiness.com*, 10 February 2010. Available from http://www.globaltelecomsbusiness.com/Article/2390893/Regions/25190/Broadband-investment-to-hit-72bn-in-2010.html.

[233] *Tunis Agenda*, article 97.

[234] The reports are available from http://www.unctad.info/en/CSTD_WSIS5.

[235] http://www.ungis.org/.

[236] *Ibid.*

[237] http://www.ungis.org/ThematicMeetings/HarnessingInformationandICTsforDevelopment.aspx.

[238] http://www.unctad.org/Templates/Page.asp?intItemID=4242&lang=1.

[239] http://www.africa-union.org/root/au/aboutau/au_in_a_nutshell_en.htm.

[240] Other RECs on the continent are the Arab Maghreb Union (UMA), the Community of Sahel-Saharan States (CEN-SAD), the Economic Community of Central African States (ECCAS) and the Intergovernmental Authority on Development (IGAD).

[241] http://www.atu-uat.org/.

[242] UNECA (2008), *The African Information Society Initiative (AISI): A decade's perspective* (Economic Commission for Africa, 2008), p. ix. Available from http://www.uneca.org/aisi/docs/AISI+10.pdf.

[243] http://www.uneca.org/aisi/docs/arapke%20version%20of%20september%202005.pdf.

[244] See ECA response to this consultation. Available from http://www.unctad.info/upload/WSIS5/Contributions/UNGIS/ECA.pdf.

[245] Abebe Chekol, "Report on the Outcomes of the 1st Follow-up Workshop on WSIS, Tunis+3"http://www.uneca.org/codist/codist1/content/ict/CODIST-I-ICT-Outcomes_WSIS_Follow_up_1-Chekol-en.ppt.

[246] http://www.itu.int/ITU-D/connect/africa/2007/summit/pdf/finalreport.pdf.

[247] http://www.nepad.org/regionalintegrationandinfrastructure/infrastructure/ict.

[248] http://www.itu.int/ITU-D/connect/africa/2007/summit/pdf/finalreport.pdf.

[249] http://www.afdb.org/en/topics-sectors/sectors/information-communication-technology/bank-group-strategy/.

[250] infoDev (2010) "Transformation Ready, a new flagship study of the World Bank Group and African Development Bank," 30 September. Available from http://www.infodev.org/en/Article.605.html.

[251] ESCAP response to this consultation. Available from http://www.unctad.info/upload/WSIS5/Contributions/UNGIS/ESCAP.pdf.

[252] http://www.aptsec.org/.

[253] http://www.pita.org.fj/.

[254] ESCAP (2006) *Regional Action Plan towards the Information Society in Asia and the Pacific* (United Nations), p. 2. Available from http://www.unescap.org/idd/Pubs/st_escap_2415.pdf.
For more information see also ESCAP response to this consultation and information on the Expert Group Meeting on WSIS+5, available from http://www.unescap.org/idd/events/EGM-WSIS+5-2008/index.asp.

[255] ESCAP (2010) *Regional Progress and Strategies towards Building the Information Society in Asia and the Pacific*, p. 11. Available from http://www.unescap.org/idd/pubs/Regional-Progress-WSIS-ST-ESCAP-2555.pdf.

[256] http://www.unapcict.org/.

[257] http://www.unescap.org/idd/events/cict-2010/CICT2_2E.pdf.

[258] ESCAP response to this consultation.

[259] ESCWA response to this consultation. Available from http://www.unctad.info/upload/WSIS5/Contributions/UNGIS/ESCWA.pdf.

[260] http://isper.escwa.un.org/.

[261] http://www.escwa.un.org/information/publications/edit/upload/ictd-09-12.pdf.

[262] ESCWA response to this consultation.

[263] http://ec.europa.eu/europeaid/where/latin-america/regional-cooperation/alis/index_en.htm.

[264] ECLAC (2010) *Monitoring of the Plan of Action eLAC2010* (United Nations, LC/R.2165, November). ECLAC response to this consultation is available from http://www.eclac.org/ddpe/publicaciones/xml/2/41802/LCR2165.pdf.

[265] http://www.eclac.cl/cgi-bin/getProd.asp?xml=/socinfo/noticias/documentosdetrabajo/5/41775/P41775.xml&xsl=/socinfo/tpl-i/p38f.xsl&base=/elac2015/tpl-i/top-bottom.xsl.

[266] http://www.eclac.org/socinfo/osilac/.

[267] http://www.eclac.org/ddpe/publicaciones/xml/2/41802/LCR2165.pdf.

[268] UNECE response to this consultation. Available from http://www.unctad.info/upload/WSIS5/Contributions/UNGIS/ECE.pdf.

[269] http://www.unece.org/cefact/.

[270] *Ibid.*

[271] http://www.unece.org/env/pp/documents/cep43e.pdf.

[272] http://www.intgovcode.org/images/c/c1/COGP_IG_Version_1.1_June2010.pdf.

[273] http://www.unctad.org/Templates/Page.asp?intItemID=4972&lang=1; http://www.unctad.org/Templates/Page.asp?intItemID=4242&lang=1.

[274] http://www.itu.int/net/about/index.aspx.

[275] http://www.itu.int/itu-wsis/docs/WSIS+5.pdf.

[276] http://www.itu.int/ITU-D/ict/publications/world/world.html.

[277] http://www.itu.int/aboutitu/strategic_plans/04-07/d_mission.html.

[278] http://www.itu.int/ITU-D/pdf/op/OP2011-2014.pdf.

[279] Details can be found in ITU, *WSIS+5*.

[280] UNESCO, *Towards Inclusive Knowledge Societies* (UNESCO 2010). Available from http://unesdoc.unesco.org/images/0018/001878/187832e.pdf.

[281] *Ibid.*

[282] http://portal.unesco.org/ci/en/files/26352/12114609343ifap_draf_strategic_plan.pdf/ifap_draf_strategic_plan.pdf.

[283] http://www.unesco.org/new/en/communication-and-information/intergovernmental-programmes/ipdc/.

[284] http://www.uis.unesco.org/ev.php?URL_ID=2867&URL_DO=DO_TOPIC&URL_SECTION=201.

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[288] http://www.apdip.net/.

[289] http://ictdegov.org/e-gov/.

[290] http://www.unctad.org/en/docs/sdteecb20072rev1_en.pdf.

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[293] http://www.unctad.info/upload/WSIS5/Contributions/UNGIS/DESA.pdf; http://www.unctad.org/Templates/Page.asp?intItemID=4242&lang=1.

[294] http://www2.unpan.org/egovkb/global_reports/10report.htm.

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[296] http://www.un-gaid.org/Portals/2/docs/AbuDhabi%20Global%20Forum%202010/Draft_Summary_Global_Forum.21dec.pdf.

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[298] FAO response to this consultation. Available from http://www.unctad.info/upload/WSIS5/Contributions/UNGIS/FAO.pdf.

[299] http://www.e-agriculture.org/en.

[300] UNICEF response to this consultation. Available from http://www.unctad.info/upload/WSIS5/Contributions/UNGIS/UNICEF.pdf.

[301] WHO response to this consultation. Available from http://www.unctad.info/upload/WSIS5/Contributions/UNGIS/WHO.pdf.

[302] WIPO response to this consultation. Available from http://www.unctad.info/upload/WSIS5/Contributions/UNGIS/WIPO.pdf.

[303] http://www.wipo.int/about-wipo/en/what_is_wipo.html.

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CHAPTER 6
NEW THEMES IN CHANGING TIMES

Previous chapters of this report have looked back at work which has been undertaken by international and regional agencies to implement WSIS outcomes since 2005. They have been primarily concerned with ICTs and the Information Society as these were seen at the time of WSIS and with objectives which were identified then as important aspects of ICT development against which progress should be measured. The discussion in these chapters has shown that substantial progress has been made towards many of the targets and in the thematic areas identified by WSIS, but that continued efforts are needed to achieve the desired outcomes, particularly in Least Developed Countries (LDCs), in Africa, in rural areas, and where more complex ICT-enabled applications and services are concerned.

ICT technology and markets, however, are in constant change. The communications landscape today, which is described in Chapter 2, is very different from that of 2005. Mobile networks and services now play a much greater part than they did then. Broadband networks and services are much more prominent in the expectations that policymakers, business leaders and other stakeholders now have of the communications landscape of the future. The nature of the digital divide has shifted from one that is primarily concerned with the availability of services to one which, in many respects, is concerned with their quality instead. The very indicators that we can use to measure progress towards the Information Society need to be adjusted to take account of these rapid changes in ICTs and their use around the world. These set new baselines which policymakers can use today, at the midpoint between the Tunis Summit and its review date in 2015, to think about how best the international community can work to achieve WSIS objectives from 2011 to 2015.

Some of these changes which have taken place in the ICT landscape continue trends that were underway before and during WSIS. Others, however, are entirely new developments—innovations in technology and services that have become available since 2005 or will do so before 2015 and that are likely to alter prospects for the Information Society significantly by that date. Because these were not anticipated in 2003, when the WSIS targets and action lines were established, they are not covered by the outcome documents. However, as respondents to the consultation process for this review have pointed out, they need to be considered now by Governments, businesses and others that are concerned with public policy, to influence the policy decisions which they make, and to be included in the present and subsequent reviews of WSIS outcomes.

UNCTAD summarised these changes as they affect e-business in its submission to this review:

> "As in other areas of the information society, the area of e-business has been greatly affected by market and technological changes in the ICT landscape. Changes in technology and markets are taking place far more rapidly than in other economic sectors. For example, mobile telephony has made connectivity in some rural areas of low-income countries—long regarded as unviable—into a reality. Expansion in the reach of communications networks has been accompanied by innovation in services and applications, influencing adoption patterns and user behaviour. These changes have been difficult to predict. They have opened up new opportunities for development interventions but have also undermined the sustainability of other projects."[325]

The consultation process for the review invited respondents to identify "what important new issues or themes concerning the Information Society have emerged or become important since the Summit ended in 2005, which deserve more attention in the next five years." "New themes" that were mentioned in response to this request included the growth of mobile telephony and mobile Internet; the development of broadband networks and services; social networking; environmental issues and "green IT;" cybersecurity, child protection and data privacy; and cloud computing. UNCTAD also mentioned changes in attitudes towards ICT4D within development agencies. Some respondents urged changes in the aims and modalities of WSIS implementation in order to bring them into line with today's communications context. The Government of the Republic of Korea, for example, suggested that "WSIS action lines should be revised to make them applicable in addressing new challenges of today."[326] The ESCWA urged that ICT and Information Society plans and strategies should be adapted to "constantly changing realities."[327]

This chapter therefore complements the consideration of progress towards WSIS targets and action lines, which can be found in Chapters 2 to 5, by discussing new developments in the communications environment that were not anticipated at the time of WSIS, or in which international policy thinking has moved in new directions. It does not provide a comprehensive review of changes in technology, services and markets since 2005, but considers a number of examples of change and innovation which were raised by respondents to the consultation,

which have or are likely to have significant impact on progress towards the Information Society, and which are currently receiving attention from policymakers and other stakeholders. Addressing these new challenges and opportunities is as important as achieving the WSIS targets in implementing the WSIS ethos, to bring about a "people-centred, inclusive and development-oriented Information Society."

SECTION 1—CHANGES IN INFRASTRUCTURE AND TECHNOLOGY

Information and communication technologies are in constant change. It is now 45 years since Gordon Moore, co-founder of Intel, noted that the number of components in integrated circuits was doubling each year and predicted that this trend would continue for some time.[328] His observation has become a metaphor for continuous rapid growth in the capabilities of computer and communications hardware, which has been underway since the 1960s and which has driven continuous enhancements in the capabilities of software and in the range and quality of services that can be made available through information technology devices. This is a rate of technological advance which is unprecedented in human history.

The WSIS outcome documents appreciated the importance of this rapid ongoing development of technology and infrastructure. Some technical advances could be anticipated at the time of WSIS. A number of different new wireless technologies, for example, which are capable of delivering greatly enhanced quality and capacity, were already being deployed, near deployment or in earlier stages of research and development. The Internet community was readying itself to move from version 4 to version 6 of the Internet Protocol, enabling an expansion in the Internet numbering system that would put scarcity beyond prospect and permit the advent of connected devices in the "Internet of things." Broadband networks were already expected to play a crucial part in the communications future and investment in them was emphasised by the Task Force on Financing Mechanisms and in the *Tunis Agenda for the Information Society.*

It was then and continues to be difficult to predict the outcomes of these changes. The history of communications includes many instances in which services which had been thought likely to succeed have failed—for example, early attempts to introduce videophony—and many more of services which proved far more useful and successful than had been expected by their designers and by operating companies—for example, mobile telephony itself, SMS texting and social networking. The same challenge lies before policymakers and businesses today. It is difficult to predict which wireless technologies will prove most effective in generating business and consumer value in evolving infrastructure markets, or to anticipate, five years ahead, what new services will come to market and which will have the most significant impact on human behaviour and progress towards the Information Society.

Convergence between different media will continue to play an important part in evolving communications markets. The same underlying transmission technologies now underpin computing, broadcasting and telecommunications, enabling content to be delivered to end-users over any communications network and to be received by a much more diverse range of terminal devices than was hitherto the case. Many people now listen to radio programmes on their mobile phones or watch broadcast television on computers, while development agencies and NGOs have benefited from the opportunity to draw on multiple media resources to monitor problems and deliver services. Technological convergence has led, in turn, to convergence in business ownership, to innovation in the products offered to consumers, including bundled packages of telephone, broadcasting and Internet services, and to convergence in regulatory frameworks. The future development of these increasingly complex markets is also difficult for policymakers to predict.

Communications services also have strong network effects. In many cases, there may be a critical mass of participation which, when reached, leads to much higher levels of adoption. Such a point has clearly been reached in mobile telephony worldwide, with broadband Internet in developed countries, and with social networking amongst established users of the Internet. It is difficult to identify which new services are likely to experience similarly rapid acceleration of demand or when that is likely to happen, but it is highly probable that there will be more examples in the next five years of unpredicted advances in technology and services.

The transition to mobility

The most dramatic change to have taken place in the communications landscape since 2005 has been the growth in mobile access and the number of mobile users. This growth, which is described in Chapters 2 and 3, represents a major transformation in social behaviour, in which the opportunity for personal interactive communications at the point of need or choice has, for the first time, become available to the majority of people in low-income countries.

Until the advent of mobile telephony, as recently as 15 years ago, telephone subscription rates in LDCs were typically below one telephone line per 100 people. In practice, the large majority of people in such countries did not use the telephone. Mobile telephone ownership and use are now part of the common experience of people in those countries, particularly in urban areas but also in rural districts which were historically very underserved, and even amongst those on low incomes. While coverage is more limited in the countryside in LDCs, about 85 per cent of Africa's population is now covered by mobile networks, and the figure should approach 100 per cent by 2015.

As discussed in Chapter 2, this growth in mobile telephony greatly exceeded the expectations of policymakers and other stakeholders at the time of WSIS, when participants set a target for half the world's population to have ICTs "within their reach" by 2015. The WSIS outcome documents placed much more emphasis on the Internet than on telephony as means of enabling the Information Society to develop. While the word "Internet" appears more than 200 times in those documents, the words "phone," "telephone," and "telephony" are barely mentioned.

Two more important changes have taken place in mobile telephony over the period since 2005:

- Firstly, mobile handsets have evolved, becoming much more complex devices, offering much more value to their owners than telephony alone.
- Secondly, improvements in both handsets and networks, including the growth of mobile broadband, mean that mobile telephones have become a viable means of access to the Internet.

The social and behavioural implications of these changes are discussed later in this chapter.

Mobile telephony has therefore become the predominant mode of voice communications worldwide, leading not just to growth in the number of mobile phones but to a reduction in the number of fixed line subscriptions in all world regions. This challenges three assumptions that were widely held during the Summit: 1) that fixed infrastructure would continue to be more important than mobile infrastructure in delivering communications services in the medium term, even in areas that were currently underserved; 2) that the majority of the poor would continue to be dependent on public access (telecentres and kiosks) rather than enjoying personal access (by mobile phone) to telephony/ICTs; and 3) that the Internet would remain a computer-based resource rather than one that is also accessible through devices such as mobile phones. It is now widely expected, especially in Africa, that access to Internet in the near and medium term will be gained primarily through mobile networks, and devices that make use of them, rather than through fixed local access networks and attached computers. In Kenya, for example, at the end of 2010, over 98 per cent of the country's 3.2 million Internet subscribers held subscriptions on mobile networks.[329]

It seems clear that mobile phone use will continue to grow towards ubiquity during the next five years, and that both the Internet and ICT4D need to adjust to its new prevalence and predominance. The transition to a mobile-led communications environment is leading to significant changes in operators' business models and in the design of handsets, websites and applications. It requires significant rethinking of the ways in which individuals and communities make use of networks and devices, of Government strategies for the delivery of online public services and citizen communication, and of ways in which communications networks can be used to achieve development objectives.

Concern continues to be expressed within the ICT4D community, however, about the limitations of Internet access on mobile phones, and about whether mobile networks can meet the long-term quality and capacity demands of mass market Internet. There is a good deal of uncertainty about how this will be affected by new generations of mobile technology, including local access networks, which will become available within the next few years. This will be an important subject for technologists and policymakers in the period up to 2015.

The transition to broadband

Defining broadband is not simple. As noted in Chapter 2, there is no internationally agreed definition of what it means, beyond a rate of connectivity which is significantly above the standard data

transfer rate obtainable through dial-up Internet connections. Until recently, a data transfer rate of 256kbps was regarded by many analysts as the broadband threshold. Definitions based around speed have become less popular, however, as faster speeds have become available, making yesterday's "broadband" seem unacceptably slow to today's and tomorrow's customers. One way of addressing this is to define broadband not by a particular speed but by its relationship to commonly available speeds in a particular time or place. In that context, a speed of 256kbps might be considered broadband in some locations but not others, or at a particular stage in the development of communications markets but not later. Another way of defining broadband, which has been proposed by the World Bank, is to regard it as an ecosystem of technology, services and demand.[330] The Broadband Commission for Digital Development has suggested defining it as a cluster of concepts, including high-capacity/speed, continuous ("always-on") service and the ability to combine voice, data and video in a single service offering.[331]

The period since WSIS has seen rapid growth in broadband access networks, though this has been heavily concentrated in developed countries. These have seen steady growth in fixed broadband access but faster growth in mobile broadband, which has now overtaken fixed broadband in every world region. There is, however, a growing digital divide in the availability and use of broadband between high-income countries and other regions, with LDCs and Africa, as a continent, lagging behind the rest of the world. In many developed countries, household broadband access is now the norm, while it remains exceptional even in major cities in some low-income countries. This resembles the digital divide in telephony before the rapid growth in mobile networks which began in the 1990s, and is a matter of concern to intergovernmental agencies and to the Governments of many countries.

The WSIS outcome documents recognised the importance of broadband at the leading edge of progress towards the Information Society. The *Geneva Declaration* called for "greater use of broadband and other innovative technologies" as catalysts for social and economic development.[332] The *Geneva Plan of Action* urged the development and strengthening of broadband infrastructure at international, regional and national levels.[333] The need for investment in broadband networks, including investment by international financial institutions and through public-private partnerships, was given prominence in the report of the Task Force on Financing Mechanisms.[334] Nevertheless, as with mobile phones, there are surprisingly few direct references to broadband in the WSIS outcome documents.

The period since WSIS has seen a substantial increase in the importance attached to broadband by the international community. Instead of being regarded as an improvement in the communications environment, it has come to be seen as an essential and fundamental element in regional and national strategies for ICTs. The greater importance attached to broadband is exemplified by the outcome document of the *Connect Africa* summit which was held in Rwanda in 2007, which included in its five priorities the objectives of: a) interconnecting all African capitals and major cities with broadband infrastructure by 2012; and b) connecting African villages to broadband ICT services by 2015.[335] ECLAC has also placed broadband at the heart of its strategy for the future of communications in Latin America, going so far as to describe it as a "public good."[336]

Since the *Connect Africa* meeting, there has been extensive investment across Africa, as in other continents, in national backbone infrastructure which is capable of delivering broadband access to much wider population groups, although actual access for end-users has been limited to date in low-income countries and further investment is required. The growth of mobile broadband has been particularly notable. The five years to 2015 will bring greater clarity on the question of how far and how quickly mobile networks will be able to overcome low rates of broadband access and the digital divide associated with them, and how sufficient and sustainable they will be in providing broadband access to the majority in the medium term.

In 2009 and 2010, strong calls for investment in broadband, as a critical part of national infrastructure, came from the ITU and the World Bank. One study for the World Bank suggested that broadband services are more substantially associated with economic growth than mobile phones.[337] High hopes such as these have contributed to broadband investment being seen as a touchstone of future progress towards the Information Society, to a degree that was not the case in 2005, and to its inclusion in a number of economic stimulus packages. The strongest vision of a broadband future to emerge so far from the international community is

contained in the report of the Broadband Commission for Digital Development, which was presented to the UN General Assembly in 2010. It described the importance it sees in broadband thus:

"Beyond any physical or virtual infrastructure that has preceded it in the industrial revolution or information age, and as a catalyst and critical enabler for recovery in the wake of the recent economic slowdown, broadband will be the basis for digital invention and innovation and the foundation for digital and other investments that lie at the very heart of our shared knowledge and society."[338]

The development policy implications of the Broadband Commission's work are considered later in this chapter.

Cloud computing

A third significant development in the technology and infrastructure of ICTs since 2005 is that of cloud computing. As with broadband, definitions vary. One widely-used definition, from the United States National Institute of Standards and Technology, describes cloud computing as "a model for enabling convenient, on-demand network access to a shared pool of configurable computing resources (e.g. networks, servers, storage, applications, and services) that can be rapidly provisioned and released with minimal management effort or service provider interaction."[339] Another, more succinct, definition describes it as "… applications delivered as services over the Internet and the hardware and systems software in the data centers that provide those services."[340]

Tasks that were previously performed in hardware can be performed in cyberspace. This new architecture of ICT use is expected to have significant benefits for end-users, who can access services as and when they require them rather than having to invest in hardware and software assets that they rarely need—cloud computing has reduced costs, enabled greater capacity and range of activity, and generated efficiencies in business practice and the use of ICT resources. It will also improve people's ability to use computers when they are on the move.

Proponents of cloud computing expect it to have extensive impact in sectors beyond information technology, including production sectors such as manufacturing, media and the delivery of health, education and other Government services. This implies that it could bring about further changes in the structure of the ICT sector and the dynamics of the relationship between that sector and its consumers—changes which could be as profound in time as were the development of personal computers, graphical user interfaces or the Internet itself. Cloud computing could also change the way in which ICTs, as general purpose technologies, interact with wider social and economic development objectives.

It is unclear at present how extensively cloud computing will be adopted or how far, where it is adopted, this potential will be realised. The technology challenges are significant, as are organisational changes within the ICT sector and other sectors that will make use of it. Users and potential users also have concerns about privacy and security which need to be addressed. Governments, businesses and citizens are concerned about the security of data locations and of the networks and facilities that are used to access them. Some end-users are also worried that cloud computing may shift the balance of power and rights between the individual, the state and business, jeopardising personal privacy, allowing much greater aggregation of data about individuals than has historically been possible, and perhaps leading to concentration of businesses in the Internet and data management arena. There are also uncertainties about the extent to which cloud computing will alter the environmental impact of ICTs (see later in this chapter). Its development potential may be constrained—irrespective of its other benefits—if these concerns cannot be overcome.

SECTION 2—NEW DEVELOPMENTS IN SERVICES AND APPLICATIONS

If technology and infrastructure are in constant change, then so are services and applications. The speed of innovation and of the adoption of new services and applications is remarkable, and just as rapid in developing as in developed countries. Indeed, some innovations, such as mobile transactions and free cross-border roaming on mobile phones,[341] have emerged first in developing country markets. Changes in the availability of communications networks and services also have effects on behaviour patterns and on the distribution of power and influence within communities, which in turn affect social and economic opportunity. The following paragraphs illustrate three examples of

areas in which services, applications and behaviour have changed since the Tunis summit in 2005.

Mobile behaviour and the mobile Internet

The growth of mobile telephony over the past decade is probably the fastest diffusion of any new technology in history. Innovative pricing mechanisms, such as prepaid service and tariffs targeted on what have become known as "bottom of the pyramid" markets,[342] have encouraged the rapid adoption of mobile telephony in lower-income groups. The adoption of mobile phones has been particularly significant in low-income countries where, for most people, it has represented a more dramatic change in circumstances than it has elsewhere. In developed countries, most people initially acquired mobile telephony as a complement to fixed services to which they already had access. For most users in developing countries, by contrast, mobile telephony represents the first time that they have had their own personal telephone connection. For them, the innovation has been telephony, not just mobility.

As a result, the mobile phone has had an even more profound impact on opportunities for social and economic interaction in developing countries than in the developed world; and these new opportunities for interaction have in turn enabled changes in social dynamics and in economic opportunity. Many commentators have noted the ways in which mobile telephony can change relationships within the family—for example, by enhancing communications between distant family members (including migrant workers) and by disrupting established power relationships between parents and their children. There may be important impacts on women's independence and access to resources which are relevant to developmental outcomes. Much has been written about the ways in which people have made use of mobile phones to improve the performance of small businesses—for example, by shopping around for better value inputs, accessing information on business practice and improvements, maintaining stronger customer relationships, and identifying the most profitable markets in which to sell their produce. Much of this literature has concentrated on the way in which mobile phones have reduced information asymmetries between producers, intermediaries and consumers.[343]

The fact that the reach of mobile telephony has grown much faster than anticipated at the time of WSIS suggests a need to rethink some of the assumptions that were made then about its potential and its relationship with development, not least about the relationship between public and private communications access (telephones and telecentres). When a significant proportion of a population gains personal access to telephony, the business model for telephone kiosks becomes less sustainable. Mass market mobile Internet, as it develops, is likely to have a similar impact on the business models of cybercafes and telecentres, which will need to upgrade, extend or diversify their services in order to retain regular custom.

The nature of the mobile handset has also been changing over time. From the outset, mobile handsets have offered more than voice telephony alone, with SMS texting in particular providing an additional, cheaper mode of communication. Second generation feature phones have many more functions than earlier mobiles or than fixed lines, including cameras (still and video), preinstalled games, sound recording and personal organiser functions. Smartphones, which account for an increasing proportion of new phone sales and will gain further share in all markets between now and 2015, add many additional functions, some of which are dependent on their higher connectivity capabilities (such as full Internet access and the mobile applications which offer additional information and entertainment opportunities), while others (such as music storage and playback) result from their enhanced computing capabilities. Rather than mere telephones, these have become multi-purpose mobile devices which can displace other portable consumer goods such as radios, cameras and games consoles.

Mobile Internet is largely a post-WSIS development, but has been growing rapidly in many markets, including developing countries, and has the potential to bring Internet access to low-income mass markets in the same way and over the same period as mobile phones have previously brought telephony. Although mobile phone owners are likely to continue to use cybercafés for certain purposes—such as large downloads, watching films, game playing and some kinds of information search—the potential growth of mobile Internet changes many of the perceptions about future Internet access which were held by policymakers at the time of WSIS, requiring reconsideration of business models, plans for e-government and the delivery of developmental services. For example, mobile applications may prove at least as attractive a means of making interactive e-government resources available than the conventional websites which are currently more widely deployed.

Changes in mobile services: the example of mobile transactions

Mobile transactions present a new service which has developed strongly since WSIS, and which has attracted a great deal of interest from development agencies. Some mobile transaction services were available before or during WSIS, for example in the Philippines,[344] but they were not widely discussed during the Summit. A great deal of attention has been paid since 2005 to a number of new and highly successful mobile transactions services, particularly the M-PESA ("mobile money") service of Safaricom in Kenya. This has gained more than ten million customers in the period since its launch in March 2007.[345]

Mobile money services use the mobile communications network and its associated network of airtime sellers to enable the exchange of funds between holders of mobile money accounts. Business models vary between different companies. In essence, however, these services allow individuals to hold money in a phone-based account, which can be used to make payments for goods and services to other account-holders, so reducing the need to carry cash. They also facilitate the transfer of remittances, i.e. cash payments from family members working away from home, typically in urban areas or another country, to family members at home. Remittances have become very important sources of capital in developing countries, their total value to a country often exceeding that of corporate foreign direct investment.[346] Although international financial regulations inhibit cross-border remittances through mobile money accounts, there is increasing pressure for these to be liberalised so that account holders and intended beneficiaries can gain from the greater physical security and lower commission rates available.

Mobile money services illustrate how communications networks can substitute for non-ICT facilities, such as bank branches, which are not widely available in rural areas of developing countries. A similar story could be told about mobile health initiatives. Where communications networks add value of this kind, the services concerned have often been taken up with enthusiasm. The developmental value of successful mobile transactions is believed to be substantial, improving access to capital, security of savings and facilitating the flow of money into rural areas. Services like these represent an additional dimension of potential progress towards the Information Society that was not well anticipated at the time of WSIS and (at least in the case of mobile transactions) is not measured in the WSIS targets or included in remits of the WSIS action lines.

The changing Internet: Web 2.0, user-generated content and social networking

The Internet is anything but static. Since it first emerged in the 1960s, and particularly since the time of the emergence of the World Wide Web in the 1980s that led to much more widespread use of Internet by citizens, Governments and businesses, it has experienced rapid change, both in technology and in the services which it enables. The range and pace of adoption of services, and of technical and policy challenges, has been difficult even for ICT sector specialists to predict. Many of these new services have given citizens opportunities which were previously unavailable to them, in particular enabling access to greatly increased information resources, the ability to exchange audio and video files instantly while at a distance, and the chance to buy online goods and services that were hitherto unavailable in their communities. Some Internet-enabled services have displaced longstanding business models, for example in the sale of music, travel and entertainment tickets. The combination of these factors has been disruptive of established legal and other norms. For example, it has enabled individuals to bypass intellectual property requirements and legal constraints on access to certain types of content such as pornography and certain physical goods such as pharmaceuticals. The impact of the Internet on patterns of behaviour has been complex and became more so with the development of what has become known as Web 2.0 and social networking.

Web 1.0—the first generation of Web content, which was prevalent at the time of WSIS—for the most part made available content or information *to* end-users. This content was provided through formal websites maintained by Governments and other official bodies, commercial businesses, non-governmental and academic organisations, media outlets, and individuals with a relatively high level of Internet participation and/or technical competence. The production and management of content was largely a matter for website owners and administrators. A significant and growing number of websites included managed transaction services such as online shopping and applications for official documents, while some offered

other forms of interaction such as the opportunity to post comments on published articles. However, most were static vehicles for dissemination of information in the manner of broadcasting rather than platforms for interaction in the manner of telecommunications.

Web 2.0—the second generation of Web content, which has become prevalent in the years since WSIS—is very different. Building on the experience of bulletin boards, listservs and other interactive modes of Internet communication, it is primarily concerned with the exchange of information *between* end-users. Web 2.0 sites and services enable people to be more than merely consumers of content on the Web, but also to become content producers– "prosumers" as they have been called. This change has occurred almost entirely since the second WSIS summit in 2005, and its dynamism and capacity to transform the nature and value of the Internet for many people were not anticipated at that time.

"User-generated content" takes many forms, not all of which require the innovations that are usually called "Web 2.0." These include the following:

- Online chat and instant messaging (IM) services enable text-based conversations between users of computer terminals which are similar in some ways to SMS texting between mobile phones. They built on the pre-Internet experience of bulletin boards and online lists to establish a new mode for mass market communications from around 2000. Popular instant messaging services such as those of Yahoo! and MSN may be provided as part of wider content offerings by major global Internet businesses. Other instant messaging services such as Tencent's Chinese service QQ are more local. The South African IM service MXit, which is mostly used on mobile phones, had 27 million subscribers in January 2011.[347] IM services intersect with VoI and social networking services (below).
- Voice over Internet services (VoI) such as Skype (founded in 2003) provide suites of communications resources including instant messaging, voice telephony, video telephony and file transfer, either free or at much lower prices than are usually available through conventional telephony, particularly for international calls. Skype ranks around 200th in the list of most accessed websites worldwide and it has been reported that Skype-to-Skype calls accounted for 13 per cent of international call minutes in 2009.[348] The low-cost interactivity enabled by IM and VoI is thought to have been significant in intensifying social relationships between home countries and diaspora communities and family members.
- Audio and video sharing websites enable individuals to share material which results either from their own creative work or from other sources. The most popular video-sharing website, YouTube, was officially launched in November 2005, incidentally the same month as the Tunis summit, and is now the third most popular website worldwide.[349] Video-sharing websites have been particularly significant to the music industry, providing new marketing opportunities not least for unsigned acts. Photo-sharing sites such as Flickr (founded in 2004, ranking 39th in global Internet access at the beginning of February 2011) emphasise still rather than video images, and also provide a mechanism for sharing personal and public access content. Flickr hosted some four billion images in October 2009.[350]
- Blogs (which first appeared before the turn of the century) enable individuals to make public personal comments on issues of interest, and to create opportunities for others to engage in public online discussion with them. In contexts where opportunities for publication are limited, as a result of media concentration or political censorship, they have opened up space for more people to engage in public debate (sometimes anonymously or pseudonymously) and for what has become known as "citizen journalism." There were approximately 155 million blogs worldwide at the beginning of February 2011.[351] Blogging culture has extended into conventional website design, as traditional websites have added opportunities for reader comment and debate. User-generated content, distributed through blogs and other Web 2.0 services, is increasingly finding its way into mainstream media, including news-gathering, and is influencing civil society engagement in politics and social change.
- Wiki-based sites and wiki software enable collaborative content production, providing alternative sources of information, of varying quality, to that found in official or conventional publications. This includes collaborative production of both private and published documents, allowing groups of authors to work collaboratively without direct personal interaction. Wikis are used in community websites, corporate intranets and activist networks. The best-known instance of wiki publishing, the online encyclopaedia Wikipedia, has become the eighth most accessed website worldwide.[352] In February

2011 it had over 3.5 million pages of content, with over 140,000 active contributors. Between them, its contributors had made more than 440 million page edits since Wikipedia was launched in 2001.[353]

- Other important areas of user- and network-generated content include personal sales and auction sites, online gaming and peer-to-peer filesharing. The auction site eBay (founded in 1995) ranked around twentieth among the world's most accessed websites in February 2011.[354] Online gaming establishes communities of shared interest which transcend geographic boundaries. Peer-to-peer filesharing has a variety of purposes, although it has become best known as a means for bypassing intellectual property constraints on film and music.
- The new interactivity of Web 2.0 provides an opportunity for what has become known as "crowdsourcing," i.e. the outsourcing of activities which would normally be undertaken by employees or those within a particular social group to a much wider community of people who respond to opportunities online, both formal and informal. Crowdsourcing has long been used to facilitate software development, but is now entering other economic spaces such as data management and analysis. Mobile phone-based crowdsourcing resources such as Ushahidi have been used to monitor elections, political violence and the impact of natural disasters.[355]

It can be argued that these examples of user-generated content represent part of a cumulative cultural shift in the nature of the Internet, at least from the perspective of end-users, from something that was primarily a source of information to something that is primarily a means for interactive communication. This cultural shift is most evident in the development of social networking websites. Although rooted, like some of the other modes of user-generated content above, in the experience of bulletin boards before the World Summit, social networking sites have accumulated very high numbers of users within the past four years. They have changed the nature of the Internet experience in ways that were not anticipated at the time of WSIS, becoming a core part of daily life for many individuals in many countries, intensifying social interaction and providing new ways for social, political and other groups to organise themselves, either in the long term or in short term *ad hoc* groupings.

There are a number of social networking sites which are widely used in different countries. As well as the Internet messaging and audio/video-sharing sites mentioned above, these include sites such as MySpace and LinkedIn, which is primarily associated with business networking. Two sites in particular—Facebook and Twitter—have become particularly prominent and received much publicity during the last two years.

Facebook was launched during 2005, shortly before the second WSIS summit. By the end of August 2010, five years later, it claimed to have 518 million users worldwide, about a quarter of all estimated users of the Internet. The number of active users was said to have risen from 100 million to 500 million in the two years from August 2008 to July 2010.[356] More than 50 per cent of estimated Internet users in North America and Oceania/Australia had Facebook accounts in mid-2010, with the lowest proportion for a world region being 11.3 per cent (Asia)[357] The micro-blogging site Twitter, meanwhile, which was founded in 2007, has become the tenth most accessed website worldwide, with an estimated 200 million users.[358]

Social networking and other forms of user-generated content are the most dynamic area of Internet development today, at least as far as end-users are concerned. The changes in the relationship between the production and consumption of content which are associated with them have already had profound implications which were not anticipated at the time of WSIS. Web 2.0 has enabled a widespread and continuing shift in the balance of communications and content consumption away from a more traditional pattern (such as newspapers, broadcasting and mainstream websites), in which content was delivered to consumers, towards a new pattern in which a high proportion of content is exchanged among consumers.

The increasing availability of Internet, and so of Web 2.0 interaction, on mobile phones is adding a new dynamic to the growth of social networks. Recent studies have suggested that social networking sites are becoming a default mode of entertainment and lifestyle activity for many users.[359] The immediacy of Facebook and Twitter, combined with the widespread adoption of mobile phones, was credited with a significant part in the political upheavals which took place in a number of countries in early 2011.

Although the leading social networking sites are global businesses, the content which they host, being user-generated, is often local to those who are making use of it. While much of this content is private social

interaction, social networking sites could provide Governments, businesses and other organisations with new ways of sharing information, reaching local communities and local markets more effectively than they can through conventional websites.

SECTION 3—PUBLIC POLICY ASPECTS OF THE INFORMATION SOCIETY

The final section of this chapter considers new thinking in three areas of policy concerned with the Information Society which were raised by respondents to the consultation for this review: the relationships between ICTs and development; ICTs, rights and citizenship; and ICTs and the environment.

ICTs and development

Assessing the impact of ICTs on development is difficult for a number of reasons which are discussed in Chapter 2, including the limited availability of statistical data and the exceptional pace of change in ICTs that are available and used in developing countries. It is also too early, in many cases, to observe long-term impacts from ICT adoption and use on the social and economic welfare of individuals and communities. In spite of these difficulties, however, a great deal more has been learnt about the relationship between ICTs and development in the five years since 2005. As well as reports specifically related to WSIS, a good deal of analysis has been undertaken by UN and other international agencies, and there has been much new academic and professional development research. These assessments, together with the ongoing changes in ICT technology and markets described earlier in this chapter, have stimulated new thinking about the relationship between ICTs and development within Governments, international development agencies and NGOs.

Development thinking itself has evolved during the period since WSIS in response to new and changing development challenges. High priority continues to be attached to poverty reduction and to the achievement of the Millennium Development Goals (MDGs), particularly as the 2015 target date draws near. The UN Secretary-General reported limited progress on many of the MDGs to the General Assembly in February 2010, and warned the international community that "the prospect of falling short of achieving the goals" was "very real."[360] The quality of governance, the challenges of failed states, and the risks posed to the poor and to prospects of prosperity by civil disorder and military conflict all continue to receive a good deal of attention from development agencies. Increased attention has been paid since 2005 to the challenges of climate change, including both mitigation and adaptation, and especially the impact which it may have on agriculture. Growing anxiety about the sustainability of food supplies has raised the profile of food security in development debate, and sharpened discussions about the relationship between technology and food production. Increased attention has also been paid to energy security and to the vulnerability of current energy supplies to political and economic crises in producing countries. The 2004 tsunami and subsequent natural disasters have heightened awareness of the importance of emergency response and recovery. All of these issues affect the context in which thinking about ICTs in development has evolved since WSIS, not least about ways in which ICTs themselves can contribute to achieving large-scale developmental goals.

Changes in global economic structures have also formed an important part of the backdrop for consideration of ICTs in development since 2005. Globalisation, in which ICTs play a major role, has continued to intensify the interdependence of economies in all world regions. High rates of growth in some countries, notably in Asia, have been associated with long-term shifts in the balance of global economic power. The economic downturn of 2008-2010, meanwhile, had a significant negative effect on some development indicators, and raised concerns about the level of international development assistance, though ICT investment seems to have remained relatively robust. UNCTAD expressed concern in its contribution to this review about a reduction in the level of interest and expenditure devoted to ICTs within bilateral development agencies.[361]

The following paragraphs draw attention to four aspects of ICTs and development in which there has been significant debate in the period since WSIS.

The first concerns expected macroeconomic outcomes from ICT development. The concept of the Information Society is rooted in the belief that large-scale changes in social and economic organisation and behaviour will result from new ICTs, and that these will unlock improvements in efficiency and

productivity that will in turn enable growth. These changes include the increased importance of information and knowledge as a factor of production, better integration in global markets for goods and services, the improvement of human capacity within the workforce, and the empowerment of individuals, including the poor, to identify and take advantage of opportunities to improve their lives. It is expected that a "people-centred, inclusive and development-oriented Information Society" will be more prosperous and equitable than the society from which it has evolved.

As discussed in Chapter 2, it is difficult to measure large-scale social and economic changes, particularly where terms as imprecise as "information" are involved. In particular, little research has been undertaken concerning the impact of new ICTs on the distribution of power and assets, resources and income within societies, which would help inform policymakers about whether the Information Society that is developing is "people-centred, inclusive and development-oriented." More is needed, especially on issues such as gender equity, the relationship between ICTs and education, and the distribution of resources and opportunity between generations.

Past studies in industrial countries have sometimes found it difficult to identify macroeconomic gains that can confidently be attributed to investment in information technology, the so-called "Solow paradox,"[362] leading to the suggestion that it can take considerable time for the impact of investment to be felt in macroeconomic outcomes, and that the extent to which it does so may be dependent on complementary factors such as the skills available within the economy and the enabling environment for business innovation and organisational change. Nevertheless, there has been growing confidence in the value of ICT investment as a catalyst for economic growth, with concomitant concern that countries which do not experience significant levels of ICT investment will suffer long-term economic disadvantage as a result. [363]

Two influential recent studies have suggested that a significant economic growth dividend is likely to arise from the extent of ICT deployment and access within societies.

- In a 2005 study published by Vodafone, Leonard Waverman and colleagues suggested that "A developing country which had an average of 10 more mobile phones per 100 population between 1996 and 2003 would have enjoyed per capita GDP growth that was 0.59 per cent higher than an otherwise identical country."[364]
- In 2009 a World Bank study suggested that "for every 10-percentage-point increase in penetrations of broadband services, there is an increase in economic growth of 1.3 percentage points," and that "This growth effect of broadband is significant and stronger in developing countries than in developed ones, and higher than that of telephony and the Internet."[365]

More research is needed to corroborate the findings of these studies, not least to address questions about the possibility of reverse causality—i.e. that it is GDP performance that is influencing ICT adoption rather than *vice versa*—and to update understanding of the impact of mobile phones now that they are much more prevalent. If their conclusions are correct, however, they reinforce the case for investment in infrastructure, including investment at an international and regional level.

The case for broadband as a stimulant for development has been made particularly strongly by the Broadband Commission for Digital Development. Sponsored by the ITU and UNESCO—and chaired jointly by the President of Rwanda, His Excellency Mr Paul Kagame and the communications entrepreneur Mr Carlos Slim Helú—the Broadband Commission was composed of more than 50 senior figures in international development agencies, communications businesses and ministries of communications, with a sprinkling of celebrities from cultural and media backgrounds. Its report, *The Future Built on Broadband: a 2010 Leadership Imperative*, was presented to the UN General Assembly, as part of that year's review of progress towards the MDGs.[366]

The Commission endorsed a transformation model of ICTs and development, offering what it described as "a vision that embodies effective and sustainable solutions to the great global challenges of the 21st Century in poverty, health, education, gender equality, climate change and the seismic demographic shifts in youth and ageing populations." It argued that "the social and economic development of every country on earth will depend on accessible and affordable access to broadband networks, … as the basis of human opportunity for all citizens—wherever they live and whatever their circumstances." In consequence, it called for global agreement on policies aimed at achieving "broadband inclusion for all." Policies which have been suggested by the Commission and the World Bank[367] include prioritisation of broadband investment and the stimulation of demand for

broadband through Government services and the promotion of broadband access in communities.

The Broadband Commission report and other studies envisage broadband enabling a step change in the capability of communications systems where it become available, both in terms of information transfer and of interaction between Governments, businesses, citizens and communities. Experience in industrial countries suggests that step change brings with it considerable economic potential. There may well be a tipping point, i.e. a critical mass of users beyond which the impact of broadband multiplies more quickly. Broadband could, therefore, have a transformative effect both on communications and on society in general, marking a decisive point in progress towards an Information Society. Its potential is, however, constrained by the same challenges of implementing ICT4D on the ground that have faced earlier generations of technology. The next five years will give an opportunity to assess more clearly how and where broadband's transformative potential can be translated into real developmental gains, and whether those gains will accrue as readily to the poor in low-income countries as they do to the prosperous in the industrialised world.

The emphasis on the technological potential of broadband and other ICTs is sometimes juxtaposed against human aspects of development—the view that technology can only deliver outcomes which are mediated through human organisation and activity, which is constrained by a variety of factors ranging from the availability of power networks in rural areas to the skill base which is available to deploy and make use of what technology affords. UNICEF, in its response to the consultation for this review, stressed its concern that "we must take care that undue focus is not placed on the technology aspects at the expense of the human side of the Information Society."[368]

The balance between technological potential and human capacity lies at the heart of two continuing themes in debates about ICT4D. The first of these concerns the mainstreaming of ICTs in development programmes and projects. "Mainstreaming," in this context, refers to the inclusion of ICTs in public services and in development interventions, in ways that it is hoped will leverage efficiencies and add value to the outcomes experienced by citizens. The mainstreaming of ICTs in various development sectors forms part of the discussion of progress towards the implementation of WSIS action lines in Chapter 4.

At the time of WSIS, although many initiatives had been undertaken by Governments and development agencies to apply ICTs to mainstream development sectors, a high proportion of those that had been evaluated had been pilot projects and had been implemented too recently for it to be possible to undertake detailed impact assessment. The evidence base concerning their scalability and sustainability was therefore considered weak by many mainstream development specialists. Far more experience, in more diverse circumstances and over a longer period of time, is now available for policymakers and other stakeholders who are concerned with the design and implementation of development programmes and projects. The use of computers and mobile phones has become commonplace today in project management and delivery, where it was not so widespread in 2003. This more diverse experience has helped the designers of development programmes to achieve a better balance between the potential and aspirations of ICT-enabled programmes, and the realities (such as lack of electrical power and skill shortages) that constrain their implementation, especially in rural areas.

Similar questions about the impact of ICTs arise where the MDGs are concerned. The principal means of achieving the MDGs are, naturally, directly related to the goals themselves—health interventions, for example, in the case of child and maternal mortality and reductions in the incidence of HIV or malaria, and water supply and sanitation measures where clean water is concerned. The anticipated impact of ICTs on the MDGs is more indirect and/or supportive—achieved through improvements in administration and logistical planning, for example, through public information campaigns, improvements in the information resources available to teachers and clinicians, the knowledge available to citizens, and the ability of communities to engage effectively in the decisions that affect their lives. It is increasingly felt that the effective use of ICTs in delivering outcomes in areas such as health, education and support for microenterprise depends on dialogue between ICT professionals and those with mainstream expertise and responsibilities, and on the involvement of target beneficiaries in programme design.[369] A number of international agencies have sought to list potential ICT contributions to the MDGs, most recently including the Broadband Commission (see above). A more comprehensive assessment of the outcomes of mainstreaming experience would make a valuable contribution to assessing the impact of ICTs on MDG attainment when both WSIS and the MDGs are reviewed in 2015.

Another perspective on development impacts has been raised by the very rapid growth of personal communications. Since 2005, the patterns of communications and of information delivery in developing countries have changed substantially. Mobile telephony has made personal communications accessible and increasingly affordable to the majority of the poor. The financial cost and skills required for telephone use are lower than those required for computer use. Content of value to end-users—including information on health issues and market prices, and applications such as mobile transactions—is being provided through SMS and increasingly through mobile Internet. All of these factors have contributed to the growth in prevalence of mobile phones which has been described above.

The outcome of this personalisation of communications has been a change in the balance between private and public access. High levels of ownership of mobile phones do not obviate the need for community access points such as telecentres. These are still important in enabling access for those who do not have personal communications devices, for delivering services which cannot readily be provided to handsets (for example, the certificates available through India's Common Service Centres), and for combining information, service and guidance for end-users. The prevalence of mobile phones does, however, mean that community access points are likely to play a lesser role in the implementation of WSIS outcomes than was envisaged at the time of the Summit itself.

Mobile phones are also being used in ways that were not initially anticipated by handset manufacturers and service providers. One well-known example is the practice of "flashing" or "beeping," whereby users generate unconnected calls as signals that they wish to receive a call at the expense of another party. Other examples of innovation by end-users at a basic level include the use of SMS texts to share information within social and professional groups, and the use of car batteries to charge mobile handsets. The appropriation of mobile devices—these and more subtle ways in which end-users have adapted them to their own needs and circumstances—is receiving increased attention in ICT4D debate. In an influential analysis, Richard Heeks of the Institute for Development Policy and Management at the University of Manchester has proposed an "ICT4D 2.0" model, in which user-generated innovation of this kind is considered a principal source of the developmental gains resulting from new technology. In the past, ICT4D initiatives have generally been built around interventions by Governments, donors and NGOs which have been intended to address development challenges. The "ICT4D 2.0" model suggests that policymakers should move away from this "pro-poor" approach towards one that is described as "per-poor," building on the appropriation of technology by the poor.[370]

UNCTAD, too, has suggested that many ICT4D interventions have been characterised by "a centralized, top-down model of development which has been insufficiently responsive to the needs of small-scale enterprises and to the priorities of target beneficiaries."[371] Instead, it argues, policymaking should be built upon an understanding of the "real experience and requirements" of citizens and enterprises, with more tailoring of interventions to local, sectoral and cultural contexts. Local contextualisation of this kind, which might be described as a user-led approach to ICT4D, requires a more thoroughly researched understanding of the overall development and communications context than is currently available in many cases.

ICTs, rights and citizenship

A second broad theme which has seen new thinking since 2005 concerns the way in which ICTs and the evolving Information Society have affected human and other rights, and the relationships between citizens and the state and between citizens and businesses. This theme has a number of facets, many of which are associated with the issues explored by Action Line C5 on trust and security and Action Line C10 on the ethical dimension of the Information Society.

ICTs are essentially enabling technologies. They equip those who have access to them and the skills to make use of them to take advantage of opportunities in ways that they might not previously have been able to do, and that might not be available to others who are not so well equipped. This is true of all users of ICTs, from Governments to individual citizens, and it is true of all purposes to which technology might be applied, whether society generally considers them to be positive (such as distance education) or negative (such as fraud and other forms of criminality).

Although "information and communications" are usually linked together in a single phrase, it is useful in this context to recognise that, though closely related, they are also distinct.

- ICTs, particularly the Internet, have enabled people to

access a much wider range of information or content than was previously available to them, and to source that information worldwide rather than from their immediate neighbourhood. As well as content which was hard to find, this includes content which was previously prohibited for reasons of culture, morality, social order or political control.

- ICTs, both telephony and the Internet, have enabled people to communicate and collaborate with a much wider range of other people than was previously the case, whether in informal friendship groups of the kind enabled by social networking websites, or in political, social and cultural organisations. Civil society organisations have seen this as a significant benefit for the empowerment of both individuals and non-governmental organisations, enabling individuals better to express their views about issues that affect their lives, and NGOs to mount more effective campaigns for particular policy changes or on behalf of particular communities. Many have also commented on the power of mobile telephony and social networking sites, including Facebook and Twitter, to coordinate political activity and protest, not least in the upheavals which took place in a number of countries during the early months of 2011.

In both of these contexts, ICTs have enabled people to do more than was previously possible, and this has implications, which are increasingly widely discussed, for the relationships between different groups within society and between Governments and citizens. Two aspects which have received attention are the ability of people to act anonymously or pseudonymously on the Internet, and the difficulty of enforcing national legislation in a medium like the Internet which is essentially global in character. Issues that have been prominently discussed since WSIS have included the accessibility of pornography and child pornography, the publication of leaked official documents, and access by Governments to data on individuals' use of telecommunications and the Internet. Child protection was mentioned as an issue of growing importance by several contributors to this review.

Many of these issues fall at least partly within the purview of the international rights regime, which is composed of the Universal Declaration of Human Rights, the International Covenants on Civil and Political Rights and on Economic, Social and Cultural Rights, and other international agreements such as the UN Convention on the Rights of the Child. These agreements were reached by the international community before many of today's ICTs were widely available, in particular before the Internet, and the new configurations of information and communications which are emerging have raised questions about their interpretation in a world that is increasingly different from that in which they were agreed and ratified. Similar questions have been asked about ways in which the intellectual property regime should balance the needs of content producers and content users in an Information Society where the scope for creating, sharing and adapting existing content is much greater than it was before.

Three major themes have been prominent in the years since WSIS in discussion of these rights-based aspects of the Information Society.

The first of these has been concerned with access. Most Governments have legislated for some form of universal access or universal service regime for communications, in developed countries often over a long period of time. In developing countries, universal access regimes have been primarily concerned with encouraging operating companies to extend infrastructure into rural areas. In recent years, the growing importance of communications networks has led to discussion of whether access should be considered a right, and if so at what levels of quality and affordability. Some agencies, including ECLAC, have also urged that communications infrastructure should be treated as a public good.[372] In 2009, the Government of Finland granted its citizens the right to a broadband connection if they so desired.[373]

The second theme, which has been emphasised by UNESCO and other agencies and has been of particular concern to civil society organisations, is concerned with freedom of expression. ICTs, the Internet and particularly Web 2.0 have greatly expanded the opportunities which people have to express their views. Mobile telephony, SMS and social networking have increased the scope for both long-term and ad hoc coordination of citizen behaviour. New forms of expression have challenged established understanding of the rights and responsibilities which are contained in national legislation concerned with human rights and with the rights of citizens. There has been significant debate, for example, over the responsibilities of Internet Service Providers and other intermediary organisations concerning content, over the rights and responsibilities of "citizen journalists," and over issues such as defamation. Debate about this theme has been heightened by the perceived role

of ICTs in the organisation of political protest and the different ways in which Governments have responded to this, including attempts to limit or even close down Internet access.

The third theme concerns the balance between privacy and security. The increased role of ICTs within society has led to a great increase in the volume and range of data on individuals which are held within computer systems, and a concomitant risk that such data will be used for purposes other than those for which it was provided. Access to information, particularly financial information, has high potential value to criminal organisations, while communications records potentially have great value in criminal investigations. Citizens and consumers are concerned that their data may leak or be misused, but Governments and many citizens are also concerned about the risks posed by international terrorism and organised crime. The confidentiality of Government information has also become an issue of debate during the past two years because of the publication of leaked material online. Debate about the balance between privacy and security has been prominent in the Internet Governance Forum and in discussions about security at the WSIS Forum.

A number of organisations have been examining the understanding of rights as ICTs have changed the landscape for information and communications. UNESCO, for example, has supported the elaboration of a non-binding Code of Ethics for the Information Society through its Information for All Programme. The Association for Progressive Communications (APC) first published an Internet Rights Charter in 2001,[374] while an Internet Rights and Principles "dynamic coalition" has been active on these issues within the Internet Governance Forum.[375] A number of respondents to the consultation for this review, including the APC, called for more attention to be paid to rights issues in the assessment of WSIS outcomes, by linking rights to social, cultural and economic development.[376] Interpretations of rights, citizenship and ethical issues within the Information Society will continue to raise challenges for the evolving Information Society in the period to 2015.

ICTs and the environment

A third major policy area in which there has been substantial new thinking about the impact of ICTs since 2005 concerns the relationship between ICTs and the environment. Several respondents to the consultation for this review identified this as an important challenge for the next five years.

The two main dimensions of this theme are concerned with electronic waste and climate change. Although the former was discussed during WSIS, much less attention was paid at the Summit to the latter. The ITU has since played a leading role in raising awareness of the issue, organising a series of conferences in 2008, publishing reports and studies, and establishing working groups within its own structure and in partnership with other agencies.[377] The OECD has also been active in developing analysis and international cooperation on ICTs and climate change,[378] as have research institutes such as the International Development Research Centre and NGOs such as the International Institute for Sustainable Development.[379]

International policy on development and the environment has been interlinked since at least the time that the World Commission on Environment and Development (the Brundtland Commission) reported in 1987 and the UN Earth Summit (1992) on sustainable development. Sustainable development was defined by the Brundtland Commission as "development that meets the needs of the present without compromising the ability of future generations to meet their own needs."[380]

The ICT sector is the fastest growing industry in today's global economy, and ICTs are leading to widespread changes in social and economic behaviour which impact on sustainability. Some advocates of ICTs see them as major potential contributors to environmentally sustainable economic growth, while others have warned that the growing use of ICTs and society's growing dependence on them have challenging implications for resource management and waste disposal.

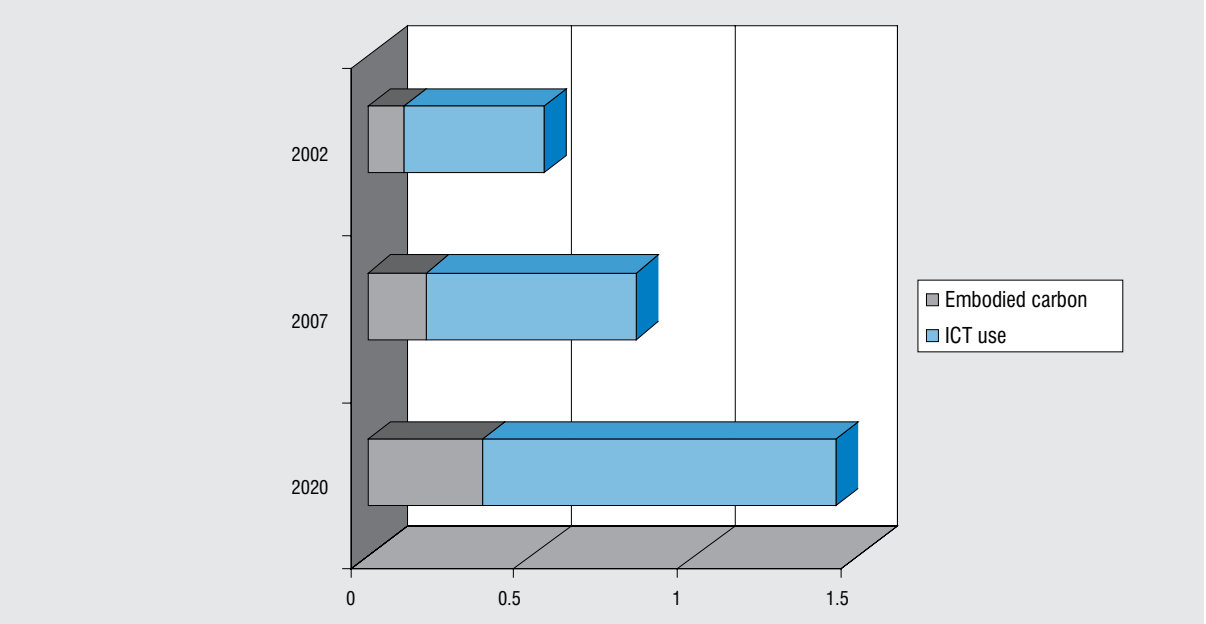
Three types of impact are observed in this analysis:

- direct or "first order" impacts, which result from the production and use of ICTs themselves;
- indirect or "second order" impacts, which result from the use of ICTs in other economic sectors; and
- societal or "third order" impacts, which result from the ways in which ICTs are facilitating long-term changes in patterns of social and economic behaviour, in effect, from the transition to an Information Society.[381]

It is estimated that the ICT sector currently contributes around 2 per cent to 2.5 per cent of global carbon emissions, about the same proportion as aviation. The

volume of emissions from the ICT sector is estimated by the Global eSustainability Initiative (GeSI), an industry group specialising in this area, to be growing at around 6 per cent annually, implying that it will more than double in the period from 2005 to 2020. This growth rate, illustrated in Figure 20, is faster than that in any other economic sector.[382] The greater part of the projected increase in emissions—doubling in quantity from 2007 to 2020 and increasing from 49 per cent of emissions to an estimated 57 per cent—results from increased use of PCs, peripherals and printers. It is estimated that the volume of emissions from telecommunications infrastructure and devices will grow over the same period by around 16 per cent (as phone networks extend to most communities and mobile phone teledensity nears saturation). Data centres, which are important for cloud computing, are the third significant factor in this expected emissions growth. Geographically, according to GeSI, the ICT sector's carbon footprint will grow fastest in China and other developing countries, at around 9 per cent compound annual growth, and most slowly in industrial countries which already have high adoption rates for ICT devices (where the figure will be around 3 to 4 per cent compound).

FIGURE 20: THE GLOBAL ICT FOOTPRINT—PROJECTIONS FROM 2002—2020 (gigatonnes of CO_2 equivalent)



Source: SMART 2020, The Climate Group and the Global eSustainability Initiative, 2008.

The other major source of direct impacts concerns the disposal of retired or redundant ICT equipment, such as computers, televisions and mobile phones. The ICT hardware industry has operated for many years on the basis of early obsolescence. Rapid changes in technology and its capacity, rapid turnover of software generations and the introduction of new services that require enhanced hardware specifications lead to a high rate of churn in communications hardware. As a result, UNEP has estimated that the volume of electronic waste could increase up to fivefold in individual developing countries between 2007 and 2020.[383] Much of this waste is currently disposed of in developing countries, where there are concerns about the risk from toxic components.

These first order effects are largely negative from the point of view of environmental sustainability. International agencies and businesses are concerned to mitigate them through the design and implementation of more energy-efficient networks, devices and data centres, and by extending the lifespan of those devices that are efficient. The pace and scale of growth in carbon emissions and electronic waste are such, however, that it will be extremely difficult to halt or reverse them in the medium term. This makes mitigation an even greater priority than it otherwise would be.

The anticipated indirect effects of ICTs on the environment are generally more positive. These arise primarily from two sources, with one being the use of ICTs to improve the efficiency of other

economic sectors, especially utilities, and the other the virtualisation of some products, services and activities.

- As general purpose technologies, ICTs have the potential to improve the management and efficiency of all economic sectors, provided that they are accompanied by organisational changes that enable efficiency gains to be achieved. In some sectors, such as power and transport, computerised management is expected to achieve high levels of efficiency improvement. GeSI believes that carbon savings resulting from the use of ICTs to improve efficiency in such sectors can substantially exceed the growth in carbon emissions from the direct effects described above. However, as it concedes, "these are not easy wins" but difficult challenges with substantial policy, market and behavioural hurdles inhibiting their achievement.[384]
- Virtualisation refers to the substitution of electronic or virtual goods, services and activities for those previously in physical or material form. Virtualisation of goods and services is already widespread, for example in the replacement of physical by virtual distribution of recorded music and software, and the replacement of services such as travel and ticket agencies by online "self-service" websites. Virtualisation of behaviour includes changes in occupational patterns (such as telecommuting) and leisure behaviour (such as online gaming and online shopping). These are also expected to grow in importance as ICTs change the nature of work, workplace and leisure activity.

The likely outcomes of these indirect impacts are much more difficult to predict than the direct impacts described above. The introduction of smart technologies in areas such as power and transport, for example, depends on decisions that will be taken by managers in those sectors, not on ICT policymakers or businesses. Those decisions also affect large systems which are unrelated to the increase in emissions and waste that results from growing network reach and usage of devices, and so the two cannot be directly juxtaposed or offset against one another

The impact of virtualisation is also uncertain, partly because of what are known as rebound effects. When virtualisation reduces the costs of goods and services or increases leisure time at the expense of working hours, the money and time saved may well be diverted into other forms of consumption which also make use of energy and resources, resulting in less or no net carbon saving.

Third order effects result from the large-scale social transformations that are implicit in the transition to an Information Society, such as changes in the structure of global production and trade, the balance between goods and services, patterns of income, expenditure and consumption, the relationship between work and leisure, and the relationship between Government, business and the citizen. These large-scale long-term trends are likely to have profound implications for ICT use, but their net impact on environmental outcomes is extremely difficult to predict. They will need to be continually monitored as the Information Society continues to evolve.

NOTES

[325] http://www.unctad.info/upload/WSIS5/Contributions/UNGIS/UNCTAD.pdf.

[326] http://www.unctad.info/upload/WSIS5/Contributions/Governments/Republic_of_Korea.pdf

[327] http://www.unctad.info/upload/WSIS5/Contributions/UNGIS/ESCWA.pdf.

[328] Gordon Moore (1965) "Cramming more components onto integrated circuits," *Electronics Magazine* 19 April.

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[330] Yongsoo Kim, Tim Kelly, and Siddhartha Raja (2010) *Building broadband: Strategies and policies for the developing world* (World Bank, January). Available from http://siteresources.worldbank.org/EXTINFORMATIONANDCOMMUNICATIONANDTECHNOLOGIES/Resources/282822-1208273252769/Building_broadband.pdf.

[331] Broadband Commission, *The Future Built on Broadband*, p. 20. Available from http://www.broadbandcommission.org/report1/report1.pdf.

[332] Article 22.

[333] Article 9.

[334] http://www.itu.int/wsis/tffm/final-report.pdf.

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CHAPTER 7
SUMMARY AND CONCLUSIONS

SUMMARY

The objective of the World Summit was to move towards a "people-centred, inclusive and development-oriented Information Society," in which the benefits of information and communication technologies, networks and services would be available to all and in which the use of those networks and services would contribute to gains in social and economic welfare, including the achievement of the MDGs.

Overall progress towards the universal availability and use of ICTs summarised in Chapter 2 contains the following elements:

- There has been rapid growth in the coverage of mobile telephone networks and in the adoption and use of mobile telephony. The expansion of mobile telephony has exceeded expectations at the time of WSIS and, for the first time, given the majority of people worldwide the opportunity to interact immediately with family members who live remotely, and to access an increasing range of other business and official services. The digital divide in voice telephony has narrowed and is now focused on a relatively small proportion of world population, mostly in rural areas of some LDCs.
- Internet use has also grown rapidly in developed countries and middle-income countries, becoming pervasive in the former, but is at much lower levels in lower-income countries and is not yet growing there as fast as in the industrial world. Internet use is particularly limited in sub-Saharan Africa.
- Broadband networks have become pervasive in many developed countries, but are not so widely available in middle-income countries and are poorly available in low-income countries, again especially in sub-Saharan Africa. While Internet access is growing in all world regions, the digital divide in the quality (and therefore value) of Internet access represented by the availability of broadband is also growing. The advent of mobile Internet and mobile broadband may address this during the next five years, but the extent to which they will do so is yet unclear.

Connectivity is a cornerstone of progress towards the Information Society, but it cannot bring the Information Society about on its own. That depends on the ways in which human actors—Governments, businesses, citizens and consumers—interact with technology, networks and services. This varies substantially between countries and regions. The evidence from the ICT Development Index and elsewhere suggests that there is a general increase in the role of ICTs in production and in their contribution to economic growth, while the growth of voice telephony and Internet reported in Chapter 2 shows that there has also been a general increase in the role they play in social interaction and access to information. Some countries, mostly in Europe, North America and East Asia, now have economies in which ICTs play a very powerful role, and so may be described as having progressed close to what can be described as an Information Society which is broadly inclusive of their whole populations. Other countries, including middle-income and developing countries, remain further from realising that ambition, though the majority are making progress towards it. The impact of the recent economic downturn on this is uncertain: while it may have deterred investment in information technology in some cases, it also led to new investment through economic stimulus packages and so to more ICT-enabled recovery as economic growth resumes.

WSIS established two frameworks through which progress in the achievement of Summit objectives could be assessed. These were a series of 10 targets to be achieved by 2015, progress towards which is described in Chapter 3, and a series of 11 (or, including sub-themes, 18) action lines, progress on which is described in Chapter 4. Follow up activity to the WSIS themes of Internet governance and financing mechanisms, and the work of the UN Regional Commissions and other UN agencies, are described in Chapter 5.

- There has been progress towards achieving each of the 10 targets included in the *Geneva Plan of Action*, although the uncertain terminology and lack of specific indicators for these targets makes this difficult to measure with precision. Most progress has been made in ensuring that everyone has access to ICTs "within their reach," and in enabling access to ICTs in all village communities. The former target has already, in effect, been met, and, on present trends, it should be possible to achieve virtually universal access to voice telephony by 2015. As a result, the ITU and other agencies in the Partnership on Measuring ICT for Development have suggested upgrading these targets to include usage as well as access and to include higher qualities of access, specifically broadband.
- There has been variable progress towards achieving other targets on the *Plan of Action* list, where the focus is on connectivity for particular community facilities. While there seems to have been progress towards these in all groups of countries, this has often been

significantly greater in developed than in developing countries, and there is therefore still a good deal to be done. Measuring progress towards these targets is particularly hampered by their imprecision and by the limitations of data collection, especially in developing countries. As a result, the ITU and other agencies in the Partnership on Measuring ICT for Development have suggested a list of indicators which, if they are adopted, should enable a clearer idea of progress to be achieved in 2015.

- There has also been progress in each of the action line thematic areas identified by WSIS, which are discussed in Chapter 4. Again, however, progress has been variable, and there have been significant shifts in priorities within these thematic areas as a result of ongoing developments in technology, networks and services. The action line reporting process has limitations, which are discussed in the final section of Chapter 4, and is insufficient in itself to give a comprehensive picture of progress towards a "people-centred, inclusive and development-oriented Information Society."
- Many international and regional organisations have played a part in the implementation of WSIS outcomes, including the UN Regional Commissions and the ITU, UNESCO, UNDP and UNCTAD, which have been responsible for coordinating the facilitation of action lines. The private sector and civil society associations have also played a crucial part, but have not reported their activities through WSIS processes as UN agencies have done.
- The Internet Governance Forum has added a significant new space for discussion of Internet governance and public policy issues to the established range of Internet and international decision-making bodies, and has demonstrated the multi-stakeholder character of much WSIS follow-up. Follow-up work has also been undertaken on enhanced cooperation in Internet governance and on the role of financing mechanisms in enabling ICT investment and ICT4D.

There have been a number of changes and new developments since 2005 which were not anticipated in the WSIS outcome documents, such as changes and developments in ICTs themselves, in ICT4D, and in the relationship between these and other policy domains including development. Some of these changes have been mentioned in the paragraphs above, including the pace of growth of mobile telephony, the advent of mobile Internet, and the changing availability and high expectations now placed on broadband networks. These all have implications for the nature of the emerging Information Society, requiring reassessment by policymakers and other stakeholders of what is meant by a "people-centred, inclusive and development-oriented Information Society" and how they can most effectively help to bring it about. Other innovations have arisen since the Summit took place, with equally profound implications for our understanding of the future Information Society and how the WSIS objectives can best be achieved. These include innovations such as mobile transactions and cloud computing and, perhaps most important of all, the user-led services such as social networking which are sometimes encompassed by the term "Web 2.0." Finally, there have also been significant developments in international thinking about ICTs and development, about the human rights implications of the Information Society, and about the relationship between ICTs and environmental sustainability. These issues are discussed in Chapter 6, and form part of the background for understanding WSIS outcomes that will need to be considered in 2015.

CONSTRAINTS

While there have been substantial achievements in international and regional efforts to implement WSIS objectives since 2005, obstacles and constraints have also been identified, by UN and other stakeholders, both in their contributions to the consultation for this review and elsewhere. The most important obstacles and constraints identified in the consultation process can be summarised as follows:

- A lack of affordable infrastructure inhibits full advantage being taken of ICTs in many countries, particularly in rural areas. This is not just a matter of communications infrastructure but also includes complementary infrastructure such as electric power. Continued high levels of investment in broadband infrastructure in developed countries are not yet being matched in many middle-income countries. The majority of developing countries are still lagging behind developed countries in progress towards universal high-quality communications access. The problem is particularly acute where LDCs are concerned. For them to overcome this barrier, efforts will be needed to address deficits in both communications and complementary infrastructure.
- Although there has been a high level of private investment in developing country communications markets since 2005, there remains a problem in

securing sufficient investment for infrastructure in remote and rural areas. The universal access funds which have been established in many countries have been criticised for failing to disburse finance effectively, and there have been calls for alternative approaches to ensuring the ubiquity of communications networks. In its contribution, the Association for Progressive Communications (APC) calls for an ICT research agenda to help focus investment more effectively and facilitate innovative investment models.[385]

- Continuing weaknesses in communications regulatory regimes have been identified as barriers to investment and improvements.[386] Experience over the past 20 years has shown that competitive markets have generally been more effective than alternatives in delivering affordable access and enabling innovative services and applications. However, there are still many markets in which competition is weakly established, and where regulators have difficulty in ensuring outcomes which benefit consumer welfare. There are a number of reasons for this, including the ways in which communications markets are changing in an era of technological and business convergence, outdated legal and regulatory frameworks, and the need for more capacity-building within regulatory authorities.
- Lack of capacity to make full use of ICTs, within the populations of developing countries, was also cited as an important constraint by contributors to this review. The challenge of building capabilities is complex - ranging from basic skills in the use of computers and the Internet (including literacy), which are required by end-users, through ICT maintenance, design and application skills, to high-level professional skills in the design and deployment of technology, in regulation and in policy development. This will be an ongoing challenge because of the constant evolution of ICT technology and markets. The ICT-related skills acquired by individuals, including those acquired at school and university, have a relatively short lifecycle and need to be continually refreshed.
- The importance of relevant, and particularly local, content, which enables users to exploit knowledge to achieve their development objectives, has been stressed by many stakeholders in ICT4D over the past decade. Although the proportion of content originating in developing countries has been increasing, it remains much less pervasive than content originating in the developed world, and this is a particular barrier for those who only speak minority languages which are poorly represented on the Internet. The rapid development of the mobile Internet may lead to innovation in both content and applications, using social networking as well as more conventional Internet platforms, which could help to address this particular constraint.
- In UNCTAD's consultation input, it drew attention to deficiencies which it sees in policymaking and in the design of programmes for ICTs and development. Current structures of decision-making, UNCTAD argued, tend to favour standardised interventions which are implemented with too little engagement from intended beneficiaries and too little adaptation to local circumstances. "Rooting policy approaches in the real experiences" of those directly concerned, UNCTAD states, would lead to better developmental outcomes, though it would place more demands on programme development and design.[387]
- Policy challenges and lack of political leadership in the ICT sector have been identified as barriers towards progress by some observers. Although there is widespread agreement in international organisations that ICTs have a critical role to play in achieving social and economic development objectives, some have suggested that this perception is not always shared at senior levels of Governments. While this might change as a new generation of leaders, more accustomed to ICTs, achieves high office, it suggests a need for interventions to raise awareness of the potential of the Information Society among political leaders and improve their understanding of ICTs' implications for social and economic development in general.
- In addition, national policy frameworks—for example, national development strategies and Poverty Reduction Strategies—have sometimes struggled to accommodate the potential of ICTs as general purpose technologies, whose impact cuts across the boundaries between mainstream development sectors and depends on synergies between them. Contributors to the consultation emphasised the desirability of greater policy coherence, integrating ICT sector development more closely with that of the economy as a whole and that of individual development sectors such as health and education. UNCTAD, in particular, has emphasised the importance of linking ICT, education and enterprise development within a coherent policy framework.[388]

IMPLEMENTATION PROCESSES

The principal mechanisms for measuring progress towards the Information Society that were established by the WSIS outcome documents are the targets and action lines which are discussed in Chapters 3 and 4.

Three important challenges affect the statistical measurement of progress towards the WSIS targets. The ITU and the Partnership on Measuring ICT for Development have proposed improvements which should significantly enhance the value of quantitative measurement before the comprehensive review of WSIS outcomes scheduled for 2015 takes place. Nevertheless, these challenges will continue to pose problems in the run-up to that review, and to limit our statistical understanding of where the developmental gains foreseen by WSIS have been achieved and of the impact of initiatives undertaken with the aim of securing their achievement.

- The WSIS targets themselves are imprecise and in most cases are not associated with indicators which would enable benchmarking of today's data against 2003 or 2005 (when the targets were agreed) or allow reliable comparisons to be made over time and between countries. The ITU and the Partnership have addressed this by proposing a set of indicators which could be introduced now and which, with the cooperation of national statistical offices, should make it more possible to measure quantitative progress over coming years.
- The range and quality of data collected by national statistical offices are inadequate for detailed and accurate measurement of progress. In many countries, the necessary data collection does not take place at all. Where it does take place, it is of variable quality and methodology. Available statistics are also often out of date. The Partnership has emphasised not just capacity-building but also the need to address gaps in data gathering through the inclusion of ICT data in national statistical strategies and the harmonisation of data gathering methodologies.[389] The ITU, UNCTAD and other entities in the Partnership are seeking to address this through capacity-building initiatives with national statistical offices, though there will be limits to the extent to which problems can be overcome by 2015. The APC suggests that it would be useful to build the capacity not just of statistical offices but also of the wider community of WSIS stakeholders, so that they can make more effective use of data to assess aspects of the Information Society with which they are most concerned.[390]
- Information and communication technologies and markets are changing very fast. As a result, some aspects of their development which would be useful to measure today were not thought relevant or did not even exist in 2005, while for others the targets which were set then have become outdated. The ITU and the Partnership have addressed this by suggesting that some of the targets set in 2005 should be upgraded, giving greater weight to usage alongside connectivity, and to higher levels of connectivity such as broadband. More detail about issues such as individual and household usage of particular services, would add considerable value in the interpretation of existing data, but would have to be obtained by methods such as household surveys and repeated regularly in order to establish trends.

The Partnership on Measuring ICT for Development has stressed the need to measure impact as well as access. Many of the statistics which are available for measuring progress towards the Information Society are input measures, concerned with the supply side of the ICT industry (access and connectivity) and of ICT-enabled applications (e.g. the number of computers in schools), rather than with outcomes (such as the use that people make of access or the educational value derived from school computers). Outcome measures of this kind are essential if those who are trying to set priorities for ICT policy are to do so on the basis of solid evidence. The Partnership particularly raises the need for better statistics to analyse "the spillover effects into non-ICT economic sectors and how ICTs help accelerate the diffusion of knowledge."[391]

The WSIS action lines provide a limited framework for assessing interventions by diverse stakeholders in support of WSIS outcomes. Each of the action lines is concerned with a particular thematic aspect of the development of the Information Society. As well as considering overall performance within a given theme, each action line provides a reporting framework for the activities of those organisations that choose to participate in it, and an opportunity for those organisations to share experience and to discuss potential joint activities. However, only a relatively small proportion of organisations working in most action line areas participate in or report to meetings of the action lines, while those that do so report only some of their activities to them. Private sector and civil society stakeholders are particularly under-represented in action line activity. What is more, the action lines are primarily concerned with international

and regional activities, while much of what happens in their thematic areas takes place at a national level, particularly where the application of ICTs in areas like e-health and e-employment is concerned.

The value of the action line process has been enhanced by the introduction of the WSIS Forum, which places the 18 separate themes covered by the action lines within an overall perspective of Information Society development, enabling better exploration of cross-cutting themes. As with the indicators proposed for WSIS targets by the Partnership on Measuring ICT for Development, this will improve the ability of the action line process to contribute towards the comprehensive review of progress in 2015. Additional improvements which have been suggested by contributors to this review are reported in Chapter 4, and more changes are proposed to the Forum for 2011. Action line facilitators could also usefully review the remits for their action lines which were included in the WSIS outcome documents to see if these still reflect priorities within those areas or whether they require amendment, as the ITU and the Partnership have reviewed the language of the WSIS targets.

TOWARDS A COMPREHENSIVE REVIEW IN 2015

While these measures concerned with the WSIS targets and action lines are useful, they can only provide part of the framework needed for a comprehensive assessment of WSIS outcomes in 2015.

WSIS was concerned with the overall development of the Information Society, not just with specific targets and specific themes. Its ethos and overall objectives were encapsulated in the first paragraph of the *Geneva Declaration of Principles*, with the aim not just of achieving an Information Society but of achieving an Information Society that is "people-centred, inclusive and development-oriented." It is progress towards this goal which should be at the heart of an assessment of WSIS outcomes, now and in five years' time.

The closest approach to a more holistic assessment of progress towards the WSIS outcomes that is currently available is the ICT Development Index which is described in Chapter 2. This draws together measurements of ICT readiness, intensity and impact, and thereby provides more of a framework for comparisons of different countries' overall progress towards an Information Society than is possible through the targets and action lines. Systematic collection of relevant data for this index between now and 2015 will help to give a stronger indication of trend towards the development of the Information Society at national, regional and international levels. It can be supplemented with material drawn from other UN studies such as UNCTAD's *Information Economy Report* and DESA's surveys of e-government, and from assessments undertaken by development agencies and research institutes.

Together, these sources will help us to assess how far different countries, and the world as a whole, have moved in respect of two fundamental WSIS objectives, namely, maximising digital opportunities and bridging the digital divide.

- Considering the present against the past in individual countries and regions will enable us to see how far they have been able to take advantage of "digital opportunities" and use ICTs to advance development.
- Comparing countries and regions with one another will enable us to see how far they have been able to overcome international inequalities in access, use and outcomes.

In assessing progress towards the Information Society in 2015, and in considering these two dimensions of "digital opportunity" and "digital divide," it would be especially valuable to look at the experience of groups of countries which have particular characteristics—for example LDCs; countries which are highly dependent on the export of primary products and raw materials; and countries which have invested in ICT-enabled sectors such as business process outsourcing. Looking at different types of society and economy in this way should help policymakers in Governments and international organisations to develop a better understanding of the ways in which ICTs are interacting with other social and economic forces.

It is not just the digital divide between countries and regions that is important. WSIS was also concerned about the digital divide within societies, and the 2015 review should also address that question, which is at the heart of assessing whether the Information Society that is emerging is "people-centred" and "inclusive" as WSIS sought that it should be. To assess progress on inequalities within societies, much more disaggregated information is needed about the impact of ICTs on economic growth and social welfare, on the performance of Government and business, and on the behaviour of citizens.

The most obvious area of potential difference lies between men and women. Some contributors to the review emphasised this point. The International Association of Media and Communications Researchers (IAMCR), for example, felt that there was "inadequate recognition of gender issues in global and regional debates and action plans." More attention, in its view, should be paid to the gender digital divide, not least as "one means of ensuring that key promising areas such as e-governance, e-commerce and e-learning become more inclusive in the future."[392] Alongside gender, if we are to assess whether the Information Society that is developing is "inclusive," we need to know more about distinctions between other social categories: between young and old, for example, between those who live in urban and those in rural areas and between those who are prosperous or well educated and those who are not. The WSIS outcome documents also ask for specific attention to be paid to indigenous communities and other marginalised groups.

Statistics of the kind which are summarised in Chapter 2, or which are concerned with connectivity targets such as those discussed in Chapter 3, provide only limited evidence for measuring inclusiveness. If the 2015 review is to do so, it will be necessary to think well ahead about the kinds of evidence that will be required, and identify how it might be obtained. Serious and substantial research along these lines needs to be carefully planned, but could greatly enhance our understanding of the Information Society that is coming into being.

As well as being "people-centred" and "inclusive," the Information Society sought by WSIS should be "development-oriented." Measuring this, too, is a substantial challenge. Development outcomes cannot be assessed on the basis of connectivity targets and ICT4D interventions alone. To assess development outcomes requires input not just from WSIS stakeholders, but from the broad development community. It involves reaching beyond the evidence base which has been available for this review, to draw on a much wider range of sources, some of which are published[393] but many of which will require proactive gathering of views, evidence and analysis.

Some respondents to the consultation for this review felt that the rapid pace of change in ICT technology and markets has meant that more attention has been paid to technological aspects of the Information Society than to its human dimensions. This was, for example, a particular concern of UNICEF.[394] IAMCR also commented that "Social issues, including fostering cultural diversity through media and education, gender and human rights issues are far less visible in on-going debates," but should receive "greater attention and action."[395] The APC stressed that "building a "people centred Information Society" involves more than science and technology, but also social, cultural, political and economic development."[396] If the Information Society is an interface between human and technological development, the 2015 review should find ways to approach assessing WSIS outcomes from both perspectives of the *Human Development Report* and of the *World Telecommunication/ICT Development Report*.

The responsibility for what has been achieved since WSIS lies with a range of stakeholders, rather than with one particular group. Private sector investment has been critically important in enabling the expansion of access and connectivity which has taken place since 2005, and the range of telecommunications and Internet services which have been made available to users of that access. Governments and intergovernmental organisations have played an important part, particularly in establishing enabling environments for investment and in addressing market failure. Civil society organisations have also been important actors, focusing on ways in which citizens can take advantage of ICTs to realise opportunities and gain more control over their lives, and addressing issues such as the development, environment and rights implications of the Information Society. People themselves, as individuals and in businesses and communities, have used ICTs in ways that suit them, which have often been unexpected and which have had unexpected impacts on social and economic life.

The contributions of different stakeholder groups need to be more thoroughly assessed in the 2015 review than has been possible in this report. Much of the evidence base which is available today has been derived from official statistics and from intergovernmental organisations. Private sector and civil society organisations make only limited input into the action line processes and made only limited contributions to the consultation for this report. Yet understanding their contributions fully is essential to understanding the outcomes of a Summit which placed so much emphasis on multi-stakeholder engagement. Assessment of the contributions of the private sector and of civil society must be a major part of the 2015 review. It is important to consider now how this can best be achieved. One option would be to aim for separate studies to be undertaken of the engagement and impact of the private sector

and civil society in delivering the WSIS outcomes, in partnership with those stakeholder communities. This would also provide a useful framework for considering dimensions of the WSIS outcomes which are of particular interest to those communities.

Multi-stakeholder participation itself is seen by many as an important outcome of the WSIS process, particularly, but not exclusively, from the point of view of non-governmental stakeholders.[397] The Internet Society, for example, argued in its consultation input that "WSIS offered an opportunity for Governments to learn about and broaden their understanding of the Internet institutions and civil society organisations," resulting in better cross-fertilisation between different stakeholder communities.[398] There is also a case, therefore, as part of the 2015 review, for looking specifically at the value which multi-stakeholder engagement has brought to WSIS implementation.

This interim review of WSIS implementation has had a limited remit. It has looked at the experience of implementing WSIS outcomes through the lens offered by the WSIS targets and action lines, through the experience reported by UNGIS agencies in their annual reports to CSTD, and through responses made to a consultation exercise. It has also been concerned with international and regional implementation, not with implementation at a national level, and has focused on the work of international and particularly intergovernmental agencies.

This is a worthwhile exercise, but it can only tell part of the story. WSIS was not just about targets and action lines; it was about the Information Society, an altogether larger concept. The targets and action lines might be visualised here as the roots and branches of a tree. If the 2015 review is to give a true picture of what has happened with the Information Society since 2005, it must go beyond them to consider the tree as a whole—its trunk, its canopy, the ecosystem that it supports, the wider environment, the forest of which it is a part. Changes such as those which can be captured in this report need to be located within a much more comprehensive understanding of major social and economic developments in world society. In the late 1990s, the CSTD commissioned a major study of the early development and impact of Information or Knowledge Societies, which sought to place these within this broader global context.[399] That study helped to set the agenda for thinking about the Information Society for a decade. A similarly wide-ranging study of the "big picture" impact of the Information Society would be one way of approaching the comprehensive review scheduled for 2015.

NOTES

385 http://www.unctad.info/upload/WSIS5/Contributions/OtherStakeholders/APC.pdf.

386 See, for example, APC response to this consultation. Available from http://www.unctad.info/upload/WSIS5/Contributions/OtherStakeholders/APC.pdf.

387 http://www.unctad.info/upload/WSIS5/Contributions/UNGIS/UNCTAD.pdf.

388 UNCTAD response to this consultation. Available from http://www.unctad.info/upload/WSIS5/Contributions/UNGIS/UNCTAD.pdf.

389 Partnership on Measuring ICT for Development response to this consultation. Available from http://www.unctad.info/upload/WSIS5/Contributions/UNGIS/Partnership_on_Measuring_ICT_for_Development.pdf.

390 APC response to this consultation. Available from http://www.unctad.info/upload/WSIS5/Contributions/OtherStakeholders/APC.pdf.

391 *Ibid.*

392 *Ibid*. See also The Destree Institute and Millenia2015 response to this consultation. Available from http://www.unctad.info/upload/WSIS5/Contributions/OtherStakeholders/The_Destree_Institute_and_Millennia2015.pdf.

393 See, for example, the *info*Dev studies on ICTs and education. Available from http://www.infodev.org/en/Topic.4.html.

394 http://www.unctad.info/upload/WSIS5/Contributions/UNGIS/UNICEF.pdf.

395 http://www.unctad.info/upload/WSIS5/Contributions/OtherStakeholders/IAMCR_Task_Force_on_Media_and_Communication_Policy.pdf.

396 http://www.unctad.info/upload/WSIS5/Contributions/OtherStakeholders/APC.pdf.

397 See, for example, APC, ESCWA, ISOC responses to this consultation. Available from http://www.unctad.info/upload/WSIS5/Contributions.

398 http://www.unctad.info/upload/WSIS5/Contributions/OtherStakeholders/Internet_Society.pdf.

399 Robin Mansell & Ute Wehn (1998) *Knowledge Societies* (OUP).

ANNEX:
LIST OF WRITTEN CONTRIBUTIONS TO THE CONSULTATION FOR THIS REVIEW

Written contributions were received to the consultation for this review from the following (available from http://www.unctad.info/en/CSTD_WSIS5/Contributions/):

Governments:

Azerbaijan
Dominican Republic
Finland
France
Holy See
Lithuania
Mauritius
Mexico
Oman
Pakistan
Philippines
Republic of Korea
Spain
Syrian Arab Republic

Intergovernmental and other international organizations:

United Nations Department of Economic and Social Affairs (DESA)
Economic Commission for Africa (ECA)
United Nations Economic Commission for Europe (ECE)
Economic and Social Commission for Asia and the Pacific (ESCAP)
United Nations Economic and Social Commission for Western Asia (ESCWA)
Food and Agriculture Organization of the United Nations (FAO)
International Telecommunication Union (ITU)
Partnership on Measuring ICT for Development
United Nations Conference on Trade and Development (UNCTAD)
United Nations Educational, Scientific and Cultural Organization (UNESCO)
United Nations Children's Fund (UNICEF)
World Health Organization (WHO)
World Intellectual Property Organization (WIPO)

Non-governmental organizations in consultative status with the Economic and Social Council; civil society entities accredited to WSIS; academic entities participating in the work of the Commission on Science and Technology for Development

Association for Progressive Communications (APC)
Arianous ICTD
Association Tunisienne de la Communication et des Sciences Spatiales (ATUCOM)
Centre Féminin pour la Promotion du Développement (CEFEPROD)
Centre Africain d'Echange Culturel
Coopération Solidarité Developpement aux PTT - Le Centre d'Etude sur la Synergie Inter Reseaux (CSDPTT-CESIR)
Deep Dish Network
EcoMicro
European NGO Alliance or Child Safety Online
IAMCR Task Force on Media and Communication Policy
Internet Society
Nodo Mexicano El proyecto del Milenio
People's Movement for Human Rights Learning
Telecentre
The Destree Institute and Millennia2015
University of Athens

ITU Sector Members; private sector entities accredited to WSIS; business entities participating in the work of the Commission on Science and Technology for Development

International Chamber Of Commerce/BASIS
International Chamber Of Commerce/Germany
Nominet

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