UNITED NATIONS CONFERENCE ON TRADE AND DEVELOPMENT
WORLD SUMMIT ON THE INFORMATION SOCIETY

IMPLEMENTING WSIS OUTCOMES:
A TEN-YEAR REVIEW

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PREFACE

The World Summit on the Information Society (WSIS), held in 2003 and 2005, was the first major United Nations event devoted to the potential of information and communications technologies (ICTs), which have had such a marked impact on humanity over the past two decades. Its *Declaration of Principles*, agreed in Geneva in 2003, held out the vision of a 'people-centred, inclusive and development-oriented Information Society,' in which people could share knowledge, improve their quality of life, and achieve their full potential, within the framework of sustainable development and human rights. That vision has resonated ever more strongly in all countries, developed and developing, in the subsequent decade.

Major achievements have since occurred in ICTs. The number of mobile phone subscriptions worldwide is now almost equal to the number of people on the planet. As many as four out of 10 people in the world now make use of the Internet, and that number is growing steadily. Governments, business and civil society have used ICTs to improve the quality of service that they offer to citizens and consumers, and to support development objectives. Innovations such as mobile money, environmental monitoring and the use of information technology in health and education have had major impacts on the lives of individuals, communities and whole societies, contributing towards achieving the Millennium Development Goals.

The past decade has also seen new developments in information technology, in new communications media and in the range of services which can be deployed through them. Today's networks and devices are many times more capable than those available at the time of WSIS. Broadband networks, built with private and public finance, have enabled faster transmission of much larger volumes of data, transforming aspects of government and business practice. Social media platforms are used by more than a billion people to interact with and learn from others in their communities and around the world. Cloud computing is facilitating new business models and accelerating big data analysis, which can be used to enhance governance and service delivery. New devices, including smartphones and tablets, are spreading, while the Internet of Things promises another wave of innovation. No one doubts today that ICTs play an increasingly important part in economic, social and cultural development; that their role will continue to grow; and that they have the potential to fulfil the vision set out in the *Geneva Declaration.*

ICTs will be key enablers in the context of the post-2015 development agenda, and in efforts to achieve the Sustainable Development Goals (SGDs).

But important challenges remain. While the digital divide in access to basic services between developed and developing countries, and within countries, has been greatly reduced since WSIS, substantial discrepancies still persist in terms of affordability, content and applications. New divides have emerged in access to broadband networks and services, and to the opportunities which they enable. New challenges have surfaced, in areas such as cyber security, human rights including the right to privacy, and the use of ICTs for criminal purposes. It is vital that the accelerating opportunities of new technologies do not result in a widening gap between developed, developing and least developed countries, or between rich and poor within societies. More effort is needed to ensure that women and girls benefit fully from the Information Society, that multilingual content increases, in particular content in languages that are currently under-represented on the Internet, and that everyone is able to acquire the skills and confidence needed to make full use of the ICTs that are available to them. More needs to be done, to achieve a common vision of the future of the Internet enabling all governments and other stakeholders to play their full part in its development.

The *Tunis Agenda for the Information Society*, which was agreed in the second phase of the Summit in 2005, requested the United Nations General Assembly to make an overall review of the implementation of WSIS outcomes in 2015. The Economic and Social Council (ECOSOC) subsequently asked its Commission on Science and Technology for Development (CSTD) to undertake a ten-year review of progress made in the implementation of WSIS outcomes and to submit its results in 2015, through the ECOSOC, to the General Assembly. This report has been prepared by the CSTD Secretariat in order to assist the Commission in that crucial task. It draws on existing reports and open consultation with all stakeholders to provide an overarching assessment.

I commend the work and am convinced that this report provides an excellent basis for the CSTD's review which, in turn, will contribute to the overall review by the General Assembly in December 2015. I also hope that its analysis and observations will help the General Assembly in integrating the ICT dimension effectively into the post-2015 development agenda and the Sustainable Development Goals.

Ms. Omobola Johnson
Chair, Commission on Science and
Technology for Development
Minister of Communication Technology
of the Federal Republic of Nigeria

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Additional inputs were received from stakeholders during consultation sessions which were organized in the context of the following international and regional events:

- WSIS+10 High Level Event (Geneva, June 2014);
- African Internet Governance Forum (Abuja, July 2014), the consultation was organized in collaboration with ECA;
- Ninth Internet Governance Forum (IGF) (Istanbul, September 2014), the consultation was organized in collaboration with ECLAC;
- Eighth ICT4All meeting (Tunis, September 2014), the consultation was organized in collaboration with ESCWA;
- World Congress on Information Technology (WCIT) 2014 (Guadalajara, September 2014), the consultation was organized in collaboration with the World Information Technology and Services Alliance (WITSA);
- Fourth Session of the Committee on Information and Communications Technology (Bangkok, October 2014), the consultation was organized in collaboration with ESCAP.

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ABBREVIATIONS

A4AI	Alliance for Affordable Internet
AfDB	African Development Bank
AfICTA	African ICT Association
AfrISPA	African ISP Association
AGORA	Access to Global Online Research in Agriculture
AISI	Africa Information Society Initiative
AMARC	World Association of Community Radio Broadcasters
APC	Association for Progressive Communications
APCICT	Asian and Pacific Training Centre for Information and Communication Technology for Development
ARAPKE	African Regional Plan on the Knowledge Economy
ASCII	American Standard Code for Information Interchange
AU	African Union
B2B	Businesses-to-Business
B2C	Business-to-Consumer
BPO	business process outsourcing
ccTLDs	country code Top-Level Domains
CDT	Center for Democracy & Technology
CEB	United Nations System Chief Executives Board for Coordination
CEDAW	Convention on the Eradication of Discrimination against Women
CERTs	Computer Emergency Response Teams
CGI.br	Brazilian Internet Steering Committee
CIGI	Centre for International Governance Innovation
CIRTs	Computer Incident Response Teams
CRC	Convention on the Rights of the Child
CSTD	United Nations Commission on Science and Technology for Development
DAC	OECD Development Assistance Committee
DESA	Department for Economic and Social Affairs
DIRSI	Diálogo Regional sobre Sociedad de la Información
DNS	Domain Name System
DNSSEC	Domain Name System Security Extensions
EC	European Commission
ECA	Economic Commission for Africa
ECE	Economic Commission for Europe
ECLAC	Economic Commission for Latin America and the Caribbean
ECOSOC	Economic and Social Council

EMIS	education management information systems
ESCAP	Economic Commission for Asia and the Pacific
ESCWA	Economic Commission for West Asia
FAO	Food and Agriculture Organization
FDI	foreign direct investment
FIRST	Forum of Incident Response and Security Teams
G2B	Government-to-Business
GAC	Governmental Advisory Committee
GAID	Global Alliance for ICT and Development
GESI	Global e-Sustainability Initiative
GNI	Gross National Income
GPS	Global Positioning Systems
GSMA	GSM Association (Groupe Speciale Mobile)
GSR	Global Symposium for Regulators
gTLDs	generic Top-Level Domains
HAP	Hyderabad Action Plan
HRC	United Nations Human Rights Council
IAB	Internet Architecture Board
IADB	Inter-American Development Bank
IANA	Internet Assigned Numbers Authority
ICANN	Internet Corporation for Assigned Names and Numbers
ICC-BASIS	Business Action to Support the Information Society
ICCPR	International Covenants on Civil and Political Rights
ICESCR	International Covenants on Economic, Social and Cultural Rights
ICTs	information and communications technologies
IDI	ICT Development Index
IDRC	International Development Research Centre
IEEE	Institute of Electrical and Electronics Engineers
IETF	Internet Engineering Task Force
IFAP	Information for All Programme
IFIs	International Financial Institutions
IFLA	International Federation of Library Associations and Institutes
IGF	Internet Governance Forum
IICD	International Institute for Communications and Development
IMPACT	International Multilateral Partnership against Cyber Threats
IPB	ICT Price Basket
IPDC	International Programme for the Development of Communications
IPv4	Internet Protocol version 4
IPv6	Internet Protocol version 6

ISOC	Internet Society
ISPER	Information Society Portal for the ESCWA region
ISPs	Internet Service Providers
IoT	Internet of Things
ITES	ICT-enabled services
ITU	International Telecommunication Union
ITU-D	ITU Telecommunication Development Sector
IXPs	Internet Exchange Points
KICTANet	Kenya ICT Action Network
LDCs	Least Developed Countries
LLDCs	Landlocked developing countries
MAG	Multi-stakeholder Advisory Group
MDGs	Millennium Development Goals
METER	Measurement and Evaluation Tools for E-Government Readiness
MIL	media and information literacy
MIS	Measuring the Information Society
MOOCs	Massive Online Open Courses
MPP	Multi-stakeholder Preparatory Process
MPPI	Mobile Phone Partnership Initiative
NEPAD	New Partnership for Africa's Development
NETmundial	Global Multi-stakeholder Meeting on the Future of Internet Governance
NGNs	Next Generation Networks
NGO	non-governmental organization
NICIs	National Information and Communication Infrastructure Plans
NRENs	National Research and Education Networks
NSOs	National Statistical Offices
NTIA	National Telecommunications and Information Administration
OARE	Online Access to Research in the Environment
ODA	Official Development Assistance
OECD	Organization for Economic Cooperation and Development
OER	Open Educational Resources
OSILAC	Observatory for the Information Society in Latin America and the Caribbean
OSPs	Online Service Providers
p.a.	per annum
PACE	Partnership for Action on Computing Equipment
PPPs	Public-Private Partnerships
PrepComs	Preparatory Committees
RENs	Research and Education Networks
RFID	radio-frequency identification

RIA	Research ICT Africa
RIRs	Regional Internet Registries
SADC	Southern African Development Community
SDGs	Sustainable Development Goals
SIDS	Small Island Developing States
SMEs	Small and medium-sized enterprises
STIs	National reviews of science, technology and innovation
TCP/IP	Transmission Control Protocol/Internet Protocol
TFFM	Task Force on Financial Mechanisms
TLD	top level domain registries
TRE	Telecommunications Regulatory Environment
UDHR	Universal Declaration of Human Rights
UIS	UNESCO Institute for Statistics
UNCITRAL	United Nations Commission on International Trade Law
UNCTAD	United Nations Conference on Trade and Development
UNDAFs	United Nations Development Assistance Frameworks
UNDP	United Nations Development Programme
UNEP	United Nations Environment Programme
UNESCO	United Nations Educational, Scientific and Cultural Organization
UNGIS	United Nations Group on the Information Society
UNICEF	United Nations Children's Fund
UNPAN	United Nations Public Administration Network
UNU	United Nations University
UN Women	United Nations Entity for Gender Equality and the Empowerment of Women
W3C	World Wide Web Consortium
WBG	World Bank Group
WCIT	World Congress on Information Technology
WGEC	Working Group on Enhanced Cooperation
WGIG	Working Group on Internet Governance
WHO	World Health Organization
WIPO	World Intellectual Property Organization
WITSA	World Information Technology and Services Alliance
WSIS	World Summit on the Information Society
WTDC	World Telecommunication Development Conference
WTDR	World Telecommunication/ICT Development Report
WTO	World Trade Organization

EXECUTIVE SUMMARY

The World Summit on the Information Society (WSIS), held in two phases, Geneva in December 2003 and Tunis in November 2005, was the first opportunity for the international community to assess the potential of new information and communication technologies (ICTs) for achieving internationally-agreed development goals, and to consider the new challenges which they presented. The four WSIS outcome documents – the *Geneva Declaration of Principles*, *Geneva Plan of Action*¸ *Tunis Commitment* and *Tunis Agenda for the Information Society* – set out a vision of a 'people-centred, inclusive and development-oriented Information Society' that would enhance the opportunities and quality of life for people worldwide and facilitate sustainable development. They also established mechanisms for monitoring progress towards this vision, including targets for connectivity and access, Action Lines to implement Information Society objectives in specific areas, financial mechanisms for meeting the challenges of ICTs for development, and commitments for the development of Internet governance.

The *Tunis Agenda* gave the United Nations Economic and Social Council (ECOSOC) responsibility for overseeing the system-wide follow-up of WSIS outcomes. The Council asked the United Nations Commission on Science and Technology for Development (CSTD) to assist it in this work. In 2013 it requested the CSTD to submit, after its eighteenth session, the outcome of its ten-year review of the implementation of WSIS outcomes, through the Council, to the United Nations General Assembly in 2015. This report has been prepared by the CSTD secretariat to support the Commission in its review. It draws on a variety of sources, including a multi-stakeholder open consultation process and inputs from United Nations agencies and other entities.

Progress towards implementing WSIS outcomes

The vision of a 'people-centred, inclusive and development-oriented Information Society' has continued to inspire efforts to implement WSIS outcomes during the past decade. Increased use of ICTs has led to changes in the underlying structure of societies, economic production, distribution and consumption, access to and use of information and knowledge, relationships between citizens, businesses and governments, patterns of work and leisure, and people's participation in decisions that affect their lives. The increasing pervasiveness of ICTs has also had a significant impact on economic and social development, governance and human rights. Governments and development agencies have developed strategies, policies and programmes designed to leverage greater developmental value from ICTs. However, major challenges remain in bridging the digital divide, achieving equitable access to ICTs and the benefits which can accrue from them.

The *Geneva Plan of Action* set out ten targets for the growth of connectivity and ICT usage during the period to 2015. Progress towards achieving these has been reviewed by the Partnership on Measuring ICT for Development. The years since the Summit have seen rapid growth in the reach of ICTs throughout the world, particularly in wireless networks, which now cover almost all communities, and in the adoption and use of mobile phones, subscriptions to which are now almost as numerous as world population. Access to the Internet has grown less rapidly, but it is estimated that about 40 per cent of the world's population now goes online, at least on occasion. Internet services are increasingly widely accessed through wireless networks and on mobile devices as well as through computers.

While increased connectivity and access to voice telephony have significantly reduced the digital divide in access to basic ICTs, other digital divides are still wide and may be widening. Basic telephone access remains expensive for people living on marginal incomes in many countries, and the costs of Internet access are much higher, relative to incomes, in developing countries than in developed countries. Network capabilities are generally poorer in rural than in urban areas. Relevant content and applications are less widely available in low-income countries and in local languages and to marginalized communities. The potential of ICTs

remains unfulfilled for many people because they lack the financial capacity or skills to access ICTs and information effectively, limiting the benefits that they can realize as individuals and those that could be reaped by their societies.

Broadband networks and services are now the benchmark against which progress towards an Information Society is measured. They have been and are being deployed extensively across the world, but more rapidly in developed than in developing countries, in higher-income developing countries than in LDCs, and in urban than in rural areas, widening divides in the capabilities of ICTs between countries and communities. The broadband gap, measured by the quality of connectivity, increases the differences in opportunity and empowerment between advantaged and disadvantaged groups. Therefore, broadband investment has become a critical priority for the international community, and is an essential requirement for leveraging value from recent innovations such as cloud computing.

There have been impressive achievements in connectivity and access to basic ICTs since WSIS. However, given the pace of innovation in ICTs, continued attention needs to be paid to investment in broadband networks and services and to the application of ICTs to achieve international development objectives, in order to achieve the WSIS vision set out in the *Geneva Declaration of Principles*.

The WSIS outcome documents identified eleven Action Lines and eight subsidiary Action Lines to coordinate and monitor the implementation of WSIS outcomes in different areas of activity. The overall work of the Action Lines was reviewed at a multi-stakeholder WSIS+10 High Level Event, coordinated by the International Telecommunication Union (ITU), organized in collaboration with UNCTAD, UNDP and UNESCO, and held in Geneva from 10-13 June 2014. At this event, commitments were also made to enhance further the work of Action Lines beyond 2015. Beyond the framework of the Action Lines, WSIS stakeholders have undertaken extensive work within their own programmes and activities to build on the potential of the Information Society and to address new challenges arising from it.

It is clear from the evidence reported by United Nations and other stakeholders that considerable growth and diversity in the volume of ICT-enabled development activity has occurred since WSIS. ICTs have been increasingly deployed in the delivery of government services (e-government), in support of health, education, business and agriculture, among other sectors. United Nations and multilateral agencies, governments and the private sector have invested extensively not only in infrastructure but also in the development of new services and applications to meet the needs of different users. In doing so, they have made a valuable contribution towards achieving the Millennium Development Goals. Civil society organizations have also played an important part in leveraging ICTs for development. As with connectivity, however, experience during the period since WSIS suggests that developmental gains have been easier to achieve in some countries and regions than in others. As well as connectivity, the skills and capabilities available within the population, the availability of finance for investment, and the availability of local content have been important. Coherent national strategies have also proved valuable, particularly where they respond to rapidly changing opportunities that result from innovations in technology and services. Particular attention needs to be paid to the challenges facing landlocked and least developed countries, Small Island Developing States, and countries emerging from conflict.

Changes in ICTs have also led to new challenges including the need to adjust the enabling environment for investment and exploitation of ICTs, cybersecurity, ethical issues associated with ICTs and the Internet, financial investment and inclusiveness. These have been addressed by WSIS stakeholders within the framework of the Action Lines and in their own programmes and activities, as well as by other initiatives resulting from WSIS. Experience, reinforced by contributions to the consultation for CSTD's review, has emphasized the value of multilateral and multi-stakeholder cooperation in addressing these challenges.

The spread of ICT adoption and the development of technology and services have led to new patterns of behaviour and relationships emerging between people, businesses and governments, which have had profound impacts on economic and social change, human rights, privacy and sustainable development. The impact of ICTs

and the emergence of an Information Society can be seen in changes to economic production, distribution and consumption; access to information and knowledge; changes in patterns of work, leisure and human settlement; new business models and modes of social interaction; and increased globalization. These underlying changes in economy, society and culture have resulted primarily from the interaction between technology, society and business. Together with continued innovation in technology and markets, they are altering the context for the post-2015 development agenda.

The capabilities of ICT networks and services today are some thirty times what they were at the time of WSIS. Besides the rapid growth of mobile, Internet and broadband markets, there have been major developments in the capabilities of mobile phones and computers (such as smartphones and tablets), in the services available through them (including mobile apps) and in the ways in which these are being used. The World Wide Web has become a much more interactive platform than at the time of WSIS, with the emergence and rapidly growing popularity of social media and other platforms for user-generated content. Very rapid growth in the capabilities of both computing and communications resources has enabled powerful new ICT modalities, including cloud computing, and new forms of data storage and analysis, such as 'big data' and social media analytics. These have led in turn to new forms of business and government practice, enabled greater understanding of social and economic trends, and set the scene for new types of intervention to support development. The capabilities of ICT networks and services are continuing to grow rapidly. The emergence of the Internet of Things and further innovations in technology and services will lead to more changes in business, government and development opportunities in the next decade. This rapid evolution of the Information Society is changing the parameters for the implementation of WSIS outcomes in the future.

Financial investment is an important aspect of the enabling environment, in which multi-stakeholder cooperation has also been important. The primary role in ICT sector investment since WSIS, both for infrastructure and services, has been played by the private sector, though significant roles have also been assumed by International Financial Institutions (IFIs) and national governments, particularly in connection with broadband infrastructure and development-oriented applications. The dynamic growth of ICT technology has led to high levels of continuous investment in most markets, though there was a significant, temporary dip in investment following the international economic recession in 2008. Much experience has been gained in establishing regulatory frameworks to encourage private investment, in developing mechanisms to promote universal access, and in implementing public-private partnerships.

Internet governance has featured prominently in the implementation of WSIS outcomes. The Internet has continued to grow rapidly in both scope and services since WSIS and there have been important changes in its technical modalities, including the introduction of internationalized top level domains and the deployment of Internet Protocol version 6. The Internet Governance Forum, which was introduced following WSIS, has become a significant gathering for multi-stakeholder discussion of Internet issues and is seen as having contributed to greater understanding and cooperation. However, it is agreed that its contribution could be enhanced through further improvements to its inclusiveness and ways of working. There has been less success to date in reaching consensus on ways to achieve enhanced cooperation in international public policy issues pertaining to the Internet. A number of other initiatives have taken place over the past ten years to broaden debate and facilitate the development of commonly agreed principles around the Internet.

The WSIS outcome documents emphasized the responsibility of all stakeholders in implementing WSIS outcomes. Multi-stakeholder cooperation in WSIS implementation has extended beyond joint activities such as public-private partnerships to broader cooperation in the development of technical standards and of new approaches to development strategies, policies and programmes. Multi-stakeholder participation has been particularly evident in the Internet Governance Forum, where it has built on established experience in other entities concerned with Internet governance. Many other multi-stakeholder initiatives have been reported through the Action Lines. Many contributions to the consultation for CSTD's review have emphasized the value that stakeholders attach

to multi-stakeholder participation in improving understanding and facilitating innovation in the complex and rapidly changing environment of the Information Society.

Challenges

Five major challenges arising from the implementation of WSIS outcomes are identified in the report as requiring renewed efforts by the international community.

- The first concerns the digital divide, whose nature and scope have changed greatly since the Summit. The divide in broadband connectivity and access appears to be widening today in several contexts – within as well as between countries. There is a risk that, unless this is addressed, it will in turn exacerbate other development divides. Continued attention therefore needs to be focused on efforts to bridge the digital divide and ensure inclusiveness in the Information Society.
- The second challenge stems from the unpredictability of the changes taking place in ICT technology and services. Some important aspects of the Information Society today, such as the emergence of online social media, cloud computing and big data analysis, were poorly anticipated at the time of WSIS. Similar challenges arise with current waves of innovation in the cloud economy, the Internet of Things and the datafication of government and business practice. The speed and unpredictability of ICT developments make it difficult for international agencies and governments to adopt long-term goals and strategies for the Information Society. Short term goals that are adaptable enough to meet changing circumstances, including both opportunities and threats, therefore have an important role to play alongside long-term strategies for ICTs in sustainable development.
- The third challenge concerns the mainstreaming of ICTs into wider social and economic development policies and programmes. As ICTs become more pervasive, the emphasis in ICT4D needs to shift from programmes and projects that are primarily concerned with promoting connectivity towards programmes and projects that leverage the increasingly widespread use of ICTs within government, business and society. ICTs now form an integral part of development programmes in sectors like health and education, and are increasingly used for the delivery of other government services. Insufficient analysis has been undertaken to date of this changing emphasis or of its implications for development policy and practice. The potential role of ICTs and their underlying significance for social and economic change are of particular importance in the context of the post-2015 development agenda, which will underpin international development policies at a time of further rapid growth in the reach and scope of ICTs.
- Many stakeholders, including contributors to the CSTD ten-year review of WSIS, have emphasized a fourth challenge: the importance of education and capacity-building to ensuring that ICTs and the Information Society contribute most effectively to development. Education in the use of ICTs and of the information and knowledge that they unlock is critically important for equipping the young and future generations to take full advantage of them. It is also vital to improve the capacity of those currently in work, in the public and private sectors or in self-employment, in factories and fields, at all levels of work. Particular attention needs to be paid to ICT technical skills, to policy and regulation, and to the day-to-day media and information literacy skills that are valuable in everyday life. These, too, are changing rapidly as technology evolves.
- The fifth challenge concerns the monitoring and measurement of WSIS outcomes. It is easier to measure inputs on the supply side of the ICT sector, such as connectivity, than to measure the impacts that these are having on economic growth, in areas of social policy like health and education, and on individual lives. The data that are currently available for monitoring the implementation of WSIS outcomes and the development of the Information Society are relatively poor. If governments and international agencies are to grasp fully the opportunities provided by the Information Society, they need to have a better quantitative and qualitative understanding of developments on both supply and demand sides of communications.

Priorities for the future

A number of priorities for forward-looking international action were identified by stakeholders in their contributions to the CSTD ten-year review of WSIS. Prominent among these were:

- the need for rapid deployment of broadband networks;
- efforts to improve inclusiveness and reduce digital divides, including lower costs for international bandwidth, affordable access for lower-income users, reduction of the gender gap in communications access, capacity-building to increase e-literacy and the inclusion of marginalized groups including those with disabilities, indigenous peoples and users of minority languages;
- resolution of ongoing differences concerning Internet governance, including the roles and responsibilities of governments and other stakeholders;
- increased attention to education and capacity-building;
- increased attention to cybersecurity, including more coordination among stakeholders, that will secure continued public confidence in ICTs and the Internet;
- attention to the emergence of the cloud economy, which presents opportunities for adding economic and social value while posing new challenges including issues of economic and content regulation, data sovereignty and security;
- attention to ethical and rights aspects of the Information Society, particularly those concerning access, freedom of expression, privacy and surveillance, in the context established by the United Nations General Assembly's recognition that 'the same rights that people have offline must also be protected online;' and
- attention to the threats to sustainability posed by e-waste and increased greenhouse gas emissions emerging from the ICT sector, and to opportunities to use ICTs to promote sustainable development and address the challenges of climate change.

The report notes the emphasis in these priorities on a forward-looking approach to the implementation of WSIS outcomes and the development of the Information Society. The WSIS Targets and Action Lines have helped to enable monitoring of WSIS outcomes over the last decade, but the reach and capabilities of ICTs are now much greater than they were in 2005. Those capabilities, it is generally believed, are continuing to double every two years or so. In this context, it is important for international policies and programmes concerned with the future implementation of WSIS outcomes to be located in a thorough understanding of current circumstances, opportunities and challenges. This is particularly critical in ensuring that WSIS outcomes are integrated into the post-2015 development agenda.

The report makes a number of suggestions which stem from this.

- As recommended by the Partnership on Measuring ICT for Development, the report suggests that any targets for WSIS implementation should be forward-looking, readily measurable and facilitate greater understanding by all stakeholders of current ICT contexts and future goals.
- The WSIS Action Lines have provided a useful framework for reporting on WSIS implementation, particularly for UN agencies, but have not attracted extensive participation from the wider stakeholder communities in their areas of responsibility, while their mandates do not reflect changes in ICT technology and services since WSIS. The report draws attention to the recommendations in the *WSIS+10 Vision for WSIS Beyond 2015,* agreed at the WSIS+10 High Level Event in June 2014, concerning the future development of WSIS Action Lines, including the need to pay greater attention to the gender dimension of the Information Society.
- UN agencies and other stakeholders should pay particular attention to integrating education and capacity-building concerning ICTs into their programmes and policies for social and economic development, with the aim of equipping both current and future generations to take maximum advantage of the potential of ICTs and to feel confident and secure in their productive use.

- WSIS outcomes have not been well integrated into UN Development Assistance Frameworks (UNDAFs). This should be addressed if the United Nations as a whole is to leverage the role of ICTs effectively in its development activity.
- Renewed attention should be paid to financial mechanisms for the Information Society, including infrastructure investment to meet increased traffic arising from growing data volumes, the cloud economy, the Internet of Things, and the expansion of e-commerce. The report also calls for a systematic review of ODA commitments to the ICT sector, similar to that undertaken by the OECD at the time of WSIS.
- There is a continued high level of divergence of views on aspects of Internet governance, in particular concerning 'enhanced cooperation … in international public policy issues pertaining to the Internet.' The Internet is now extremely important to all aspects of economy, society and culture. In this context, concerns have emerged that disagreements concerning its future should not inhibit discussion of how to take best advantage of innovation in technology and services and the positive impact that the Internet can have on development. Renewed efforts should be made to resolve differences and achieve consensus on the future of Internet governance, and to find solutions that enable all governments, on an equal footing, to carry out their roles and responsibilities in international public policy issues pertaining to the Internet.
- The *Geneva Declaration of Principles,* adopted more than a decade ago emphasized that the implementation of WSIS outcomes would require 'strong commitment by all stakeholders,' and multi-stakeholder cooperation and dialogue have been hallmarks of the subsequent implementation of WSIS outcomes. A body of experience has arisen from this, including different ways of addressing the inclusiveness of multi-stakeholder participation and its relationship with multilateral institutions. Analysis should be made of the benefits and challenges arising from this experience in order to improve the inclusiveness and effectiveness of future multi-stakeholder cooperation.

The rapid growth of ICT adoption and use and the dynamic pace of innovation in the ICT sector will ensure that their impact on society, economy and culture continues to grow rapidly. This suggests the importance of ensuring that WSIS outcomes are integrated fully into the post-2015 development agenda and the Sustainable Development Goals (SDGs) that are to be agreed by the United Nations General Assembly in late 2015. Many stakeholders have expressed concerns that ICTs and the Information Society are not sufficiently integrated into the preparatory work that is being undertaken towards the Agenda and the SDGs. More attention should be given to them as a priority.

While great progress has been made in implementing WSIS outcomes over the past decade, much still remains to be done, in extending the potential benefits of the Information Society to all, in addressing new challenges that have arisen from its development, and in adapting to the continual innovation that is taking place in information and communication technologies and the services that they enable. While the priorities for individual targets and Action Lines evolve with these changing technologies and services, it is vital that the discourse in international public policy on the future of the Information Society begins from an understanding of current circumstances and is located in the present and the future rather than the past. The reach and capabilities of ICTs are now much greater than they were in 2005 and are continuing to grow rapidly. Technologies and services that were in their infancy at the time of WSIS, such as cloud computing and social networks, are now widespread, while the Internet of Things and big data analysis are now imminent realities. In these rapidly evolving circumstances, there is a need for continued efforts by all stakeholders, working independently and through multi-stakeholder partnership and dialogue, to achieve the WSIS vision that people everywhere, regardless of their background or origin, should have the opportunity to play a full part in a people-centred, inclusive and development-oriented Information Society.

CHAPTER 1
INTRODUCTION

CHAPTER 1 – INTRODUCTION

The World Summit on the Information Society (WSIS) took place in two phases, in Geneva in December 2003 and Tunis in November 2005. These resulted in four outcome documents – the *Geneva Declaration of Principles* and *Geneva Plan of Action*, the *Tunis Commitment* and the *Tunis Agenda for the Information Society*.[1] Together, these four documents set out a vision for the Information Society, identified objectives for the international community, and established a framework for the implementation and follow-up of WSIS objectives by United Nations agencies and other stakeholders.

This report on the implementation of WSIS outcomes has been prepared by the secretariat of the UN Commission on Science and Technology for Development (CSTD). Its purpose is to assist the Commission in considering the review of WSIS outcomes which it has been requested to make, through the United Nations Economic and Social Council (ECOSOC), to the General Assembly in 2015. The report surveys available evidence concerning the implementation of WSIS outcomes and the development of an Information Society since 2005. It draws on a variety of sources, including a multi-stakeholder open consultation process implemented between June and October 2014. Preparation of the report has been supported by independent expert advice and inputs from other United Nations agencies.

This introductory chapter describes the outcomes that were set out in the Summit's four outcome documents, identifies the methodology and sources used for this report, and summarizes the processes for the WSIS+10 review.

A. THE WORLD SUMMIT ON THE INFORMATION SOCIETY

The WSIS was organized for the United Nations by the International Telecommunication Union (ITU) in conjunction with other UN agencies. Each phase of the Summit consisted of a series of preparatory meetings (PrepComs), with extensive involvement by stakeholders from governments, international organizations, the private sector, civil society and the technical and academic communities, culminating in a three-day plenary meeting attended by Heads of State and Government as well as other representatives, at which its outcome documents were formally adopted.

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

- the *Geneva Declaration of Principles*,[2] which set out the international community's vision and principles for the development of a 'people-centred, inclusive and development-oriented Information Society;' and
- the Geneva Plan of Action,[3] which established targets for connectivity in different social contexts and built on the principles set out in the Declaration to identify priorities for action.

Two supplementary fora were convened by the United Nations Secretary-General between the first and second phases of the Summit to address particular issues arising from the Geneva phase: a Task Force on Financial Mechanisms for ICT investment and development;[4] and a Working Group on Internet Governance.[5] The second (Tunis) phase of the Summit concentrated on issues arising from the reports of these supplementary fora, and on establishing implementation mechanisms for achieving objectives that had been agreed. Its outcomes were encapsulated in two further documents:

- the *Tunis Commitment*,[6] which reaffirmed and built upon the agreements reached in Geneva; and
- the *Tunis Agenda for the Information Society*,[7] which reflected agreements on financing mechanisms and Internet governance, and established implementation and follow-up arrangements.

There have been many important developments concerning the Information Society since the Summit. The evolution of ICT technology and markets has been exceptionally rapid, and the

capabilities of ICT networks and devices are, as a result, much greater than they were ten years ago. While some of the changes which have taken place were anticipated at WSIS, entirely new communications modalities and services have also emerged, creating new opportunities and challenges for government, business and other stakeholders. These have influenced the implementation of WSIS outcomes, as well as their interaction with other global economic and social trends.

As well as reviewing progress in implementing WSIS outcomes during 2015, the United Nations General Assembly will review progress towards achieving the Millennium Development Goals (MDGs) and adopt its post-2015 development agenda, including new Sustainable Development Goals (SDGs). The relationship between WSIS implementation and this wider development agenda is also addressed in this report.

B. THE WSIS OUTCOMES

The WSIS outcomes, which were set out in the documents agreed in Geneva and Tunis, fall into six main groups.

1. The vision of a people-centred, inclusive and development-oriented Information Society

At the heart of the WSIS outcome documents lies a vision for Information Society development – the international community's aspirations and expectations for the future – which 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.*[8]

The phrase 'a people-centred, inclusive and development-oriented Information Society' has been widely used to summarize this vision.

2. The WSIS Targets

Much discussion about the Information Society – before, during and after WSIS – has concerned the 'digital divides' between those with more access to ICTs, and those with less, both between and within countries. The international community pledged at WSIS to bridge these digital divides, enabling everyone to benefit from access to ICTs. This objective was spelled out in the *Geneva Plan of Action* in ten targets, concerned with connectivity in general and with access to ICTs within specific public services.[9] The *Tunis Agenda* also endorsed the establishment of multifactorial indices to measure the emergence of Information Societies at the national level.[10] A Partnership on Measuring ICT for Development was established in 2004 to facilitate the measurement of the Information Society, including WSIS Targets.[11]

3. The WSIS Action Lines

The *Geneva Plan of Action* established eleven Action Lines, building on principles and mandates set out in the *Declaration of Principles*. These were intended as platforms for multi-stakeholder cooperation to implement WSIS objectives in specific areas of the Information Society, each facilitated by one or more United Nations agencies. One Action Line, concerned with the application of ICTs in development, was subdivided into eight subsidiary Lines, bringing the total to eighteen. Implementation mechanisms for these Action Lines were established by the *Tunis Agenda.*[12]

4. Financial mechanisms

The development of an Information Society requires investment in infrastructure, services and human capacity. The *Tunis Agenda* acknowledged the central importance of investment in infrastructure, advocating national and international action to create an enabling environment for investment by the private sector, and urging cooperation between public and private sectors in meeting infrastructure needs. It called for increased investment and innovative approaches to financing in a number of areas, including infrastructure, content and capacity-building. The *Tunis Agenda* also endorsed the establishment of a voluntary Digital Solidarity Fund to complement existing financial mechanisms.[13]

5. *Internet governance*

The *Tunis Agenda* set out an overall framework intended to facilitate the development and governance of the Internet, building on existing governance arrangements and the conclusions of the multi-stakeholder Working Group on Internet Governance. Within this framework, the *Agenda* invited the United Nations Secretary-General to initiate two processes concerning Internet governance:

- 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,' though not in 'day-to-day technical and operational matters, that do not impact on international policy issues;'[14] and
- the establishment of a 'multilateral, multi-stakeholder, democratic and transparent' Internet Governance Forum (IGF), to fulfil a number of purposes, including discussion of public policy issues related to the Internet, facilitation of discourse between entities concerned with Internet governance, and building wider understanding of the Internet, its development and emerging issues.[15]

6. *Multi-stakeholder implementation and cooperation*

The *Tunis Agenda* envisaged that all stakeholders participating in the Summit would take responsibility for implementing outcomes, and emphasized the value of multi-stakeholder cooperation. 'Building an inclusive development-oriented Information Society,' it said, 'will require unremitting multi-stakeholder effort,' including '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….'[16] A WSIS Stocktaking Database was established to gather examples of WSIS implementation by different stakeholders.[17]

C. FOLLOW-UP ACTIVITIES BY UNITED NATIONS AGENCIES AND OTHER STAKEHOLDERS

The *Tunis Agenda* requested the United Nations General Assembly to make an overall review of the implementation of WSIS outcomes in 2015.[18] In July 2014, the General Assembly resolved that this overall review should be undertaken through 'a two-day high level meeting of the General Assembly, to be preceded by an intergovernmental preparatory process that also takes into account inputs from all relevant stakeholders…' This High Level Meeting will be convened in December 2015.[19]

The *Tunis Agenda* gave the ECOSOC responsibility for overseeing the system-wide follow-up of Summit outcomes, and asked it to review the mandate and composition of the CSTD in order to facilitate this.[20]

In 2006, the Economic and Social Council tasked the CSTD to assist it in this work, requesting it 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;*

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.*[21]

In a further resolution in 2013, the Council asked the CSTD:

> *… to collect inputs from all facilitators and stakeholders and to organize, during its seventeenth session, in 2014, a substantive discussion on the progress made in the implementation of the outcomes of the World Summit, and to report thereon, through the Council, to the General Assembly as it makes an overall review of the implementation of the outcomes of the World Summit in 2015;*

> *… to submit, after its eighteenth session, the results of its 10-year review of progress made in the implementation of the outcomes of the World Summit, through the Council, to the General Assembly as it makes an overall review of the implementation of the outcomes of the World Summit in 2015.*[22]

This resolution was reaffirmed by the Council in 2014.[23]

In addition to the CSTD ten-year review of WSIS requested by the ECOSOC, a number of other processes have been undertaken within the UN system in the run-up to the United Nations General Assembly's overall review.

- In February 2013, UNESCO hosted a conference 'Towards Knowledge Societies for Peace and Sustainable Development', co-organized with the ITU, UNCTAD and UNDP. This agreed a Final Statement, *Information and Knowledge for All: an expanded vision and a renewed commitment*,[24] which was subsequently adopted by UNESCO's General Conference.[25]

- In June 2014, the ITU hosted a multi-stakeholder WSIS+10 High Level Event, co-organized with UNCTAD, UNDP and UNESCO, which adopted two *WSIS+10 Outcome Documents*, a *Statement on the Implementation of WSIS Outcomes* and a *Vision for WSIS Beyond 2015*.[26]

- In June 2014, the Partnership on Measuring ICT for Development published its *Final WSIS Targets Review*, which analysed available statistical evidence concerning progress towards the WSIS Targets.[27]

D. METHODOLOGY AND SOURCES

The four WSIS outcome documents provide the foundation for the analysis in this report, which also incorporates the outcomes of the three WSIS+10 review processes identified above. The report has been prepared by the CSTD secretariat to assist the CSTD in preparing its review of the implementation of WSIS outcomes for the United Nations General Assembly. It also draws on a wide range of other sources.

The United Nations General Assembly and the ECOSOC have adopted annual resolutions concerning *Assessment of the progress made in the implementation of and follow-up to the outcomes of the World Summit on the Information Society* and concerning *Information and communication technologies for development*, which have provided the framework for United Nations activity following WSIS.[28] Reports by UN agencies and some other international stakeholders have been summarized in annual reports by the United Nations Secretary-General.[29] Regular reviews of specific Action Lines have been undertaken during annual meetings of the WSIS Forum and are summarized in WSIS Forum publications, while the ITU and UNESCO have published comprehensive summaries of their WSIS implementation activities.[30] Annual meetings of the IGF have been summarized in Chair's reports and reviewed by its Multi-stakeholder Advisory Group as well as open consultations.[31]

Midterm reviews of WSIS outcomes were published by several UN agencies in 2010/2011, including the ITU *World Telecommunication/ICT Development Report* for 2010, *Monitoring the WSIS Targets*,[32] a report by the Partnership on Measuring ICT for Development that presented a statistical framework for *Measuring the WSIS Targets*,[33] summaries of the WSIS-related work of the ITU and UNESCO,[34] and a comprehensive midterm review by the CSTD, *Implementing WSIS Outcomes*.[35] The CSTD has also considered reports concerning WSIS outcomes at its annual sessions and intersessional panels.

A number of United Nations Summits concerned with wider development issues are relevant to the review of WSIS outcomes, including the UN Summit on the Millennium Development Goals (2010), the UN Conference on Least Developed Countries (2011) and the UN Conference on Sustainable Development (Rio+20, 2012). The report has drawn on these and on work to develop Sustainable Development Goals (SDGs) and the post-2015 development agenda, which the United Nations General Assembly is expected to adopt in 2015.

A great deal of analytical literature has been published since WSIS concerned with ICTs and their application to development, and with specific aspects of WSIS implementation. This includes publications and reports from:

- intergovernmental agencies, including UN specialized agencies, regional organizations and international financial institutions;
- international multi-stakeholder, private sector and civil society organizations, including those concerned with the development of the Internet, and with economic and social development; and
- research institutes and academic departments.

This literature has been reviewed during preparation of this report, though it is not possible in the space available to explore the rich diversity of analysis that it contains. Particular attention has been paid to reports by multilateral and international multi-stakeholder organizations. A selection of relevant reports and other publications is included in the bibliography.

An open consultation process was initiated by the CSTD secretariat in June 2014. All stakeholders were invited to contribute their experiences, views and priorities to the CSTD ten-year review of WSIS by responding to an online questionnaire, and to forward copies of relevant literature to the secretariat. As well as detailed input concerning their own work, the consultation gave stakeholders the opportunity to contribute their experience, views and priorities on broad issues of WSIS implementation and Information Society development. Formal invitations to contribute to the review were issued to members of the CSTD, to Member-States of the United Nations, to the facilitators of WSIS Action Lines, to UNGIS[36] agencies and to those UN and other agencies that contribute to the United Nations Secretary-General's annual report on WSIS outcomes.

The online open consultation lasted from 27 June 2014 to 15 September 2014. Ninety-six contributions were received, including 40 contributions by governments and governmental agencies, 18 by international organizations and 38, in total, from civil society, private sector and technical and academic respondents.[37] These have been considered in this report alongside the written contributions made to the Multi-stakeholder Preparatory Platform that preceded the WSIS+10 High Level Event.

A number of open discussion sessions were organized as part of the consultation at international events during 2014, focused on particular regions. These included sessions during:

- the WSIS+10 High Level Event held in Geneva in June 2014;
- the African Internet Governance Forum held in Abuja, Nigeria in July 2014, in association with ECA;
- the global Internet Governance Forum held in Istanbul, Turkey in September 2014, including a separate workshop in association with ECLAC;
- the ICT4All event held in Tunis in September 2014, in association with ESCWA;
- the World Congress on Information Technology (WCIT) 2014 of the World Information Technology and Services Alliance (WITSA) held in Guadalajara, Mexico in October 2014; and
- the ICT Committee meeting of the UN Economic Commission for Asia and the Pacific (ESCAP) held in Bangkok, Thailand in October 2014.

A first draft of this report was discussed at the intersessional panel of the CSTD which was held in Geneva in November 2014. CSTD members and other stakeholders were asked to make further comments and provide updated information in writing. The report was finalized, following this, during January 2015.

E. STRUCTURE OF THE REPORT

This report is divided into nine chapters. Following this introduction:

Chapter 2 assesses implementation of the overall WSIS vision of 'a people-centred, inclusive and development-oriented Information Society,' developments since WSIS concerning the relationship between the Information Society, development and human rights, and the interaction between WSIS outcomes and the post-2015 development agenda.

Chapter 3 summarizes evidence concerning progress towards the WSIS targets established in the *Geneva Plan of Action.*

Chapter 4 describes the development of ICT technology and services since WSIS and the implications of this for implementation of WSIS outcomes.

Chapter 5 summarizes work undertaken within the WSIS Action Lines, concerned with aspects of the ICT sector and its application in development, which were identified in the *Geneva Declaration of Principles*, elaborated in the *Geneva Plan of Action* and supported by implementation arrangements in the *Tunis Agenda*. It considers changes that have taken place since WSIS in the context for their work, and summarizes the steps towards 'further enhancing' of these that were agreed at the WSIS+10 High Level Event in 2014.

Chapter 6 describes developments concerning financial mechanisms for the Information Society.

Chapter 7 describes the implementation of WSIS outcomes and related developments concerning Internet governance.

Chapter 8 summarizes the implementation of WSIS outcomes by diverse stakeholders and considers progress in achieving multi-stakeholder partnership and dialogue.

Chapter 9 summarizes the report as a whole and makes a number of suggestions for consideration by the Commission when preparing its ten-year review of the implementation of WSIS outcomes for the United Nations General Assembly.

NOTES

1 These are published in ITU, 2005a, *Outcome Documents: Geneva 2003—Tunis 2005* (Geneva, United Nations publication).
2 Ibid., p. 7-24.
3 Ibid., p. 25-53.
4 See UNDP, 2004, *Financing ICD: the Report of the Task Force on Financial Mechanisms for ICT for Development* (Geneva, United Nations publication).
5 Working Group on Internet Governance, 2005, *Report of the Working Group on Internet Governance*.
6 ITU, 2005a, p. 55-64.
7 Ibid., p. 65-96.
8 *Geneva Declaration*, para. 1.
9 The Targets are listed in *Geneva Plan of Action*. *Ibid*., p. 28-30, para. 6 and in Table 1 in Chapter 3 of this report.
10 *Tunis Agenda*, para. 115.
11 Ibid., para. 114.
12 Ibid., section C.
13 Ibid., para. 28.
14 Ibid., paras. 79-81.
15 Ibid., paras. 72-78.
16 Ibid., para. 83.
17 Ibid., para. 120.
18 Ibid., para. 111.
19 United Nations General Assembly, 2014b, *Modalities for the overall review by the General Assembly of the implementation of the outcomes of the World Summit on the Information Society* (Resolution, A/RES/68/302).
20 *Tunis Agenda*, para. 105.
21 ECOSOC, 2006, *Follow-up to the World Summit on the Information Society and review of the Commission on Science and Technology for Development* (Resolution E/2006/46).
22 ECOSOC, 2013a, *Assessment of the progress made in the implementation of and follow-up to the outcomes of the World Summit on the Information Society* (Resolution E/2013/9).
23 ECOSOC, 2014a, *Assessment of the progress made in the implementation of and follow-up to the outcomes of the World Summit on the Information Society* (Resolution E/2014/27).
24 UNESCO, 2013b, *Towards Knowledge Societies for Peace and Sustainable Development: First WSIS+10 Review Event: Outcomes* (Paris, UNESCO Publication).
25 UNESCO, Records of the General Conference, 37th Session, Resolution 51, http://unesdoc.unesco.org/images/0022/002261/226162e.pdf
26 ITU, 2014f, *World Summit on the Information Society WSIS+10 High-level Event* (Geneva, United Nations publication).
27 Partnership on Measuring ICT for Development, *Final WSIS Targets Review* (Geneva, ITU publication).
28 These are accessible through the UN website, available at http://www.un.org/documents/resga.htm for United Nations General Assembly documents, and at http://www.un.org/en/ecosoc/docs/resdec.asp for ECOSOC documents (accessed 13 November 20124).
29 These, and the contributory reports by UNGIS agencies, are available at http://unctad.org/en/Pages/CSTD/WSIS-UNSG-Report.aspx (accessed 13 November 2014).
30 These are accessible at http://www.itu.int/wsis/index.html (accessed 13 November 2014).
31 These are accessible at http://www.intgovforum.org (accessed 13 November 2014).
32 ITU, 2010b, *Monitoring the WSIS Targets: A Mid-Term Review* (Geneva, United Nations publication).
33 ITU, 2011b, *Measuring the WSIS Targets: A Statistical Framework* (Geneva, United Nations publication).
34 ITU, 2010c, *WSIS + 5: Report on the World Summit on the Information Society Plus Five* (Geneva, United Nations publication). UNESCO, 2010, *Towards Inclusive Knowledge Societies: A review of UNESCO's action in implementing the WSIS outcomes* (Paris, UNESCO publication).
35 CSTD, 2011, *Implementing WSIS Outcomes: Experience to Date and Prospects for the Future* (Geneva, United Nations publication).
36 United Nations Group on the Information Society.
37 The majority of these contributions can be found at http://unctad.org/en/Pages/CSTD/WSIS-10yearReview.aspx (accessed 13 November 2014). Some contributors asked that their contributions not be published.

CHAPTER 2

IMPLEMENTING THE WSIS VISION

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The *Geneva Declaration of Principles* set out the vision of an Information Society that was agreed at WSIS. In it, the 'representatives of the peoples of the world' declared their:

> *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.*[38]

The *Declaration* upheld 'the principle of the sovereign equality of all States' and reiterated the commitment of its signatories to the achievement of sustainable development, to agreed development goals including the MDGs and to the outcomes of relevant UN summits. It reaffirmed 'the universality, indivisibility, interdependence and interrelation of all human rights and fundamental freedoms, including the right to development,' drawing particular attention to Articles 19 and 29 of the Universal Declaration of Human Rights.[39] The principles set out in the *Geneva Declaration* were reaffirmed in the *Tunis Commitment*.[40]

As many contributions to the open consultation for the CSTD ten-year review of WSIS have emphasized, the development of an Information Society cannot be measured solely through statistical analysis of connectivity and access. Assessing progress towards a 'people-centred, inclusive and development-oriented Information Society' requires consideration of the application and impact of information and communications in government, business and society in general, and of the ways in which societies and economies as a whole have changed since WSIS. This chapter describes the context for the implementation of WSIS outcomes, paying particular attention to changes in perceptions of the Information Society, to the relationship between the Information Society, development and rights, and to discussions concerning the post-2015 development agenda. Changing technological capabilities in the ICT sector, new developments in markets and services and their impact on the Information Society's evolution are described in Chapter 4.

A. THE VISION OF THE INFORMATION SOCIETY

The concept of the Information Society 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 prosperity and growth. The development of an Information Society has often been associated with transition from national agricultural or manufacturing economies towards global economies based on services.

Interest in the Information Society accelerated in the last decade of the twentieth century as rapid changes in ICT technology and markets, including the emergence of mass markets for mobile telephony and the Internet, suggested that ICTs could enable dramatic improvements in economic and social development. International initiatives in response to this included the G8's Digital Opportunity Task Force,[41] and the multi-stakeholder UN ICT Task Force, established by the United Nations Secretary-General in 2001 to build partnerships that could leverage ICTs to achieve developmental goals.[42] In 1998, the CSTD commissioned a comprehensive study of *Knowledge Societies* which explored the relationship between information technology, innovation and sustainable development, drawing on evidence from wide-ranging sources.[43] These initiatives contributed to the decisions by the ITU Plenipotentiary Conference in 1998 and the United Nations General Assembly in 2001 to instigate the WSIS, and to the vision articulated in its outcome documents.[44]

A number of complementary terms have been used to emphasise different aspects of the Information Society since WSIS.

- UNESCO has long used the term 'Knowledge Societies' to describe 'societies in which people have the capabilities not just to acquire information but also transform it into knowledge and understanding which empower them to enhance their livelihoods and contribute to the social and economic development of their societies.'[45] Its 2005 World Report, *Towards Knowledge Societies*, recognized the diversity of different Knowledge Societies, rooted in countries' different knowledge assets and development experiences, and emphasized inclusiveness and participation in bringing them about.[46] Knowledge Societies build on the relationships between human and technological development, rather than on technology alone.
- The terms 'Digital Economy', 'Internet Economy' and 'Cloud Economy' refer to economic environments in which production, distribution and consumption of goods and services focus on and are reinvigorated by information technologies.
- The term 'Network Societies' describes the potential restructuring of social, economic and cultural behaviour whereby informal networks and social groups play an enhanced role at the expense of more formal political, economic and social hierarchies.[47]

Perceptions of the Information Society have evolved since WSIS as ICTs have become more prevalent, and technology and services have come to play a greater part in economic and social life. Some commentators have emphasized continuity between past, present and future in its development, while others have stressed the disruptive and transformative impacts of ICTs displacing old technologies, patterns of behaviour and modes of production. The term Information Society, the CSTD noted in 2010, describes both developments which are currently taking place within societies, and a vision of the future, which governments and other stakeholders believe that they should expedite.[48]

The comprehensive nature of the emerging Information Society includes both:

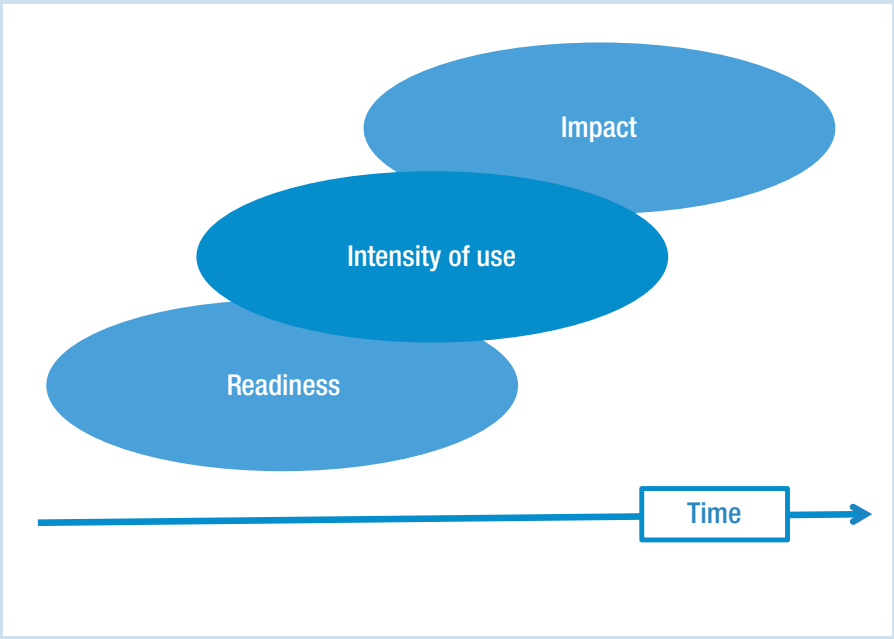
- economic changes – such as those associated with the globalization of industrial production, business organization and labour markets; the digitalization of supply chains; the development of e-commerce; the transition to automated financial markets; the virtualization of goods and services; changes in the relationships between employers and employees (including homeworking and micro-entrepreneurship); and the emergence of virtualized consumption patterns; and
- social changes – including new patterns of interaction within families, communities and diasporas; the growth of information resources and new modalities for accessing and storing information; shifts in the balance of rights and responsibilities between governments, citizens and businesses; the disruption of established models of social and economic interaction; and new patterns of human settlement and political organization.[49]

One model that encapsulates this evolution, used by a number of international agencies, is illustrated in Figure 1. This suggests that societies are progressing through a continuum with three main phases of ICT development – from 'e-readiness', in which ICT access and capabilities are relatively limited, through a period of intensification in their presence and role, to one in which they have pervasive and extensive impact on economic and social life.

Contributors to the consultation for the CSTD ten-year review of WSIS emphasized the need to locate analysis of this evolving Information Society within the context of other changes taking place in world development. 'Most changes experienced over the past ten years,' in the words of one contributor, 'are the result of a complex interplay between advocacy, global economies, market expansion, politics, and shifts in social dynamics, among other [factors].'[50] 'Where progress has been made,' another remarked, 'it has usually been driven by economic growth and opportunity, increased connectivity and access to ICTs, enabling environments, training and capacity-building, and the establishment of institutions and governance structures that are open, people-centred and inclusive.'[51] Contributions also emphasized the importance of education and capacity-building in enabling the development of skills required to translate ICT use into developmental impact.

While reflecting general experience, the model in Figure 1 also recognizes diversity. The nature of

Figure 1: Modelling the evolution of the Information Society



Source: CSTD Secretariat, based on UNCTAD, 2009, Figure 2.

the contribution that ICTs make to development varies with countries' social, economic and cultural characteristics. A country that primarily produces agricultural goods, for example, will have different economic priorities and make different use of ICTs than one whose economy focuses on high-tech manufacturing or financial services. Different levels of educational and other capabilities affect countries' capacity to leverage the developmental gains potentially available through ICTs. Geopolitical factors, such as civil conflict, and governance norms, such as policy and regulatory frameworks, are also significant factors affecting Information Society adoption and developmental outcomes. The UN Department of Economic and Social Affairs (DESA) has emphasized that 'an Information Society is not necessarily a high-technology society,' but that its development will depend on the extent to which policymakers seek to optimize technological developments in contexts that are relevant to them, rather than necessarily maximizing use of technology. 'It is important,' DESA concludes, 'to have information serving society and not the other way round.'[52]

One of the principal challenges identified in the WSIS outcome documents concerns the 'digital divides' between and within countries. Digital divides, which represent differences in access to and usage of ICTs, are evident both geographically, for example between industrial and developing countries or between urban and rural areas, and socially, for example between women and men and between those with different levels of income and education. Advocates for ICTs argue that access can help reduce inequalities in health, education and economic opportunity, while the persistence of digital divides can exacerbate and perpetuate other development divides, enabling countries with better network access, and individuals and communities with more resources, to accelerate their prosperity at the expense of less privileged countries, communities and individuals. Without the ability to connect to networks at prices they can afford, individuals and communities cannot reap the benefits that new technology offers them.

The nature of the digital divide within societies has evolved since WSIS. Rapid growth in access to mobile telephony has reduced

divides in basic communications services such as mobile telephony. While the divide in basic services has shrunk, however, there has been a growing gap in the quality of connectivity. Broadband networks are being deployed more rapidly in developed than developing countries and in urban areas of developing countries than in rural areas. Those who are poor, who lack educational qualifications, who live in rural areas or who experience social marginalization are less likely to make use of ICTs, particularly more expensive and sophisticated ICTs, than others in their societies.

The General Assembly reflected these concerns in 2013, stressing that:

> *in spite of recent progress, there remains an important and growing digital divide between countries in terms of the availability, affordability and use of information and communications technologies and access to broadband, and stressing also the need to close the digital divide, including with regard to such issues as Internet affordability, and to ensure that the benefits of new technologies, especially information and communication technologies, are available to all.*[53]

As well as opportunities, increased attention has been paid since WSIS to problems that arise from or have been exacerbated by the Information Society. Some problems, notably those concerned with cybersecurity and child protection, were highlighted in the WSIS outcome documents. Others arise from digital divides which empower those with access to ICTs and the skills and financial resources to make effective use of them, but may also increase inequality. The extent to which ICTs can displace clerical and manual jobs has raised concerns about their impact on employment. Criminals have taken advantage of digital opportunities, exploiting weaknesses in systems and deploying malware to hack online accounts and defraud consumers, while data-gathering/retention and data-mining, by governments and businesses, have raised concerns about surveillance, privacy and data protection. The increased demand for energy to power networks, data centres and devices has increased the impact of ICTs on greenhouse gas emissions, while the rapid turnover of devices has led to growing volumes of electronic waste.

B. ICTS FOR DEVELOPMENT (ICT4D)

The role of ICTs in development, often referred to as ICT4D, was first addressed by the international community in the 1970s. In the mid-1980s, the Independent Commission for Worldwide Telecommunication Development, initiated by the ITU, identified the digital divide in telecommunications between developed and developing countries, and challenged the international community to redress this for reasons of equity and in order to stimulate economic growth.[54] In the mid-1990s, a number of international initiatives contributed to a growing belief that ICTs offered the opportunity for a step change in economic and social development. Within the United Nations system, this was articulated through the multi-stakeholder UN ICT Task Force, established in 2001 'to lend a truly global dimension to the multitude of efforts to bridge the global digital divide, foster digital opportunity and thus firmly put ICT at the service of development for all.'[55]

The WSIS outcome documents set out an overall framework for WSIS activity on ICT4D. The *Geneva Declaration* stated that 'Our challenge is to harness the potential of information and communication technology to promote the development goals of the Millennium Declaration.' It recognized that 'ICTs should be regarded as tools and not as an end in themselves,' but added that:

> *The rapid progress of these technologies opens completely new opportunities to attain higher levels of development. … Under favourable conditions, these technologies can be a powerful instrument, increasing productivity, generating economic growth, job creation and employability and improving the quality of life for all.*[56]

More specifically, it declared that:

> *… ICT applications are potentially important in government operations and services, health care and health information, education and training, employment, job creation, business, agriculture, transport, protection of environment and management of natural resources, disaster prevention, and culture, and to promote eradication of poverty and other development goals. ICTs should also contribute to sustainable production and consumption patterns and reduce traditional*

barriers, providing an opportunity for all to access local and global markets in a more equitable manner.[57]

The *Tunis Agenda* identified a number of mechanisms by which ICT4D should be pursued, including:

- 'mainstreaming and aligning national e-strategies' with national development priorities;
- building ICT capacity and capabilities through training and education;
- 'promoting public policies aimed at providing affordable access at all levels';
- 'improving access to the world's health knowledge and telemedicine services';
- 'using ICTs to improve access to agricultural knowledge';
- 'developing and implementing e-government applications based on open standards,' in order to facilitate access to government information and services;
- supporting cultural institutions and cultural content;
- encouraging the development of environment-friendly applications; and
- 'promoting the use of ICTs to enhance flexible ways of working'.[58]

It also emphasized the 'enabling role of ICTs' in disaster risk reduction, including the use of early warning tools, information sharing and monitoring of emergency response.[59]

The *Geneva Declaration* and *Tunis Agenda* both encouraged multilateral cooperation to achieve social and economic development, and discouraged unilateral measures that could impede this or hinder the well-being of people in developing countries.[60]

The implementation of WSIS outcomes in ICT4D by UN agencies and other stakeholders is discussed in Chapters 5 and 8. The following paragraphs describe aspects of its overall development since WSIS that have influenced their implementation.

1. ICTs and the Millennium Development Goals

The Millennium Declaration, which was adopted by the United Nations General Assembly in 2000, set out a comprehensive approach to development, covering issues including peace and security, environmental protection, human rights and governance, as well as development and poverty eradication.[61] Many of these themes were echoed in the WSIS *Geneva Declaration* and *Tunis Commitment*. The Millennium Declaration also established eight Millennium Development Goals (MDGs), seven of which set quantitative targets to be achieved by 2015, in specific areas of poverty reduction and basic needs.[62] These provided a model for the WSIS targets included in the *Geneva Plan of Action*. The eighth Goal was concerned with developing a global partnership for development. Its final target (8F) required governments and intergovernmental agencies 'in cooperation with the private sector, [to] make available benefits of new technologies, especially information and communications.'[63] No quantitative indicators were adopted for this Goal but it has subsequently been associated with indicators concerning mobile phone subscriptions, Internet access and, more recently, broadband connectivity.[64]

The *Tunis Agenda* recognized the MDGs as 'fundamental' to all development activity and acknowledged the role of ICTs in their achievement.[65] From the outset, ITU and other stakeholders have sought to identify ways in which ICTs can contribute to achieving the MDGs, for example by improving access to information by subsistence farmers, enabling diagnostic advice to health workers, and increasing awareness of protective measures that can be taken to avoid infection by malaria or HIV. ICTs in this context have been seen primarily as tools that can support the work of sectoral development programmes, enabling interventions to be made more efficiently and effectively, disseminating information and sharing experience, and more recently enabling better analysis of data and modelling of interventions. Their potential has increased as they have become more widely available and the capabilities of networks and devices have improved, leading to revised assessments of their scope in supporting MDGs, for example by the Broadband Commission for Digital Development.[66]

2. The economic potential of ICTs

The *Geneva Declaration* asserted that 'the development of the Information Society is important for broadly-based economic growth in both developed and developing economies,'

emphasizing the scope for productivity gains and the introduction of innovative applications.[67]

Analysis of national ICT strategies has shown diversity in government approaches to the economic role of ICTs. A few developing countries, mostly in Asia, have developed ICT manufacturing sectors, which require high levels of capital investment. More widespread opportunities for entrepreneurs in more countries may now be arising for local software sectors that are less capital-dependent.[68] Some governments have emphasized the potential for ICTs to enhance productivity and facilitate participation in global markets. Some have sought to attract inward investment by becoming regional communications hubs or developing service sectors such as business process outsourcing. There has been considerable interest in the potential of ICTs to improve the productivity of small-scale farm and other businesses.

Changes in the global economy form an important backdrop to these developments. Globalization has intensified the interdependence of economies. High rates of growth in some countries, notably in Asia, have facilitated long-term shifts in economic power. The downturn of 2008-2010 temporarily reduced international trade and had a significant negative effect on some development indicators, including ICT investment. Recovery from recession has been faster in some regions than others.

It has long been expected that efficiency and productivity gains resulting from ICTs will enable economic growth. However, past studies in industrial countries have found it difficult to identify macroeconomic gains that can confidently be attributed to investment in information technology – the so-called 'productivity paradox'. In practice, it may take considerable time for the impact of investment to be felt in macroeconomic outcomes, while the extent to which gains are achieved will depend on complementary factors including skills available within the economy, the enabling environment for business innovation, and organizational change.[69]

Nevertheless, as the Information Society has developed, there has been growing confidence in the value of ICT investment as a catalyst for economic growth, with a concomitant concern that countries lacking investment will suffer long-term disadvantage as a result. There is significant evidence of improvements in productivity and of positive impacts reaching beyond the ICT sector to other economic sectors, including benefits for established and new intermediary businesses serving the needs of larger corporations. Research indicates that this positive impact may be increasing over time, but that ICTs need to be well-embedded if their value is to be maximized, including the development of complementary skills and of changes in business structures. ICTs also act as facilitators of international trade, opening additional opportunities for developing country businesses providing goods and services that are attractive in international markets.[70]

A number of studies have suggested that a measurable economic growth dividend should therefore arise from the extent of ICT deployment and access within societies, including mobile phones, 3G and broadband connectivity. A World Bank study, for example, has suggested that 'in low- and middle-income countries every 10 percentage point increase in broadband penetration accelerates economic growth by 1.38 percentage points.' A number of such studies have suggested that these effects are likely to be stronger in developing countries.[71] Critics of these studies have suggested, however, that they pay insufficient attention to the possibility that GDP performance is influencing ICT adoption rather than *vice versa*, and that different outcomes would result from analyses with different starting dates.[72] The impact of new technologies on late adopting developing countries is also likely to differ from that in early adopters, because of the different technical, economic and human resource capabilities in developing countries and because late adopters will be entering markets that are more competitive than those entered by early adopters.

3. Developments in ICT4D since WSIS

The *Geneva Declaration* recognized that ICTs 'should be regarded as tools and not as an end in themselves. 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 for all.'[73] While ICTs can facilitate developmental gains, however, it acknowledged that their capacity to do so is framed by the context in which they are deployed, and fostered by other aspects of social and economic development, political and environmental change.

A review of ICT4D literature published by UNDP in 2010 reflected this:

> *A recurrent observation in the literature … is the important realisation that ICTs alone cannot improve people's lives; the use of ICTs needs to occur within broader strategies that are tailored to make the most use of these tools and techniques in order to reap their potential benefits for human development. ICT4D therefore only represents a potential for increasing opportunities and capabilities through technology, which can also increase inequality around the world and benefit only those that are able to gain from the new opportunities that ICTs facilitate if applied with disregard for the interests of the poor.*[74]

Two important underlying changes have taken place in ICT4D since WSIS. At the time of the Summit, governments, international agencies and other stakeholders had relatively limited experience with ICT-enabled interventions in economic and social development. Much more experience is now available, in a wider variety of geographic and development contexts. The nature of the ICT technologies and services that are now available for ICT-enabled interventions is also very different from that at the time of WSIS: in particular, there is much more extensive experience of ICT use by target populations. The pace of change in technology and markets has enabled more innovative applications to be used in more extensive contexts. However, it has also reduced the relevance for future deployments of experience gained with earlier generations of technology, when ICTs were less pervasive. Care must therefore be taken in contextualizing lessons derived from prior experience.

Many ICT4D interventions before WSIS were pilot projects, designed to test the impact of ICTs in particular circumstances. Governments and development agencies often found it difficult to scale such projects up to national or regional level because of variations in the availability and quality of ICT networks and services. ICT4D deployments are inherently vulnerable to weaknesses in communications and power infrastructure, which are common in many developing countries. Human skills are also critical to successful project implementation. Many interventions have proved more accessible to better-educated social groups, making it difficult to predict their impact on inclusiveness and empowerment. ICT4D practitioner literature identifies a number of factors which are associated with improved effectiveness of interventions, including:

- thoroughly researched understanding of national and local social, economic and communications contexts, including e-readiness;
- the involvement of sectoral experts and target beneficiaries, as well as technologists, in programme/project design, development and evaluation;
- prior assessment of likely impacts on marginalized social groups, on gender, and on communities other than target beneficiaries;
- attention to technological and financial sustainability, scalability and adaptability to changes in technology and markets;
- integration of initiatives with other development programmes and activities, including national development strategies; and
- thorough and critical monitoring and evaluation of both implementation and outcomes.

The *Tunis Agenda* called for the 'mainstreaming' of national e-strategies.[75] Mainstreaming refers to the incorporation of ICTs into programmes concerned with other sectors such as education, health and agriculture, so that they form integral parts of these rather than acting as supplements to them. To some extent, it has occurred naturally because of the growing use of ICTs as general purpose technologies in all areas of administration, including development programmes.[76] Policymakers and practitioners suggest that mainstreaming has facilitated ICT4D by encouraging cooperation between ICT and sectoral development specialists, and focusing interventions more closely on outcomes that can realistically be achieved with available communications, financial and human resources.

Some national ICT4D strategies and programmes have been criticized for emphasizing the generic value of ICTs and paying insufficient attention to the challenges of local deployment and the needs of target beneficiaries. ESCWA has observed, for example, that 'many ICT development projects have failed in the past largely because they were ill-adapted to the local context and the services offered did not match the needs of the targeted

population.'[77] UNCTAD has emphasized the value of focusing on the needs of service users in designing ICT-enabled development strategies, observing that:

> *Many of the strategies and policy initiatives for ICT4D which have been developed by governments and their development partners in the past 15 years have emphasized the delivery of services to communities rather than responding to communities' own needs. This has sometimes led to 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.*[78]

Academic analysis has suggested that a distinction can be drawn between two phases of ICT4D. In the earlier period, which was prevalent at the time of WSIS, emphasis was placed on the supply of technology, through infrastructure deployment and facilities such as telecentres, leading to an emphasis on programmes and applications delivered to target beneficiaries by governments and agencies. There is much more experience today with widespread adoption and use of ICTs in target populations, particularly mobile phones. This suggests that policymakers can move towards an approach that builds on the experience of the poor in appropriating technology for their own purposes rather than relying on supply-side assessments of what ICTs might be able to achieve.[79]

This analysis reflects two underlying changes in the core technologies available for ICT4D since WSIS.

Mobile phones have been adopted more extensively than anticipated at the time of the Summit, making a much wider range of services, now including Internet and social media, available to many more people in developing countries. This has provided a platform for applications with developmental value to be provided commercially as well as through development initiatives. Examples of such applications include market price information services which help farmers to maximize income from the sale of produce, health information services aimed at clinical practitioners and the wider public, and mobile money services that facilitate both transactions and financial management.[80]

- Broadband networks are increasingly deployed and seen by many concerned with ICT4D as transforming ICTs' potential contribution to development.[81] Rather than relying solely on market forces to foster broadband investment, the World Bank and other agencies have encouraged governments to stimulate demand through subsidies, capacity-building and e-government services.[82] However, the potential impact of broadband is constrained by limitations in the quality and reliability of networks, the human skills and other resources, including local content, required to make full use of higher bandwidth.

In their submission to the post-2015 development agenda, UNGIS agencies noted that 'strategic policies, human capacity, appropriate knowledge management, relevant content development, infrastructure deployment, and an enabling environment are critical factors to ensure that the potential of ICTs for sustainable development is fully harnessed by and for all.'[83] National ICT strategies, which were advocated in the *Tunis Agenda*, provide a framework within which these various policy approaches and programme activities can be brought together, enabling synergies between different areas of government activity.

ICT4D literature has emphasized the importance of ensuring that e-strategies reflect the specific circumstances, experiences and priorities of individual countries, as well as the more generic opportunities offered by ICTs. These are diverse. Many small island states, for example, have small populations that offer limited scope for returns on investment in infrastructure and services, and are remote from international telecommunications networks. Their complex challenges often require higher levels of external support for communications investment than are required elsewhere. Landlocked states, many of which are also LDCs, depend on interconnection through neighbouring countries for access to international submarine cable networks, and in some regions are still highly dependent on satellite infrastructure for Internet access. Larger and more prosperous developing countries are better equipped to develop ICT service sectors supporting national populations, for example in software, which may in time enable them to play a bigger part in ICT-related trade. Countries in which the service sector is more prominent are better placed to take early advantage of technological innovations than those in which agriculture and raw material extraction are predominant.

Experience reported by governments and international agencies shows that the capacity of different countries to leverage the opportunities that ICTs make available is also dependent on other development characteristics such as educational attainment. A number of contributors to the open consultation for the CSTD ten-year review of WSIS emphasized the need for integration between ICT4D and development strategies concerned with education, training and capacity-building.

The *Tunis Commitment* noted 'the potential of ICTs to promote peace, security and stability,' and 'to prevent conflict which … negatively affects achieving development goals.'[84] Special attention has been paid in ICT4D to the problems of countries emerging from conflict, which have typically experienced the destruction of much of their communications infrastructure as well as high levels of social disruption, poverty and insecurity. A framework for assessing the developmental value of ICTs in this context, published by the World Bank in 2013, identified a number of areas in which they can make a particular contribution as these countries progress through stabilization to reconstruction and normalization. The restoration of telecommunications networks helps to build confidence in a return to peacetime conditions, facilitate stabilization and provide a platform for economic regeneration.[85] International humanitarian agencies and civil society organizations have made use of ICT tools to improve early warning of potential conflict, mitigate its impact and promote reconciliation and non-violent means of resolving disputes between and within nations, as recommended in the *Tunis Commitment*.[86]

The *Tunis Commitment* recognized that ICTs can also be used for purposes which are detrimental to international or national stability and security.[87] Governments, international organizations and other stakeholders have expressed concern about the potential use of ICTs in both conventional conflicts and in cyberwarfare, including espionage, hacking and other attacks on digital networks and systems. There are also risks that traditional and social media can be exploited to promote disharmony and conflict between social, ethnic or political groups.

The importance of ensuring that the Information Society benefits women equally with men was another priority identified in WSIS outcome documents. The *Geneva Declaration* asserted that 'development of ICTs provides enormous opportunities for women, who should be an integral part of, and key actors in, the Information Society.' It committed stakeholders 'to ensuring that the Information Society enables women's empowerment and their full participation on the basis of equality in all spheres of society and in all decision-making processes.'[88] The *Tunis Agenda* called for the development of gender-disaggregated data on ICTs and their impact on society,[89] though no gender-specific targets or Action Lines were established at the Summit. Research has, however, identified a significant digital divide between women and men in the adoption and use of ICTs, reflecting comparable divides in educational attainment, income and other socio-economic experiences of women and men in many countries. Evidence quantifying this is summarized in Chapter 3.

The outcome documents from the WSIS+10 High Level Event reaffirmed the importance of 'promoting and maintaining gender equality and women empowerment, guaranteeing the inclusion of women in the emerging global ICT society,' including 'WSIS related strategies.' Gender issues, it was agreed at the WSIS+10 High Level Event, should be mainstreamed in WSIS Action Lines so that they 'take account of continuing gender issues, redress discrimination and contribute to ending violence and harassment.'[90] The UN Entity for Gender Equality and the Empowerment of Women (UNWOMEN) has emphasized the need to link ICT policy, capacity and programming issues with the 2015 review of implementation of the Beijing Declaration and Platform of Action on the status of women.[91]

Significant attention has also been paid to the impact of ICTs on young people, and to their experience in leveraging the potential of ICT4D. The term 'digital natives' is used to describe those who have grown up making regular use of ICTs. The ITU estimates that some 30 per cent of those aged 15-24 worldwide have more than five years of online experience, equivalent to 5 per cent of total world population. Seventy-nine per cent of young people in Europe were assessed by the ITU as digital natives, compared with less than 10 per cent in Africa – though it believes the latter figure will increase rapidly as ICTs become more extensively available.[92] Many development agencies have stressed the importance of including young people in the development of policies

towards the Information Society and ICT4D, in order to capitalize on their experience and ensure that future generations will have the skills required to take advantage of ICT-enabled opportunities.

C. THE INFORMATION SOCIETY AND HUMAN RIGHTS

The vision of a people-centred, inclusive and development-oriented Information Society in the *Geneva Declaration* was 'premised on the purposes and principles' of the United Nations Charter and on 'respecting fully and upholding the Universal Declaration of Human Rights' (UDHR). The *Geneva Declaration* reaffirmed 'the universality, indivisibility, interdependence and interrelation of all human rights and fundamental freedoms, including the right to development,' and asserted that 'democracy, sustainable development, and respect for human rights and fundamental freedoms as well as good governance at all levels are interdependent and mutually reinforcing.' The *Declaration* reaffirmed Article 19 of the UDHR – 'that everyone has the right to freedom of opinion and expression' and that 'this right includes freedom to hold opinions without interference and to seek, receive and impart information and ideas through any media and regardless of frontiers' – as 'an essential foundation of the Information Society.'[93] It also reaffirmed commitment to the principle in Article 29 of the UDHR, 'that everyone has duties to the community in which alone the free and full development of their personality is possible, and that, in the exercise of their rights and freedoms, everyone shall be subject only to such limitations as are determined by law solely for the purpose of securing due recognition and respect for the rights and freedoms of others and of meeting the just requirements of morality, public order and the general welfare in a democratic society.'[94] These principles were reiterated in the *Tunis Commitment*.[95]

The *WSIS+10 Statement*, which was agreed at the above mentioned WSIS+10 High Level Event, reaffirmed the rights and freedoms enshrined in the UDHR and the International Covenants on Civil and Political Rights (ICCPR) and on Economic, Social and Cultural Rights (ICESCR). It also recognized 'their importance to realize economic and social development,' and asserted the importance of 'ensuring equal respect for and enforcement of all human rights online and offline.'[96]

There have been extensive discussions in many fora of the rights implications of developments in the Information Society since 2005. These have reflected the widespread perception that, 'while the rapid expansion of the internet has created new spaces in which human rights could be exercised, it has also created new means by which human rights could be violated,'[97] and focused on what one contributor to the open consultation for the CSTD ten-year review of WSIS described as the need to 'build a common understanding on the applicability of the existing international rights norms to activities in cyberspace.'[98] In 2012, the United Nations Human Rights Council (HRC) described 'the exercise of human rights, in particular the right to freedom of expression, on the Internet' as 'an issue of increasing interest and importance as the rapid pace of technological development enables individuals all over the world to use new information and communications technologies.'[99]

The Information Society and the Internet are considered in these discussions to have had significant impact on the exercise of a number of specific rights within the international rights regime. In particular, they have:

- enabled people to access a much wider range of information than was previously available to them, and to source that information worldwide rather than from their immediate neighbourhood (article 19 of the ICCPR);
- facilitated the exercise of freedom of expression, by making it easier and cheaper for people to publish their own content, especially on social media and other user-generated platforms (article 19 of the ICCPR);
- enabled new ways of exercising freedom of assembly and association online and of co-ordinating assembly and association offline (article 21 of the ICCPR);
- raised new challenges concerning privacy, including data protection (article 17 of the ICCPR); and

- enhanced capabilities to exercise a number of economic, social and cultural rights, including rights to education, to culture and to participate in government (included in the ICESCR).

ICTs are also considered to have had significant implications for women's and children's rights, as set out in the Convention on the Eradication of Discrimination against Women (CEDAW) and the Convention on the Rights of the Child (CRC), for rights concerned with personal security (UDHR article 3), for the exercise of fair trial (UDHR articles 10 and 11), and for the rights of authors (UDHR article 27).

In addition to facilitating the exercise of some rights, ICTs and the Internet are considered to have altered the relationships between some rights within the international rights regime, and posed new problems of enforcement. The changing relationship between rights of privacy and expression, for example, has been analysed in detail by UNESCO.[100] Internet modalities have made it more difficult for governments and others to enforce national laws in areas including taxation, intellectual property protection, consumer rights and some aspects of criminal law, and to enforce international rights obligations in areas such as the prevention of incitement to racial hatred and the prohibition of child sex abuse images.[101] International human rights organizations have expressed concern about restrictions being placed on access to some forms of content, for cultural, moral, commercial or political reasons. There has been increasing debate in international fora about issues of security, privacy and surveillance.

A number of international agencies have considered the relationship between access to ICTs, the Internet and the international rights regime since WSIS. Some, including ECLAC, have urged that access to communications should be treated as a public good whose availability should be guaranteed for all citizens on equal terms,[102] and some governments have introduced a civil right to Internet or broadband access within their national territories. The multi-stakeholder Internet Rights and Principles Coalition, within the IGF, has argued that the Internet is becoming indispensable for the full enjoyment of human rights, and that a right of access to it derives from its 'integral relationship' with other rights.[103] Others have taken the view that, while access to information and knowledge should be considered a human right within the terms of the international rights regime, access to particular technologies (whose appropriateness will change over time) should not be so regarded but should be addressed through universal access/service regulation.[104] The UN Special Rapporteur on Freedom of Expression took the view in 2011 that access to the Internet 'is not yet a human right as such,' but that 'States should adopt effective and concrete policies and strategies … to make [it] widely available, accessible and affordable to all.'[105] The HRC subsequently recognized 'the global and open nature of the Internet as a driving force in accelerating progress towards development' and called on all States 'to promote and facilitate access to the Internet.'[106]

In 2012 the HRC affirmed 'that the same rights that people have offline must also be protected online, in particular freedom of expression, which is applicable regardless of frontiers and through any media of one's choice,' in accordance with Articles 19 of the UDHR and ICCPR.[107] This principle of equivalence was recognized in the United Nations General Assembly's resolution concerning *Information and Communication Technologies for Development* in 2013, and was applied to 'media on all platforms,' in the *WSIS+10 Vision for WSIS Beyond 2015,* which was agreed at the WSIS+10 High Level Event in 2014.[108] It was also included in the General Assembly's 2013 and 2014 resolutions on *The Right to Privacy in the Digital Age*.[109] The equivalence of rights online and offline implies that those limitations on rights which are included in the international human rights regime also have equivalence online and offline. The HRC has established principles specifying that these limitations should be applied by governments only where they meet tests of necessity and proportionality, through legal procedures with independent safeguards.[110]

Rights to expression and information have featured prominently in debates at international fora since WSIS, including the IGF, and have been addressed by UNESCO and other international agencies. Concerns have been expressed by diverse stakeholders about limitations to

expression and access to content introduced by some governments through restrictions on online service providers and social media platforms, including the filtering and blocking of online content, and about monitoring and surveillance of online activity including citizen journalism. Concerns have also been expressed about the exploitation of ICT platforms for criminal purposes, including fraud and money laundering, the distribution of child sex abuse images, the dissemination of hate speech, the promotion of terrorism and incitement to violence, cyberbullying and sexual harassment.

Issues concerning privacy, surveillance and data protection have featured prominently in recent discussions of rights online. Concerns have been expressed both about the increasing use of personal data by commercial enterprises to maximize business revenues, and about mass surveillance of personal data and communications by government agencies. These were held by some contributors to the consultation for CSTD's review to have undermined security and confidence in ICTs and the Internet among the public at large. There has been growing anxiety about the risk that 'big data' and big data analysis (see Chapter 4) will be used, by businesses and/or governments, in ways that undermine individual privacy as well as ways which offer benefits to citizens. Rights and civil society groups have expressed concern about the implementation of sophisticated identity management schemes which can benefit citizens through better targeting of public services but which also allow much more detailed profiles to be built up of their behaviour and preferences. Some governments fear that the security of sovereign data that are held in data centres outside their territorial jurisdiction, or transmitted over international communications networks, could be compromised. A variety of data protection regimes has been enacted in different countries to address these problems.

Issues concerning privacy and surveillance have been discussed in Internet fora, including the IGF. The summary of its 2013 meeting recorded that:

> *In the context of … recent revelations about government-led Internet surveillance activities, IGF 2013 was marked by discussions about the need to ensure better protection of all citizens in the online environment and to reach a proper balance between actions driven by national security concerns and the respect for internationally recognized human rights, such as the right to privacy and freedom of expression. .... It was underlined … that any Internet surveillance practices motivated by security concerns should only happen within a truly democratic framework, ensuring their adequacy, proportionality, due process and judicial oversight. The value of finding common ground amongst all stakeholders of certain cyber-ethics that place value on respecting local cultures online was also emphasized ….*[111]

In 2013, the United Nations General Assembly adopted a resolution on *The right to privacy in the digital age*, which recognized that 'the rapid pace of technological development … enhances the capacity of governments, companies and individuals to undertake surveillance, interception and data collection, which may violate or abuse human rights, in particular the right to privacy….' As noted above, this resolution reaffirmed 'that the same rights that people have offline must also be protected online, including the right to privacy.' It called on governments to 'review their procedures, practices and legislation regarding the surveillance of communications, their interception and the collection of personal data, including mass surveillance, … with a view to upholding the right to privacy,' and to establish and maintain transparent and accountable oversight mechanisms.[112] A report on *The Right to Privacy in the Digital Age* was subsequently prepared by the UN High Commissioner for Human Rights. It analysed the implications for the right to privacy arising from ICTs, including big data, security and surveillance, and suggested that there is, in many countries, 'a lack of adequate national legislation and/or enforcement, weak procedural safeguards, and ineffective oversight' regarding the right to privacy in the digital age.[113]

D. THE WSIS VISION IN THE WSIS+10 PROCESSES

The development of the WSIS vision was a major theme of two WSIS+10 processes which were undertaken by the international community in 2013 and 2014. The first of these, the conference *Towards Knowledge Societies for Peace and Sustainable Development*, is described in Box 1.

Box 1: The conference Towards Knowledge Societies for Peace and Sustainable Development

Progress towards achieving the WSIS vision was discussed at the first WSIS+10 event, a multi-stakeholder conference *Towards Knowledge Societies for Peace and Sustainable Development* which was organized by UNESCO in partnership with other UN agencies in February 2013 and held at UNESCO headquarters in Paris. This provided an opportunity for all those concerned with WSIS outcomes to explore the changing nature of the Information Society, implementation to date and priorities for the future.[114]

The conference stressed the commitment in the *Geneva Declaration of Principles* to 'build a new Information Society based on shared knowledge,'[115] and sought to explore the extent to which the world community has moved from information to knowledge societies. UNESCO summarized its focus as follows:

Knowledge Societies cannot be constructed on ICTs or on information alone. They are achievements of human development, built upon a conjunction of human values, technology and innovation, in which fundamental roles are played by freedom of expression, quality education for all, linguistic and cultural diversity, and universal access to information, health, enterprise and community participation. These are central pillars of societies that meet the three goals of sustainable development – economic prosperity, inclusive social welfare and environmental protection.[116]

The Final Statement of the conference, *Information and Knowledge for All: an expanded vision and a renewed commitment*,[117] was negotiated on a multi-stakeholder basis by participants in the event. It declared that 'The decade since WSIS has seen very considerable progress towards the people-centred, inclusive and development-oriented Information Society,' but that 'major challenges [still] lay ahead for counteracting the wide disparities in development and enabling entire groups and countries to benefit from universal access to information and knowledge.' It affirmed the continued support of participants for the development of ICTs and their contribution to peace and sustainable development, and stressed that 'Multi-stakeholder processes have become an essential and unique approach to engagement in addressing issues affecting the knowledge and information societies.' It called attention to the importance of incorporating indigenous and traditional knowledge, education, scientific knowledge, respect for cultural diversity and freedom of expression in emerging knowledge societies.

The *Statement* encouraged stakeholders to work to improve the inclusiveness of Information and Knowledge Societies, enabling all countries and people of all kinds to benefit from their development. In this context, it emphasized the importance of pursuing 'the goal of universal access to, and preservation of, information;' the need to advance 'women's innovative and meaningful use of ICTs for their empowerment and development;' the need to focus on 'disadvantaged and marginalized groups, including indigenous peoples and people with disabilities;' and the value of a holistic approach to information and knowledge societies, including an enabling environment for local ICT sectors to grow and attract investment.[118]

This *Statement* was endorsed by UNESCO Member-States at the organization's General Conference in November 2013.

The second major WSIS+10 process culminated in the WSIS+10 High Level Event, which was held in June 2014. It is described, along with its Multi-stakeholder Preparatory Process in Box 2.

Box 2: The WSIS+10 High Level Event

The WSIS+10 High Level Event was held at the headquarters of the ITU in Geneva in June 2014. Coordinated by the ITU with UNCTAD, UNDP and UNESCO, and supported by contributions from many other UN agencies, it brought together delegates from all stakeholder communities in an international forum that agreed two WSIS+10 outcome documents, the *WSIS+10 Statement on Implementation of WSIS Outcomes* and the *WSIS+10 Vision for WSIS Beyond 2015*.

The WSIS+10 High Level Event was preceded by an open consultation process, including both written submissions and meetings of a Multi-stakeholder Preparatory Platform during which the texts of outcome documents were negotiated. These outcome documents focus in particular on the WSIS Action Lines.

The WSIS+10 Statement summarized the development and interaction of Information and Knowledge Societies, declaring that:

The evolution of the information society over the past 10 years is contributing towards, inter alia, the development of knowledge societies around the world that are based on principles of freedom of expression, quality education for all, universal and non-discriminatory access to information and knowledge, and respect for cultural and linguistic diversity and cultural heritage.

It noted, 'The uses of ICTs have developed considerably and become a part of everyday life …, accelerating social and economic growth, sustainable development, increasing transparency and accountability, where applicable, … offering new opportunities to leverage technology, in developed and developing countries,' and 'demonstrat[ing] their value as a facilitator and development enabler in reaching the Millennium Development Goals.'

Box 2: The WSIS+10 High Level Event *(cont.)*

In the *WSIS+10 Vision*, signatories recommitted themselves to 'seek common responses to the challenges and to the implementation of the Geneva Plan of Action, which will realize the vision of a people-centred, inclusive and development-oriented Information Society based on the Key Principles incorporated in the Geneva Declaration.' The *Vision* document reaffirmed 'that the Geneva Plan of Action is an evolving platform to promote the Information Society at the national, regional and international levels,'[119] and identified 36 'priority areas to be addressed in the implementation of Geneva Plan of Action Beyond 2015.'[120]

The outcome documents of the WSIS+10 High Level Event were endorsed at the ITU Plenipotentiary Conference in November 2014.[121]

The conclusions of the *WSIS+10 Vision* concerning particular Action Lines are summarized in Chapter 5.

E. THE INFORMATION SOCIETY AND THE POST-2015 DEVELOPMENT AGENDA

In 2015, alongside its review of WSIS outcomes, the United Nations General Assembly will review the outcomes of the MDGs. A United Nations summit to adopt the post-2015 development agenda will be held in New York in September 2015[122]. Many contributors to the open consultation for the CSTD ten-year review of WSIS, and to other WSIS+10 activities, have emphasized the importance of integrating ICTs into the post-2015 development agenda and have expressed concern about the extent to which integration has so far been achieved.

The third UN Conference on Sustainable Development,[123] held in 2012, was an important stage in the development of international dialogue towards the post-2015 development agenda. It reviewed progress towards achieving the three pillars of sustainable development – economic prosperity, social equity and environmental sustainability – which had been established at the first Earth Summit in 1992. In its submission to the Summit, UNGIS suggested that the WSIS outcomes:

> *provide an overall strategic framework for the deployment and use of … ICTs as an enabler for sustainable development, by enhancing access of vulnerable populations to education, health care, information, finance and knowledge, protecting the environment, mitigating natural disaster risk, ensuring sustainable use of natural resources and sustainable food production, which falls in line with internationally-agreed development goals in general and with environmental protection and the sustainable use of natural resources in particular….*[124]

In 2013, UNGIS agencies also issued a *Joint Statement on the post-2015 development agenda*.[125] This noted that 'Rapid innovation, diffusion and uptake of mobile technologies and improved access to the Internet have greatly expanded the gamut of opportunities that ICTs offer to promote inclusive development' since 2000, adding that:

> *International cooperation and multi-stakeholder collaboration on the strategic use of ICTs to address a wide range of issues … has produced a wealth of knowledge, experience and expertise – valuable resources that should be fully harnessed by the UN system as it defines a new development agenda for the coming decades.*

The UNGIS *Statement* called for 'the potential of ICTs as key enablers of development, … as critical components of innovative development solutions' and as 'cross-cutting enablers for the achievement of all three pillars of sustainable development' to be fully recognized in the post-2015 development agenda. It suggested the establishment of interaction between the post-2015 development agenda and WSIS+10 Review processes 'to ensure that efforts across the UN System are coherent, connected and coordinated to achieve maximum, sustainable impact.'

This view was reflected in the *WSIS+10 Statement* agreed at the 2014 WSIS+10 High Level Event, which concluded that:

> *ICTs have the potential to be a key enabler of development, and to be a critical component of innovative development solutions in the Post-2015 Development Agenda. ICTs should be fully recognized as tools empowering people, and providing economic growth towards achieving development, taking into account*

> *the growing importance of relevant content, skills and an enabling environment.*[126]

A number of contributors to the open consultation for the CSTD ten-year review of WSIS expressed concern that, in spite of these inputs, insufficient attention has been paid to WSIS outcomes and the Information Society in discussions concerning the SDGs and the post-2015 development agenda. The outcome document of the Rio+20 Summit, *The Future We Want*, for example, included only five brief references to ICTs, concerned with their potential for empowerment, agricultural production and education, and with the potential role of sensors as tools in contributing to sustainable development, but made no comprehensive assessment of the impact of ICTs on sustainable development since the first Rio summit in 1992 or of their overall potential impact in the future.[127]

The preparation of draft SDGs has been undertaken, *inter alia*, through an Open Working Group of the United Nations. The Open Working Group's *Proposal for Sustainable Development Goals*,[128] which was submitted to the President of the United Nations General Assembly and the United Nations Secretary-General in August 2014, includes 17 proposed SDGs, with a total of 169 draft targets. Goal 9 is concerned with infrastructure, industrialization and innovation, and includes the target to 'Significantly increase access to information and communications technology and strive to provide universal and affordable access to the Internet in least developed countries by 2020' (9.c). The proposed SDGs include other explicit references to ICTs, as follows:

- *By 2020, expand by [x] per cent globally the number of scholarships available to developing countries, in particular least developed countries, Small Island Developing States and African countries, for enrolment in higher education, including vocational training and information and communications technology, technical, engineering and scientific programmes, in developed countries and other developing countries.* (4.b)
- *Enhance the use of enabling technology, in particular information and communications technology, to promote the empowerment of women.* (5.b)
- *Fully operationalize the technology bank and science, technology and innovation capacity-building mechanism for least developed countries by 2017 and enhance the use of enabling technology, in particular information and communications technology*. (17.8)

The UN System Task Team set up to undertake preparatory work for the post-2015 development agenda has presented two reports on its scope and priorities.[129] While access to technology and knowledge are identified as development enablers in these reports, neither contains substantive discussion of ICTs or WSIS outcomes.[130]

A report, *A New Global Partnership*, was prepared by the United Nations Secretary-General's High Level Panel of Eminent Persons on the post-2015 development agenda in 2013,[131] as part of the preparatory work for that Agenda. This emphasized the potential of big data for development:

> *The revolution in information technology over the last decade provides an opportunity to strengthen data and statistics for accountability and decision-making purposes. There have been innovative initiatives to use mobile technology and other advances to enable real-time monitoring of development results. But this movement remains largely disconnected from the traditional statistics community at both global and national levels. The post-2015 process needs to bring them together and start now to improve development data.*[132]

It also called for efforts to 'take advantage of new technology, crowd sourcing and improved connectivity to empower people with information on the progress towards the targets.' However, it also made no comprehensive assessment of the role of ICTs in development, and did not integrate WSIS outcomes into its analysis.

In his synthesis report to the United Nations General Assembly on the post-2015 development agenda, published in December 2014, the United Nations Secretary-General pointed to the need for further investment, cooperation and capacity-building concerned with ICT infrastructure and data gathering and analysis.[133]

A number of contributions to the open consultation for the CSTD ten-year review of WSIS, from all stakeholder groups, emphasized the importance which they attach to the role of ICTs within the

post-2015 development agenda, and expressed concern at the limited degree to which WSIS outcomes and the development potential of ICTs have been reflected in the SDGs and post-2015 development agenda preparatory documents. The UN University concluded that the findings in the *Final WSIS Targets Review* highlight that:

> *… the current debates and processes that are feeding into the development of the Post-2015 development agenda do not seem to sufficiently recognize the potential and the importance of ICTs. While the final review of the WSIS outcomes highlights the importance of linking any future ICT monitoring framework to the Post-2015 development agenda, none of the key input documents for the Post-2015 development agenda focus on ICTs. A number of documents have made reference to ICTs, but there is limited substantive content and no clear or sufficiently strong message on the role of ICTs for achieving future development goals.*[134]

This concern arises not just from the growing impact that ICTs have had on economic and social development over the past decade, but from awareness that their impact will continue to grow as ICT adoption becomes more widespread and technologies become more complex and sophisticated during the period between 2015 and 2030 in which the post-2015 development agenda will be implemented. A report by the United Nations Secretary-General, prepared for the CSTD in 2014, concluded that 'More dialogue is needed between ICT/ICT4D and other development domains to deepen and strengthen understanding of the contribution that ICTs can make to sustainable development and the potentialities for inclusive social and economic development of emerging knowledge societies.'[135]

F. SUMMARY

The WSIS outcome documents articulated a vision of a people-centred, inclusive and development-oriented Information Society. The impact of ICTs on social and economic development has grown enormously since 2005, as their presence has become more pervasive in all countries and as advances in technology have enabled the introduction of more sophisticated services and applications. Experience has also enabled greater understanding of the potential and limitations of ICT4D in different contexts, particularly the interaction between technological and human development. Critical developments since WSIS have included the emergence of mass markets for mobile telephony, which have greatly extended the geographic and social reach of basic communications, and the deployment of broadband networks, which offer the potential for governments and businesses to make available much more complex development applications. Nevertheless, there remain powerful digital divides between and within countries, which affect the extent to which different countries and different people benefit from the emerging Information Society.

The evidence presented in this report shows that there has been significant progress towards achievement of the vision for a people-centred, inclusive and development-oriented Information Society that was agreed at WSIS. Many more people are now accessing ICTs, making their use more inclusive, and they are being used much more extensively in ways that contribute to development. Innovations like social networking have also made the experience of using ICTs more 'people-centred'.

There was widespread agreement in contributions to the consultation for this ten-year review and for the WSIS+10 High Level Event, that the vision set out in the *Geneva Declaration* remains valid and should be taken forward beyond 2015, both in the WSIS context and in that of the post-2015 development agenda. However, contributors to the consultation emphasized that much still needs to be done to ensure that the emerging Information Society is fully inclusive (see Chapter 3) and that its contribution to development is maximized. The application of that vision also needs to evolve in the light of continual change in the nature of ICT technologies and services (see Chapter 4).

The rapid growth of technology and services has also raised new challenges concerned with rights, including access to information and communications, expression and privacy. The United Nations General Assembly and other United Nations entities have adopted the principle that rights should be equivalent online and offline.

The importance of ICTs in economic and social development will continue to grow as ICT adoption becomes more widespread and diverse, and as technology enables ever more sophisticated services and applications, including cloud computing and big data analysis. To date, however, there has been little integration between WSIS outcomes and discussions concerned with the Sustainable Development Goals and the post-2015 development agenda that are expected to be adopted by the United Nations General Assembly in 2015. Some WSIS stakeholders have expressed concern that opportunities for ICT4D to contribute to social and economic development will be missed as a result.

NOTES

38 *Geneva Declaration*, para. 1.

39 Ibid., p. 9-10, paras. 2-6.

40 *Tunis Commitment*, paras. 2-5.

41 For a summary of its report, see https://www.itu.int/wsis/docs/background/general/reports/26092001_dotforce.htm (accessed 13 November 2014). See also J A Hart, 2004, 'The Digital Opportunities Task Force: The G8's Effort to Bridge the Global Digital Divide', Department of Political Science Indiana University.

42 The work of the Task Force is documented at http://www.unicttf.org/ (accessed 13 November 2014).

43 R Mansell and U Wehn, 1998, *Knowledge societies: information technology for sustainable development* (Oxford, Oxford University Press).

44 United Nations General Assembly, 2002, *World Summit on the Information Society* (Resolution A/RES/56/183).

45 UNESCO, 2014a, *Building inclusive Knowledge Societies: A review of UNESCO's action in implementing the WSIS outcomes* (Paris, UNESCO publication).

46 UNESCO, 2005, *Towards Knowledge Societies* (Paris, UNESCO publication).

47 The term is particularly associated with the sociologist Manuel Castells: see *e.g.* M Castells, 2011, *The rise of the network society: The information age: Economy, society, and culture (Vol. 1)* (West Sussex, John Wiley & Sons Ltd.).

48 CSTD, 2011, p. 5.

49 These issues are assessed in a report for the International Institute for Sustainable Development: D Souter and D MacLean, 2012, *Changing our Understanding of Sustainability: The impact of ICTs and the Internet* (Manitoba, IISD publication).

50 Contribution by the Association for Progressive Communications (APC) to the open consultation for the CSTD review, available at http://www.unctad.org/Sections/un_cstd/docs/cstd_wsis10_apc_en.pdf (accessed 18 November 2014).

51 Contribution by the Center for Democracy and Technology (CDT) to the open consultation for the CSTD review, available at http://www.unctad.org/Sections/un_cstd/docs/cstd_wsis10_center_for_democracy_technology_en.pdf (accessed 18 November 2014).

52 Contribution by DESA to the open consultation for the CSTD review, available at http://www.unctad.org/Sections/un_cstd/docs/cstd_wsis10_undesa_en.pdf (accessed 18 November 2014).

53 United Nations General Assembly, 2013, *Information and communications technologies for development* (Resolution A/RES/68/198).

54 The Commission is generally known, after its chairman, as the Maitland Commission. Its report, *The Missing Link*, can be found at http://www.itu.int/en/history/Pages/MaitlandReport.aspx (accessed 13 November 2014).

55 The Task Force completed its work in 2005, around the time of the Tunis session of WSIS, and was succeeded by the Global Alliance for ICT and Development (GAID). See http://www.unicttf.org/about/ (accessed 13 November 2014).

56 *Geneva Declaration*, paras. 2, 8-9.

57 Ibid., para. 51.

58 Ibid., pp. 87-89, para. 90.

59 Ibid., p. 89, para. 91.

60 See in particular *Geneva Declaration* paras. 17 and 46; *Tunis Agenda,* paras. 20 and 94.

61 The Declaration can be found at http://www.un.org/millennium/declaration/ares552e.htm (accessed 13 November 2014).

62 See UN website, available at http://www.un.org/millenniumgoals/ (accessed 13 November 2014).

63 Goal 8, http://www.un.org/millenniumgoals/global.shtml (accessed 13 November 2014).

64 See DESA, *Millennium Development Goals Report 2014*, http://www.un.org/en/development/desa/publications/mdg-report-2014.html (accessed 13 November 2014). Also see, http://www.itu.int/en/ITU-D/Statistics/Pages/intlcoop/mdg/default.aspx (accessed 13 November 2014).

65 *Tunis Agenda*, para. 10.

66 The Commission's assessment of ICTs' potential contribution to individual MDGs can be found in the Broadband Commission for Digital Development, *A 2010 Leadership Imperative: The Future Built on Broadband*, Chapter 4, pp 39-46, available at http://www.itu.int/dms_pub/itu-s/opb/pol/S-POL-BROADBAND.01-2010-PDF-E.pdf (accessed 13 November 2014).

67 *Geneva Declaration*, para. 41.

68 See UNCTAD, 2012, *Information Economy Report 2012: The Software Industry and Developing Countries* (New York and Geneva, Sales No. E.12.IID.14, United Nations publication).

69 The productivity paradox is sometimes known as the Solow paradox. See, for example, OECD, 2003, *ICT and Economic Growth: Evidence from OECD countries, industries and firms* (Paris, OECD Publications Service).

70 These issues are discussed in UNCTAD, *Information Economy Report, 2015: Unlocking the Potential of E-Commerce for Developing Countries*.

71 Y Kim, T Kelly and S Raja, 'Building Broadband: strategies and policies for the developing world,' 2010, at http://siteresources.worldbank.org/EXTINFORMATIONANDCOMMUNICATIONANDTECHNOLOGIES/Resources/282822-1208273252769/Building_broadband.pdf. A study by Deloitte has suggested that a 10 per cent increase in 3G connectivity is associated with a 0.15 per cent increase in GDP per capita growth, and that a doubling of mobile data use is associated with an increase of 0.5 per cent in this growth rate (C Williams, D Strusani, D Vincent, and D Kovo, 2013, Global Information Technology Report 2013, Geneva, World Economic Forum, p 77-80).

72 For example, C Kenny, 2011, Overselling Broadband: a Critique of the Recommendations of the Broadband Commission for Digital Development, *Center for Global Development*, December.

73 *Geneva Declaration*, para. 9.

74 J Hamel, 2010, ICT4D and the Human Development and Capability Approach: the Potentials of Information and Communication Technology, *United Nations Development Programme Human Development Reports*. Research Paper 2010/37, p. 59.

75 *Tunis Agenda*, para. 90.

76 In 2011, for example, UNESCO found ICT deployments in more than 600 of its development programmes and projects which would not normally have been defined as ICT or ICT4D activities. UNESCO, 2012b, Submissions from entities in the United Nations system and elsewhere on their efforts in 2011 to implement the outcome of the WSIS, *UNESCO annual report on implementation of WSIS outcomes*.

77 ESCWA, 2013a, *Impact of Selected E-Services on Socioeconomic Development in the Arab Region* (New York, United Nations publications).

78 UNCTAD, 2014c, WSIS+10 Overall Review of the Implementation of the WSIS Outcomes, *Draft Version 0.0*. Contribution to the WSIS+10 review concerning facilitation of the C7 e-business Action Line.

79 R Heeks, 2009, 'The ICT4D 2.0 Manifesto: Where Next for ICTs and International Development?', Paper No. 42, University of Manchester Institute for Development Policy and Management.

80 Mobile money services are discussed further in Box 5 in Chapter 4 of this report.

81 The Broadband Commission has offered a transformation model of ICTs and development, arguing that 'the social and economic development of every country on earth will depend [in future] on accessible and affordable access to broadband networks,' which it sees as a further step change in the capabilities of ICT4D. The Commission seeks to prioritize investment in broadband networks as the critical factor in enabling future developmental gains, but has also recognized that this needs to be accompanied by other changes in the overall information ecosystem, including content and human capacity development if it is to be successful. See its publications at http://www.broadbandcommission.org/Pages/default.aspx (accessed 13 November 2014).

82 Y Kim, T Kelly and S Raja, 2010, *Building broadband: Strategies and policies for the developing world* (Washington, The World Bank Publications).

83 UNGIS, 2013, *UNGIS Contribution on the Post-2015 Development Agenda*

84 *Tunis Commitment*, paras. 15, 36.

85 T Kelly and D Souter, 2013, *The Role of Information and Communication Technologies in Post-Conflict Reconstruction* (Washington, The World Bank). Restored communications networks also facilitate coordination between government departments and development partners. Although there are high levels of financial risk associated with infrastructure investment in post-conflict countries, mobile operators have proved willing to invest in them more quickly than other infrastructure providers.

86 *Tunis Commitment*, para. 36. See, *e.g.*, the work of the ICT for Peace Foundation, http://ict4peace.org/, and the use in conflict zones of software developed by Ushahidi, originally for use in monitoring election violence in Kenya: http://www.ushahidi.com/.

87 Ibid.

88 *Geneva Declaration*, paras. 2, 12.

89 *Tunis Agenda*, para. 114.

90 ITU, 2014f, *WSIS+10 Vision for WSIS Beyond 2015*, p. 29-33, section B.

91 Contribution by UN WOMEN to the open consultation for the CSTD review, available at http://www.unctad.org/Sections/un_cstd/docs/cstd_wsis10_unwomen_en.pdf (accessed 13 November 2014).

92 ITU, 2013a, *Measuring the Information Society* (Geneva, United Nations publication) p. 127-156.

93 *Geneva Declaration*, para. 4.

94 Ibid., p. 10, para. 5.

95 *Tunis Commitment*, para. 2-4.

96 ITU, 2014f, *WSIS+10 Statement on the Implementation of WSIS Outcomes*, p. 16-19, part. C.

97 Contribution by the Government of Canada to the open consultation for the CSTD review, available at http://www.unctad.org/Sections/un_cstd/docs/cstd_wsis10_canada_en.pdf (accessed 13 November 2014).

98 Contribution by the Government of Latvia to the open consultation for the CSTD review, available at http://unctad.org/Sections/un_cstd/docs/cstd_wsis10_latvia_en.pdf (accessed 14 November 2014).

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102 ECLAC, 2008, San Salvador Commitment, San Salvador, 6-8 February 2008.

103 Internet Rights and Principles Charter, available at http://internetrightsandprinciples.org/wpcharter/ (accessed 14 November 2014).

104 For, *e.g.*, V Cerf, 2012, Internet Access is not a Human Right, *New York Times*, 4 January.

105 United Nations General Assembly, 2011, *Promotion and protection of the right to freedom of opinion and expression* (A/66/290), http://www.ohchr.org/documents/issues/opinion/a.66.290.pdf, paras. 61-63.

106 United Nations General Assembly, 2014c, *The promotion, protection and enjoyment of human rights on the Internet* (Resolution A/HRC/26/L.13).

107 United Nations General Assembly, 2012b, *The promotion, protection and enjoyment of human rights on the Internet* (Resolution A/HRC/20/L.13).

108 United Nations General Assembly, 2014a, *Information and communications technologies for development* (Resolution A/RES/68/198); ITU, 2014f, p. 16-19, p. 29-33.

109 [109]United Nations General Assembly, 2013X, *The right to privacy in the digital age* (Resolution A/RES/68/127), 2014X, same title (Resolution A/RES/69/166).

110 These principles are summarized in the Human Rights Committee General Comment No. 34. ICCPR, 2011, *Article 19: Freedoms of opinion and expression* (CCPR/C/GC/34).

111 IGF, 2013, Chair's Summary, *8th Meeting of the Internet Governance Forum*, 22-25 October, p. 1.

112 United Nations General Assembly, 2013d, *The right to privacy in the digital age* (Resolution A/RES/68/167).

113 United Nations Office of the High Commissioner for Human Rights, *The right to privacy in the digital age* (A/HRC/27/37).

114 The conference was attended by some 1,450 participants from 130 countries, including representatives of governments, the private sector, civil society and international organizations, together with 800 remote participants. These took part in more than 80 workshop and other sessions as well as plenary discussions that focused on issues including freedom of expression, the Internet and new media, education and learning, access to information and knowledge, and linguistic and cultural diversity.

115 *Geneva Declararation*, para. 67.

116 UNESCO, 2013, *Towards Knowledge Societies for Peace and Sustainable Development: First WSIS+10 Review Event: Outcomes*, p. 10.

117 The Final Statement can be found at http://www.unesco.org/new/fileadmin/MULTIMEDIA/HQ/CI/CI/pdf/wsis/WSIS_10_Event/wsis10_final_statement_en.pdf.

118 UNESCO 2013, *Records of the General Conference. Volume 1. Resolutions*, p. 49.

119 ITU, 2014f, *WSIS+10 Vision*, p. 34-35, section C.1.

120 Ibid., p. 29-33, section B.

121 ITU, *Final Acts of the Plenipotentiary Conference (Busan, 2014)*, http://www.itu.int/en/plenipotentiary/2014/Documents/final-acts/pp14-final-acts-en.pdf, Resolution 140.

122 The modalities for this summit can be found in United Nations General Assembly resolution A/RES/69/244.

123 Also known as the Earth Summit and as Rio+20

124 UNGIS, 2011, p. 2.

125 UNGIS, 2013, Joint Statement, *UNGIS on the Post-2015 Development Agenda*, May, Geneva.

126 *WSIS+10 Statement*, p. 12.

127 *The Future We Want* is available at http://www.uncsd2012.org/content/documents/727The%20Future%20We%20Want%2019%20June%201230pm.pdf (accessed 13 November 2014).

128 *Open Working Group proposal for Sustainable Development Goals,* available at: https://sustainabledevelopment.un.org/content/documents/1579SDGs%20Proposal.pdf.

129 The second report, *Realizing the Future We Want for All*, 2012, can be found at http://www.un.org/en/development/desa/policy/untaskteam_undf/report.shtml (accessed 13 November 2014).

130 These are listed at http://www.un.org/en/development/desa/policy/untaskteam_undf/ (accessed 14 November 2014).

131 United Nations, 2013, *A New Global Partnership: Eradicate Poverty And Transform Economies Through Sustainable Development* (New York, United Nations Publication).

132 Ibid., p. 23.

133 UN Secretary-General (2014b) p 26.

134 Partnership on Measuring ICT for Development, *Final WSIS Targets Review*, p. 380.

135 ECOSOC, 2014, *Information and communication technologies for inclusive social and economic development* (Report of the Secretary-General E/CN.16/2014/3).

CHAPTER 3

IMPLEMENTING THE WSIS TARGETS

CHAPTER 3 – IMPLEMENTING THE WSIS TARGETS

The *Geneva Plan of Action* established ten WSIS Targets, most of which are concerned with connectivity and access. These were intended to serve as benchmarks, to help monitor progress and ensure that the emerging Information Society should be inclusive, irrespective of people's geographic, social or economic advantages/disadvantages. It was envisaged that supplementary targets would be established at national level, varying according to circumstances and integrated with national ICT and development strategies.[136]

There are substantial statistical challenges to measuring the Information Society, which are summarized in Box 3 (below). This chapter assesses the evidence from the report of the *Final WSIS Targets Review*, prepared by the Partnership on Measuring ICT for Development (see Box 3) alongside additional quantitative information from the ITU's World Telecommunication Indicators Database, its annual report *Measuring the Information Society* that includes its ICT Development Index, and other relevant sources. The chapter concludes by evaluating the experience and future implementation of the Targets and by summarizing overall developments concerning the digital divide since WSIS.

A. THE WSIS TARGETS

The *Geneva Plan of Action* identified ten 'indicative targets [which] may serve as global references for improving connectivity and access in the use of ICTs …, to be achieved by 2015.'[143] 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.' No indicators were identified for measuring these targets in the WSIS outcome documents, while some of their wording was ambiguous or unclear: it is difficult for example, to say exactly what was meant by 'connecting' communities, which 'ICTs' were meant to be included in particular targets, or what was intended by people having access to them 'within their reach.' Indicators for measuring the WSIS Targets were developed by the Partnership on Measuring ICT for Development in 2010[144] and used in the preparation of its *Final WSIS Targets Review*, which was published in 2014. The Targets were also adjusted by the Partnership in 2010/2011, to reflect developments since 2005.[145]

Box 3: The challenges of statistical measurement and the Partnership on Measuring ICT for Development

Three principal challenges affect statistical measurement of changes in the Information Society:

- Data concerning ICTs are of variable quality. National Statistical Offices (NSOs) in many countries are under-resourced and few collect extensive ICT data through household surveys.
- The pace of change in ICT technology and markets is too rapid for traditional data collection methods, failing to capture important changes in the nature of ICTs and ICT adoption.
- It is difficult to measure the impact of ICTs on the developmental outcomes addressed by WSIS.

A key role in addressing these statistical challenges has been played by the Partnership on Measuring ICT for Development. This was established in 2004, following the Geneva phase of the Summit, to coordinate the work of UN and other agencies concerned with measuring the Information Society. At the end of 2014 it included eleven United Nations agencies and three other partners.[137]

The Partnership drew up a core list of indicators to facilitate comparative assessment of Information Society development in 2005.[138] This list, which was last updated in 2014, now includes 58 indicators concerned with ICT infrastructure and access: the use of ICTs by households, individuals and businesses; the ICT sector; trade in ICT goods; and the use of ICTs in education; and e-government.[139] It is hoped that National Statistical Offices (NSOs) will include these in censuses, household surveys and other data-gathering in ways that facilitate comparisons between countries and over time. Manuals to support data gathering have been published by the ITU,[140] UNCTAD[141] and the UNESCO Institute for Statistics (UIS).[142]

Table 1: The WSIS Targets, 2003 and 2010

Number	Target set in Geneva Plan of Action	Target as amended in 2010/2011
1	To connect villages with ICTs and establish community access points	To connect all villages with ICTs and establish community access points
2	To connect universities, colleges, secondary schools and primary schools with ICTs	To connect all secondary schools and primary schools with ICTs
3	To connect scientific and research centres with ICTs	To connect all scientific and research centres with ICTs
4	To connect public libraries, cultural centres, museums, post offices and archives with ICTs	To connect all public libraries, cultural centres, museums, post offices and archives with ICTs
5	To connect health centres and hospitals with ICTs	To connect all health centres and hospitals with ICTs
6	To connect all local and central government departments and establish websites and email addresses	To connect all central government departments and establish websites
7	To adapt all primary and secondary school curricula to meet the challenges of the Information Society, taking into account national circumstances	To adapt all primary and secondary school curricula to meet the challenges of the information society, taking into account national circumstances (unchanged)
8	To ensure that all of the world's population has access to television and radio services	To ensure that all of the world's population has access to television and radio services (unchanged)
9	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	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 (unchanged)
10	To ensure that more than half the world's inhabitants have access to ICTs within their reach	To ensure that more than half the world's inhabitants have access to ICTs within their reach and make use of them
11 (proposed)		To connect all businesses with ICTs (proposed target)

Source: Geneva Plan of Action, para. 6; Final WSIS Targets Review.

While considerable efforts were made to obtain data for the *Final Targets Review*, there were nevertheless substantial gaps in the data sets that could be obtained. The *Review* also relied primarily on information from 2012 and 2013, well before the target date of 2015 that was set for achieving the Targets in 2003.[146]

The WSIS Targets are listed in Table 1, in their original form and as revised in 2010 (with amendments underscored). Three Targets (1, 8 and 10) are concerned with general issues of connectivity and access; five are concerned with connectivity for particular public facilities and services; and two (7 and 9) with content issues. An eleventh Target, concerned with business connectivity, has been proposed by UNCTAD and was also assessed in the *Final WSIS Targets Review.*

B. GENERAL CONNECTIVITY AND ACCESS TARGETS

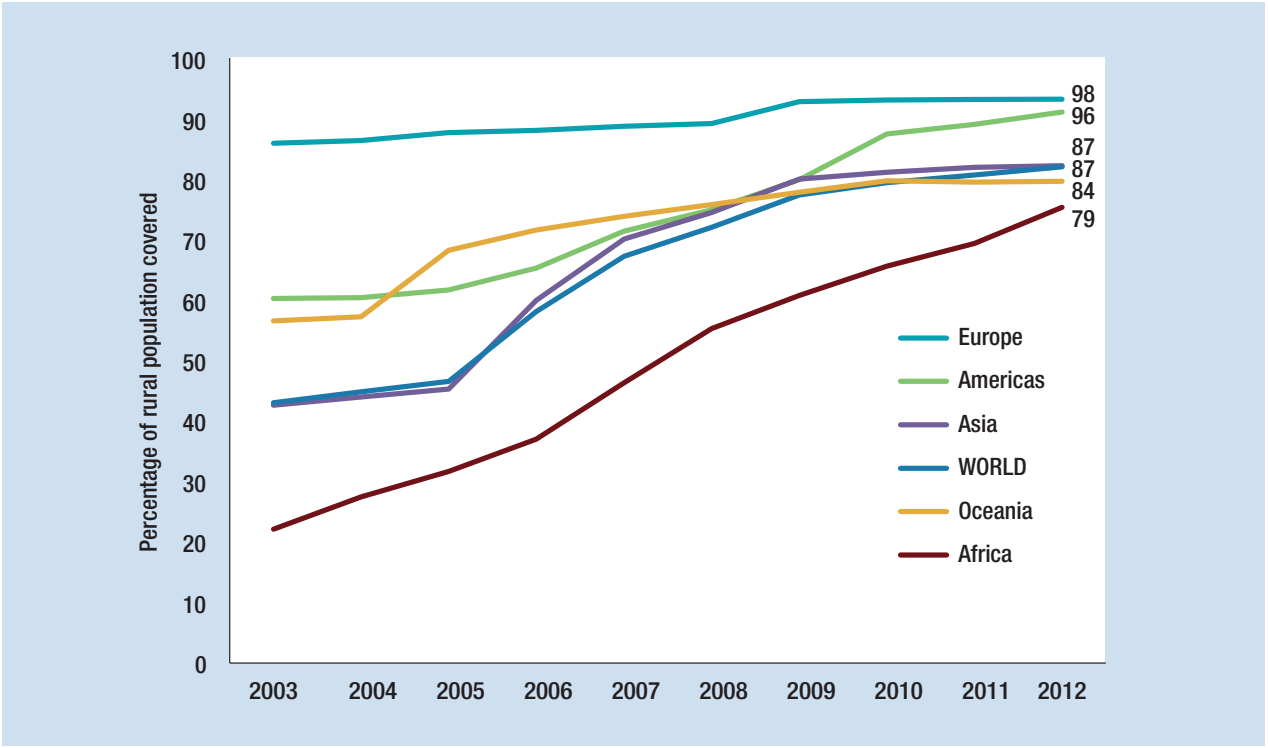
This section summarizes findings relating to targets concerned with overall connectivity and access – Target 1, concerned with the geographical spread of networks; Target 8, concerned with access to broadcasting services; and Target 10, concerned with access to other ICTs. More detailed information is available for these targets, which can be considered proxies for the overall 'digital divide' within and between countries, than for those targets that are concerned with specific public facilities. However, the targets agreed in 2003 did not clearly indicate either the types of ICTs or levels of connectivity which should be achieved by 2015. The Partnership clarified some definitions in 2010/2011 (see Table 1).[147] Lack of data from many countries, particularly LDCs, means that many data sets used in calculating findings rely substantially on estimates, and therefore have significant margins of error.

1. Target 1 – connectivity in rural areas

Target 1 seeks 'to connect villages with ICTs and establish community access points,' and therefore acts as a proxy for overall geographic connectivity. Rural areas generally experience lower connectivity and benefit later from advances in communications because they require higher capital investment than urban areas and the return on investment from smaller populations tends to be slower. However, definitions of rural communities and 'villages' vary, making it difficult to use data for cross-country comparisons.

The *Final WSIS Targets Review* found that there has been more rapid growth in geographic coverage of mobile networks in rural areas than anticipated since 2003. This is illustrated in Figure 2.

Figure 2: Network coverage in rural areas, 2003-2012



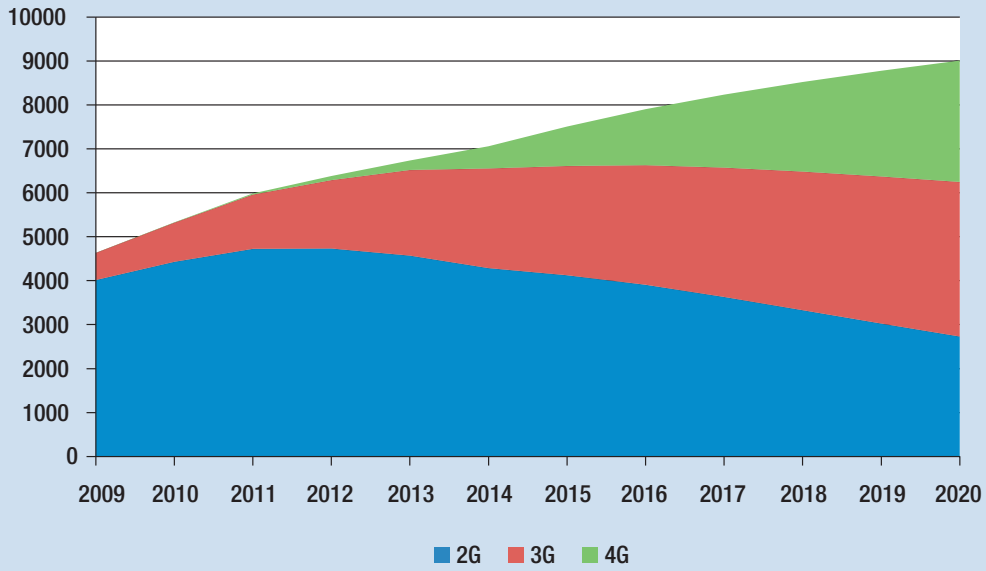
Source: Final WSIS Targets Review, p. 19.

Overall, the *Final WSIS Targets Review* indicates that 87 per cent of the world's rural population was covered by mobile networks by the end of 2012, up from 76 per cent in 2008 and 45 per cent in 2003. The 2012 figure equates to 93 per cent of total world population.[148] The rate of growth has been fastest in Africa, which had very limited rural coverage at the time of WSIS, but Africa still had the lowest estimated coverage level in 2012, at 79 per cent.[149] The GSM[150] Association, which represents mobile operating companies, believes that in 2014 between 19 per cent and 15 per cent of the global population lived outside coverage range, mostly but not all in rural areas of emerging and low-income countries. They expect an additional 1.1 million additional new subscribers to be added to networks between 2014 and 2020.[151]

While most rural areas have acquired at least 2G connectivity, there remain substantial differences in levels of access to ICTs between urban and rural areas of many developing countries. Indian census data from 2011 indicated that, while 82 per cent of urban households in India had a telephone in 2011, only 54 per cent of rural households did so. Similar differences have been reported by the ITU for Uganda and Malawi.[152]

Mobile networks provide the principal means of access to the Internet in rural areas of developing countries, many of which do not have extensive fixed networks. The capabilities of mobile networks in rural areas are therefore important factors determining access to more sophisticated ICT and Internet-enabled services. Rural coverage by 3G mobile networks, which enable Internet access, is much lower than that of 2G networks. Some sub-Saharan countries reported no rural 3G infrastructure at all to the Partnership, though this situation should improve quickly as networks are upgraded. The gap in higher-capacity connectivity may, however, then be exacerbated as 4G networks are deployed alongside 3G. Figure 3 illustrates the GSMA's prediction of the shifting balance between mobile generations in global connectivity in the period up to 2020.[153] Like 3G networks, 4G networks are likely to be available much more quickly in developed countries and urban areas.

Figure 3: Historic and predicted deployment of generations of mobile technology, 2004-2020 (million lines)



Source: GSMA, The Mobile Economy 2015, p. 10.

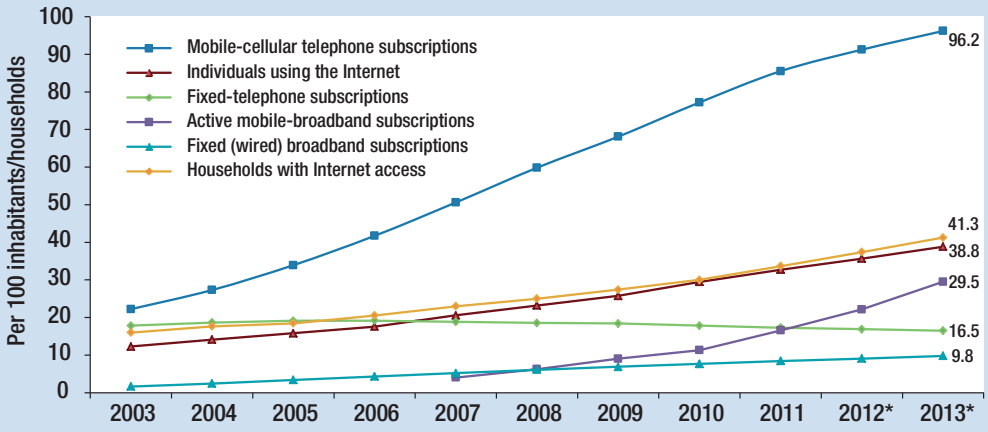
Target 1 is also concerned with the establishment of community access points, *i.e.* publicly-provided telecentres and commercial cybercafés. Insufficient data were available to the Partnership to measure this aspect of the target. At the time of WSIS, telecentres were expected to be major providers of connectivity in rural areas of developing countries, and significant investments were made accordingly by donors, governments and businesses. The telephony-based business model for telecentre provision has been undermined by the rapid growth of mobile telephony since WSIS and, more recently, by mobile Internet. However, the cost and other limitations of mobile Internet access have ensured continued demand for the faster connectivity and other services that telecentres and cybercafés provide, as well as for access in workplaces, schools and colleges. The continued role of public access facilities, in providing access and supporting its effective use, was emphasized in contributions to the CSTD ten-year review of WSIS by the International Federation of Library Associations and Institutions (IFLA) and other organizations.[154]

2. *Target 8 – broadcasting networks and services*

Broadcasting services – radio and television – are often described as 'traditional' media, juxtaposing them against the 'new media' of mobile telephony and the Internet. They remain an important part of the information and communications experience of most people worldwide, and were extensively discussed at WSIS. Community radio – produced by or for local or socio-economic groups, usually on a non-profit basis – has been promoted by development agencies, especially UNESCO, as an important mechanism for empowerment and the development of marginalized communities.

WSIS Target 8 seeks 'to ensure that all of the world's population should have access to television and radio services' by 2015. Ownership and use of radios and televisions is not systematically recorded through subscriptions and there is no consistent collection of relevant household survey data. Radio is generally considered one of the most important information sources for people in developing countries, especially LDCs, but there are insufficient data to enable detailed analysis. More data are available concerning television. The ITU estimates that 1.4 billion households – 79 per cent of those worldwide – had televisions at the end of 2012, but that this proportion varied substantially by region and level of development. There are therefore, the *Review* concluded, 'significant numbers of poor or displaced communities that still have inadequate or no access to basic radio and television services.'[155]

Figure 4: Global developments in ICT access, 2003-2013



Source: ITU, Measuring the Information Society, 2013, p. 2.
*Note: * Estimate.*

3. Target 10 – Access to ICTs

WSIS Target 10 seeks to ensure that 'more than half the world's inhabitants have access to ICTs within their reach' by 2015, to which in 2010 the Partnership added the words 'and make use of them'. However, the *Geneva Plan of Action* did not define either which 'ICTs' were intended by the target or the term 'within their reach'. It is therefore difficult to state clearly whether this target has been achieved. Efforts to measure it today focus on individual access to telephony, computers and the Internet rather than access through public or community facilities.

a. Overview

Figure 4 presents an overview of global developments in ICT access and use since 2003.[156] There has been sustained growth in the number of mobile telephone subscriptions worldwide, rising from just over 20 per cent of world population in 2003 to almost 100 per cent in 2013. For reasons discussed in Box 4, this does not indicate the proportion of people who have mobile phone subscriptions, but is a fair reflection of the growth rate of subscriptions. The figure shows more modest growth in Internet access, a recent upsurge in mobile broadband access and modest growth in fixed broadband connections. There has, however, been a decline in the global use of fixed telephones. These findings are discussed in more detail below.

b. Mobile telephony

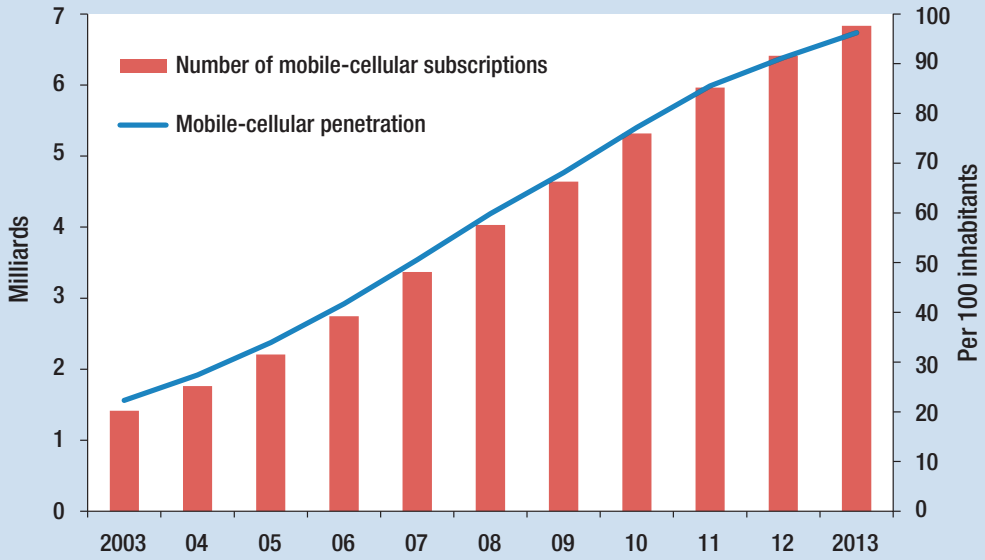
The usual way of measuring access to mobile telephony has been through network subscriptions or SIMs. Between 2005 and 2014, the worldwide number of mobile subscriptions estimated by the ITU grew from 2.2 billion to 6.9 billion.[157] The number of subscriptions reached 50 per cent of world population – the figure sought by Target 10 – as early as 2008, 50 per cent of the population of developing countries in 2009, and 50 per cent of that of LDCs by 2013. By the end of 2014, there were almost as many mobile subscriptions as people worldwide. These rates of growth are illustrated in Figure 5.

There are substantial geographical differences in mobile subscriptions, however, which reflect the ongoing digital divide. Subscription rates in LDCs are less than 40 per cent of those in developed countries, while those in Africa are just under half of those recorded for Europe. These differences are illustrated in Figures 6 and 7. There are also significant problems with using subscription levels as proxies for mobile access, which are discussed in Box 4.

c. Fixed telephony

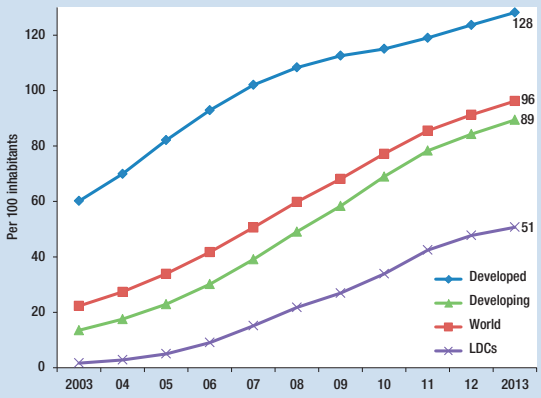
At the time of WSIS, fixed networks were close to ubiquitous in developed countries but concentrated in urban areas in most developing countries, where they were primarily used by governments,

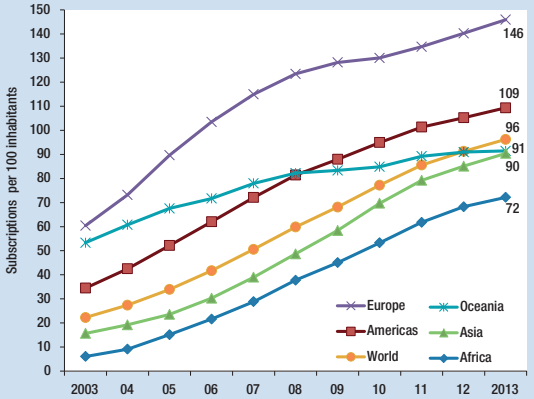
Figure 5: Global mobile subscriptions, 2003-2013



Source: Final WSIS Targets Review, p. 336.

Figures 6 and 7: Mobile subscription density by development grouping and by geographic region, 2003-2013[158]





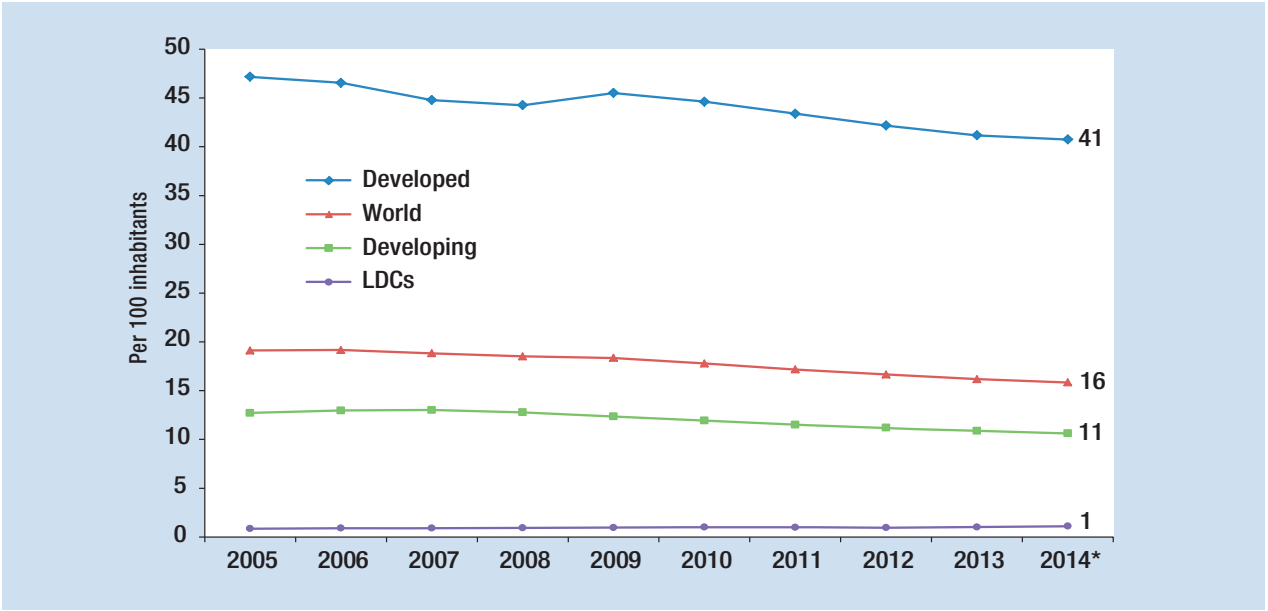
Source: Final WSIS Targets Review, pp. 337, 340.

Box 4: Mobile subscriptions and unique subscribers

Data measuring subscription levels tend to overestimate the number of people with mobile subscriptions. Many people have more than one subscription because of the different geographical coverage offered by operators or the high cost of making calls to different networks. It is also more difficult than with fixed telephony to separate active from inactive subscriptions, as many people use prepaid services rather than postpaid contracts. A significant proportion of disused and duplicate subscriptions are therefore included in subscription counts. On the other hand, in poor communities, access to mobile phones may be shared by a number of people, elevating the number of users above that of actual subscribers.

It has proved difficult to assess the relationship between these subscription data and the number of unique subscribers to mobile networks, which appears to vary widely between countries. The GSMA estimates that the number of unique subscribers has grown from just over one billion in 2003 to just over 3.4 billion at the end of 2013, and expects this to rise further to 4.3 billion by 2020. This would translate into a subscription density of 47 per cent globally – as high as 63 per cent in developed countries but only 30 per cent in LDCs.[159]

Figure 8: Fixed telephone subscription density, by development grouping, 2003-2014



Source: ITU, Measuring the Information Society 2014, p. 2.
*Note: * Estimate.*

businesses, other organizations and wealthy individuals. As late as the 1990s, fixed telephone density rates in some developing countries were below one per cent of population.

Subscriptions to fixed networks have stagnated or declined in most countries since WSIS, following the spread and popularity of mobile alternatives, as illustrated in Figure 8. The ITU estimates that there were 1.15 billion fixed subscriptions at the end of 2014.[160]

However, fixed networks remain important sources of connectivity for institutions such as government offices, schools and universities, where the quality of Internet connectivity may be much higher than can be obtained through mobile networks. They provide wireless access to the Internet for mobile devices in public and commercial buildings and other environments.[161] Backbone and backhaul infrastructure supporting fixed networks also provides capacity which will be increasingly important to mobile networks as the growing volume of data traffic puts pressure on spectrum availability.

d. Broadband

The WSIS Targets did not specifically address levels of broadband access, which were limited in reach at the time of the Summit but are now considered essential by many WSIS stakeholders for leveraging the developmental impact of the Information Society. Since 2005, broadband has become the norm for Internet access in developed countries. Since 2010, broadband access has also become the standard for forward-looking measurement of connectivity and access, including WSIS targets.

There is no precise definition of broadband. The ITU uses a data transfer rate of 256kb/s as the broadband threshold in published data, including those reported in *Measuring the Information Society*. However, this is too slow for many applications which have become commonplace on the Internet today. In many developed countries, broadband rates available to households begin at 1MB/s or more, while rates as high as 100MB/s are available to business users.

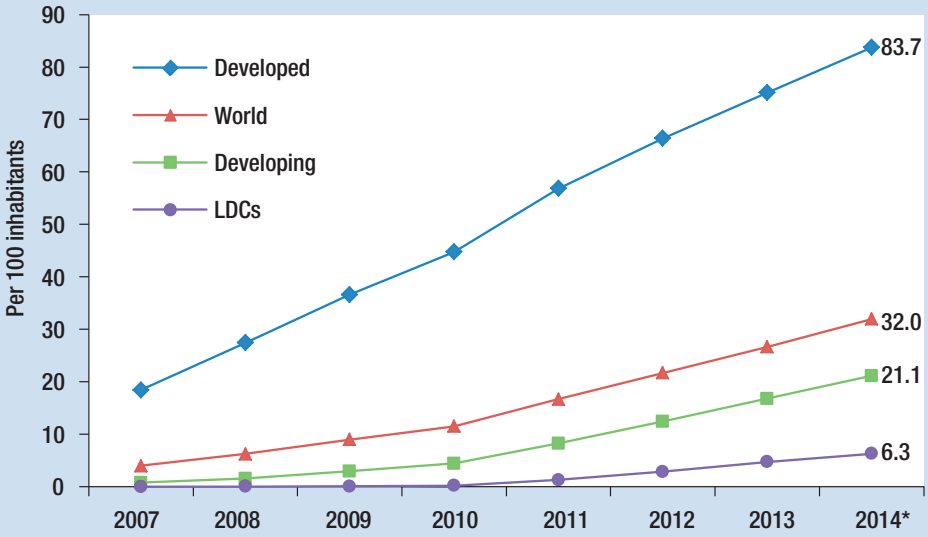
There has been very considerable growth in deployment of broadband networks since WSIS. International bandwidth delivered through submarine cables, for example, is estimated to have grown by over 50 per cent each year between 2007 and 2012, in spite of the economic recession during that period.[162]

The ITU's estimates suggest that there has been steady growth in mobile broadband subscriptions since 2005, rising to an estimated 32 per cent of world population in 2014. This figure is substantially above that for fixed broadband (see below), particularly in Africa. Significant growth is believed

to have occurred in both developed and developing countries, as shown in Figure 9. Although the rate of growth is faster in developing than in developed countries, because of their lower starting base, a growing gap in absolute density levels has emerged between developed and developing countries, and between developing countries as a whole and LDCs. There are also significant differences between countries within regions, and within countries between urban and rural areas.[163]

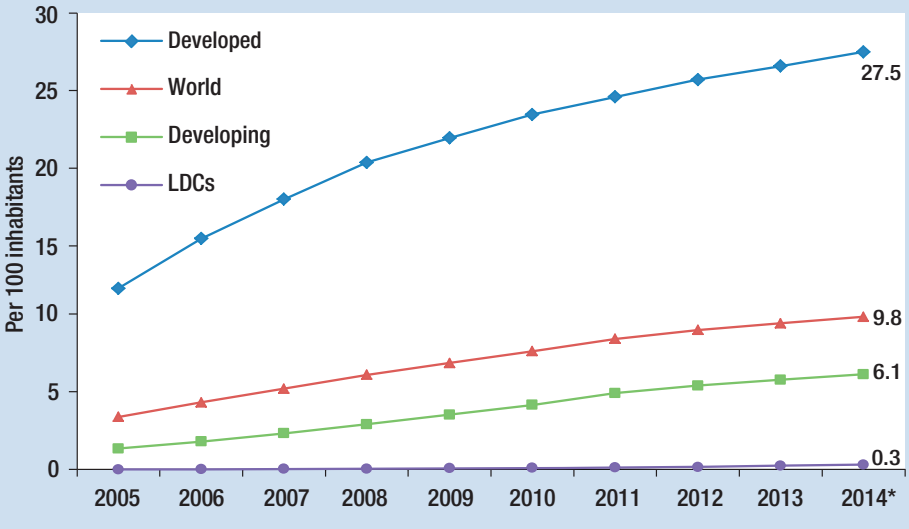
The growth in fixed broadband subscription rates has been more modest (Figure 10). People in developed countries are more than four times as likely to have fixed broadband connections as those in developing countries, because of the absence of fixed networks in many districts in the latter. The ITU estimates the fixed broadband subscription rate in sub-Saharan Africa in 2014 was just 0.4 per cent of population, compared with 27.7 per cent in Europe.[164] The rate of growth in fixed broadband

Figure 9: Active mobile broadband subscriptions, by development grouping, 2007-2014



Source: ITU, Measuring the Information Society 2014, p. 6.
*Note: * Estimate.*

Figure 10: Fixed broadband subscriptions, by development grouping, 2005-2014



Source: ITU, Measuring the Information Society 2014, p. 5.
*Note: * Estimate.*

connections has also fallen in recent years as mobile broadband has become more prevalent.[165]

This large gap in fixed broadband subscriptions is of concern as fixed networks generally offer more reliable, higher-capacity broadband than mobile networks, making them more appropriate for cloud computing and other advanced applications.

In 2011, the Broadband Commission proposed a number of 'ambitious but achievable' targets for broadband growth rates, which reach significantly beyond the WSIS targets – in particular that 40 per cent of households in developing countries should have (broadband) Internet access by 2015, at prices amounting to less than 5 per cent of average monthly income.[166] Growth rates for broadband access up to 2013 suggest that this target will not be met by 2015, in spite of high rates achieved in some developing countries such as China.

e. Computer ownership and use

At the time of WSIS, computers were the primary mode of access to the Internet. In many countries, that role has now been overtaken by mobile devices, including smartphones and tablets. Computer ownership and use were not explicitly included in the WSIS targets. The ITU estimates that the proportion of households with a computer worldwide rose from 26.2 per cent in 2005 to 40.7 per cent in 2012. By 2012, 75.5 per cent of households in developed countries were estimated to have a computer, compared with 27.6 per cent in developing countries, and just 7.8 per cent in sub-Saharan Africa.[167]

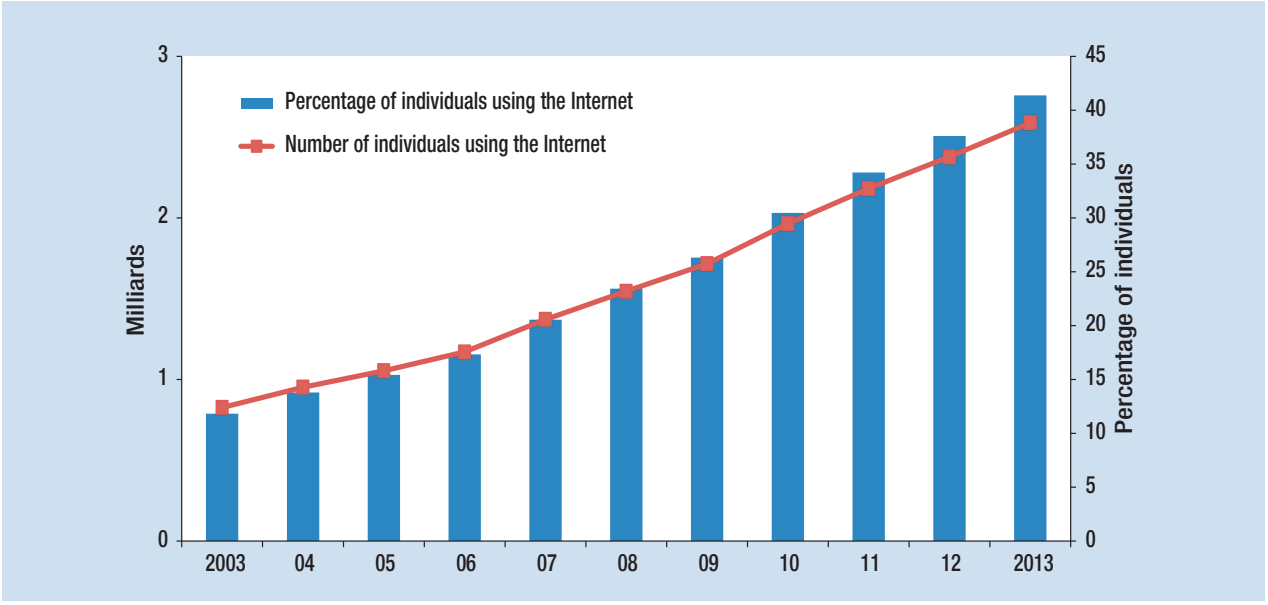
It has been estimated that the proportion of people owning a computer worldwide will rise from one in fifty to one in three between 2008 and 2020, with a parallel shift taking place from majority desktop to majority laptop usage.[168] This rate of growth, and the emergence of tablet computers (see Chapter 4), are diversifying the range of Internet access options available to people in low-income countries who are currently using mobile phones and/or cybercafés.

f. Internet access and usage

The Partnership on Measuring ICT for Development estimates that there were 2.76 billion Internet users worldwide at the end of 2013, equivalent to 39 per cent of world population (46 per cent of world population aged ten or above).[169] Internet use in this context refers to occasional use (at least once in three months) rather than regular use, on any kind of device and from any location. Estimates of growth in these rates over the period since WSIS are illustrated in Figure 11.

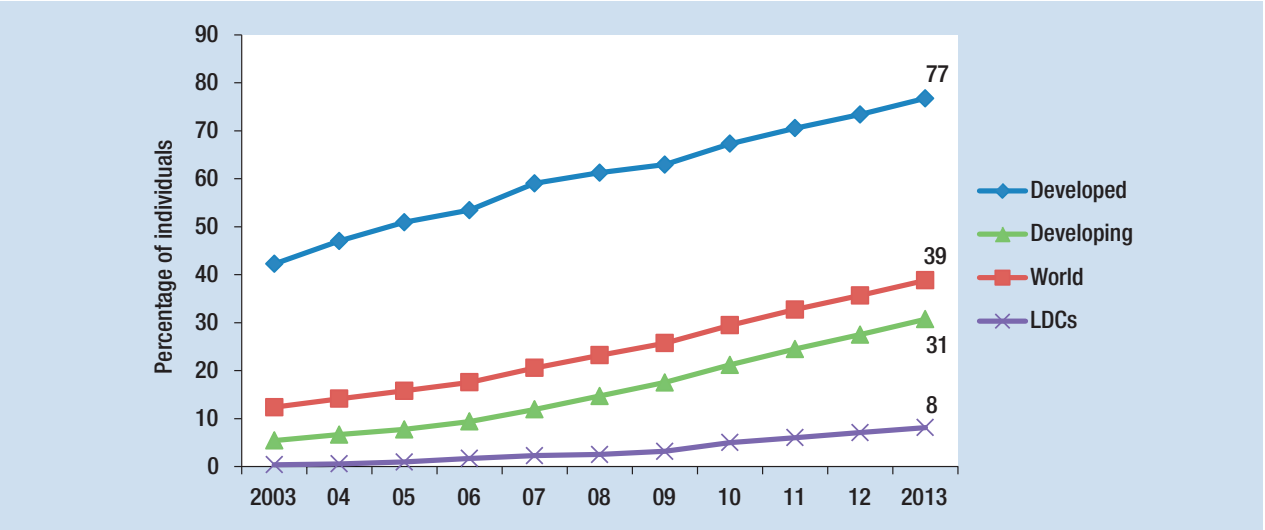
The gap in Internet access between developed and developing countries indicated by this figure is more marked than that in mobile telephony.

Figure 11: Global Internet users, 2003-2013



Source: Final WSIS Targets Review, p. 347.

Figure 12: Internet users, by development category, 2003-2013

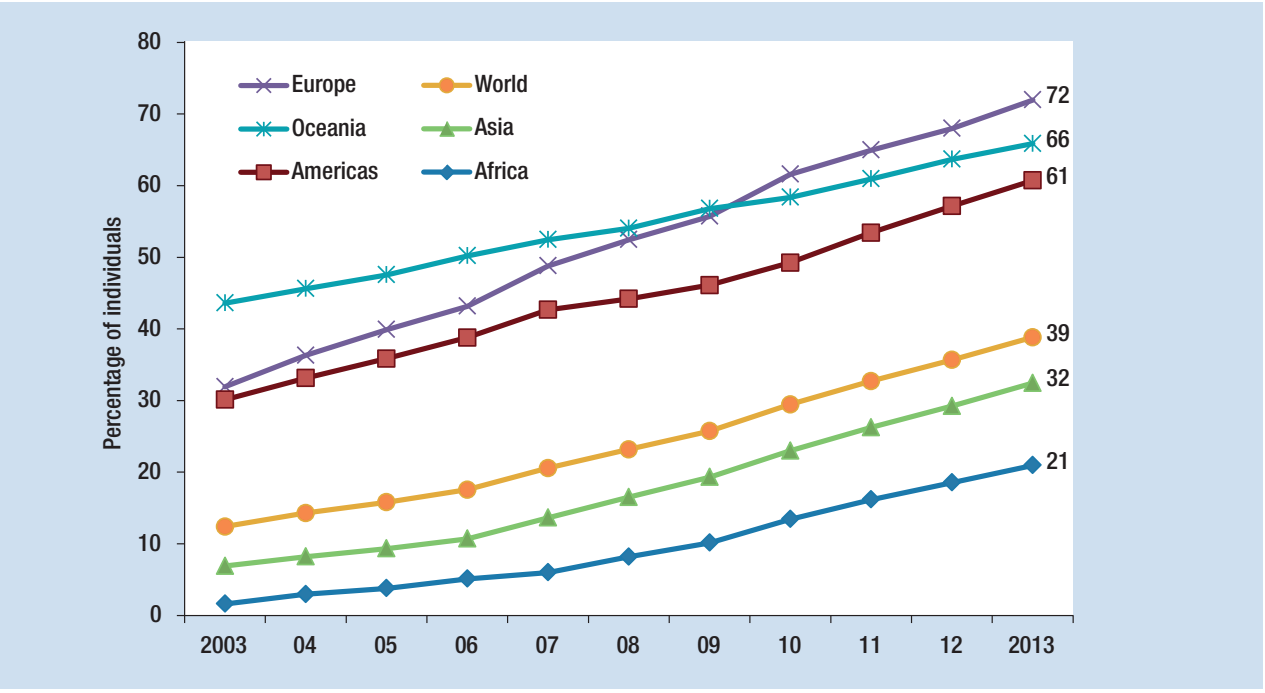


Source: Final WSIS Targets Review, p. 347.

Figure 12 shows that the proportion of individuals estimated to use the Internet in developed countries reached 77 per cent in 2013, compared with 31 per cent in developing countries, and 8 per cent in LDCs. It suggests that while the gap between developed and developing countries in general has been stable, and may be expected to narrow as developed country access approaches saturation, that between higher-income developing countries and LDCs is growing.

Figure 13 illustrates the different regional growth rates estimated in the *Final Targets Review*. While most world regions show relatively similar growth rates, it suggests that Africa has fallen behind other

Figure 13: Internet users, by region, 2003-2013



Source: Final WSIS Targets Review, p. 348. See also note to Figures 7 and 8.

regions. The outcome figure is significantly lower for sub-Saharan Africa, reaching just 16.8 per cent in 2013 and 19 per cent in 2014.[170]

The ITU has also gathered data concerning household Internet access. These suggest that almost 44 per cent of households worldwide had Internet access by the end of 2014, up from 40 per cent one year previously and 30 per cent in 2010. However, these figures also show very substantial differences between different types of country, with household Internet access estimated at 78 per cent in developed countries, 31 per cent in developing countries and just 5 per cent in LDCs.[171]

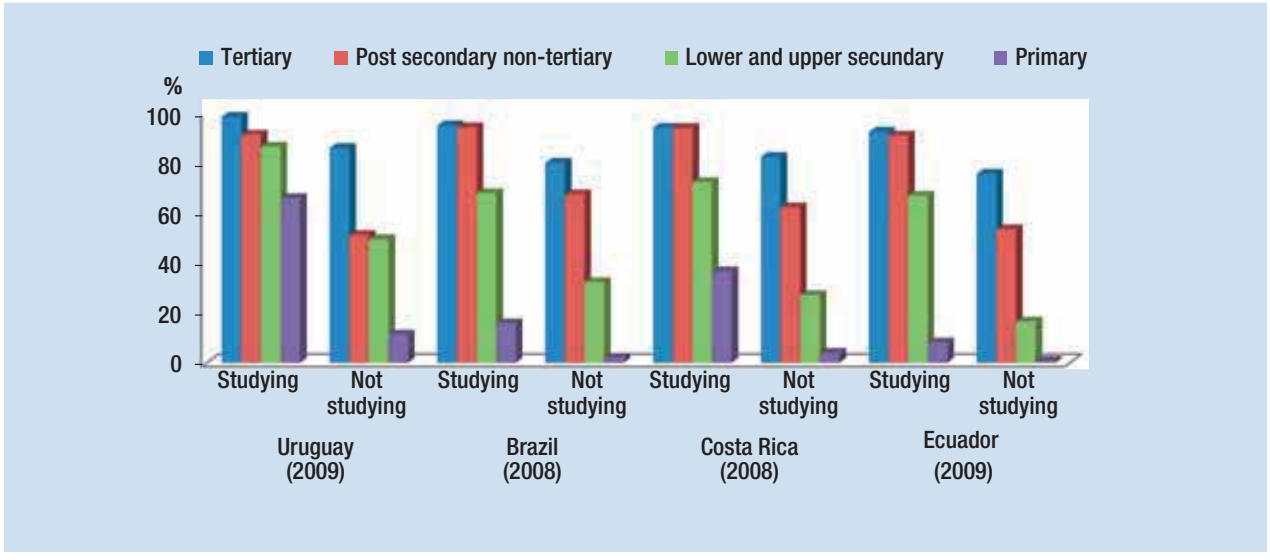
The estimates above suggest that global Internet access stood at 39 per cent of population at the end of 2013. This falls short of the revised WSIS Target 10 objective that 'more than half the world's inhabitants should have access to ICTs within their reach and make use of them' by 2015, if that Target is understood to refer to Internet access. However, at the current growth rate of 3 per cent *p.a.,* it should be achieved by around the end of 2016.

While these data illustrate digital divides between regions, attention should also be paid to digital divides within countries. Evidence from household surveys, reported by the ITU, suggests that there are significant differences between urban and rural areas.[172] What is more, the ITU found in 2011 that, in more than thirty countries for which it had data, without exception people who had attained higher (secondary or tertiary) educational levels used the Internet more than those with a lower level of education.[173] This is illustrated in Figure 14 by data from Latin America.

The location at which access is obtained is another important dimension of access measurement. At the time of WSIS, it was expected that Internet access in developing countries would be primarily obtained, in the medium term, through public access facilities such as schools, workplaces, libraries, telecentres and cybercafes. This was corroborated by evidence showing the primary location of Internet access in different world regions in 2007-2009 (Figure 15).

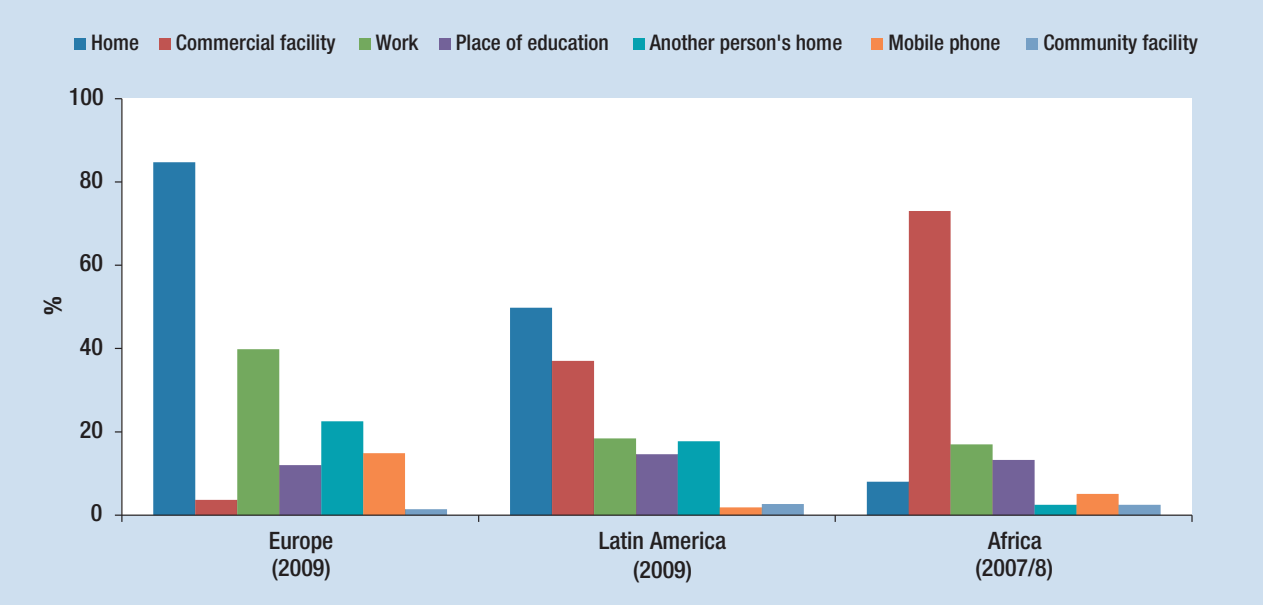
The potential for delivering Internet access through personal mobile devices, initially 3G mobile phones and more recently tablets, was not then widely anticipated. Since WSIS, however, mobile devices have become the primary mode of Internet access for many users in developing countries, especially for services such as social media. The ITU anticipated in 2011 that there was 'likely to be a trend towards increasing Internet access at home or through mobile devices,' but expected that 'in the meantime commercially operated public facilities will play a major role in facilitating Internet access in the developing world and in rural areas.'[174] Public access facilities have remained important for many Internet users in developing countries, especially for applications that require higher bandwidth than

Figure 14: Internet usage, by educational attainment category, selected countries in Latin America, 2008/9



Source: ITU, Measuring the Information Society, 2011, p. 116.

Figure 15: Location of Internet use in selected countries, 2007-2009



Source: ITU, Measuring the Information Society, 2011, p. 120.

is generally available through mobile phones, or which are most effectively used with full keyboards or large monitors.

C. THE AFFORDABILITY OF ICTS

The availability of networks and devices is not the only factor determining the extent to which ICTs reach into society. Affordability, connectivity and content are also important, particularly where development outcomes are concerned. The affordability of devices and services is crucial for users with limited or unpredictable incomes. It is also significant in determining the cost-effectiveness, and thus adoption, by businesses of ICT-enabled improvements in efficiency and productivity that may enhance their competitiveness in national and international markets.

Telecommunications prices are difficult to measure, because they can be volatile, responding to changes in technology and markets, and because they are offered in variable packages that meet the needs of different users. As with other measurements discussed above, there are also significant problems of data-gathering and comparability. The most widely available price index is the ITU's ICT Price Basket (IPB), which is published in its reports *Measuring the Information Society*.[175]

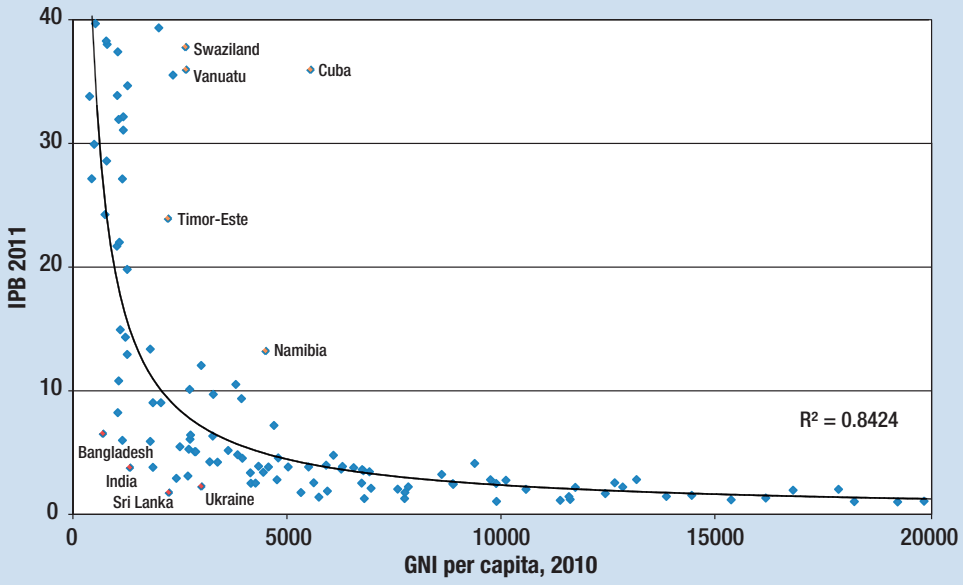
In all but one of 44 developed economies reporting data, the ITU's 2012 report showed that the basket accounted for less than 5 per cent of monthly GNI *per capita*, in 33 cases less than 2 per cent. However, more than half of developing countries returning data reported figures over 5 per cent. This relationship between the IPB and GNI p.c. is illustrated in Figure 16.

The basket for mobile telephony, illustrated in Figure 17, shows that, while prices are falling more quickly in developing countries, they remain much higher in developing than developed countries, even for mobile telephony.

Fixed broadband prices are important since they disproportionately affect costs for larger businesses. ESCAP and others have noted that wholesale prices for Internet access are 'still extremely high' in landlocked and small island countries that lack competitive fibre access to international bandwidth.[176] The Broadband Commission has set a target that 'entry level broadband services' should cost less than 5 per cent of monthly average income in developing countries by 2015.[177]

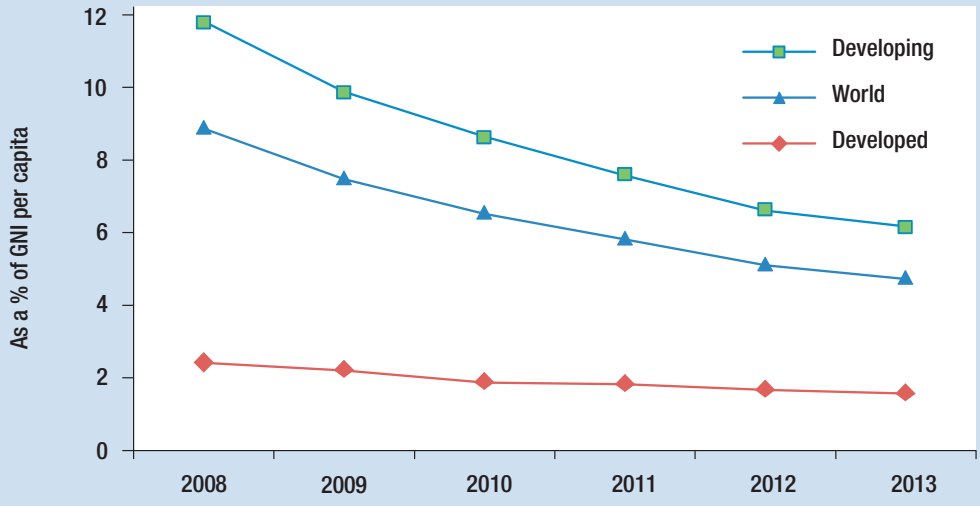
IPB data, for 144 countries, reported in *Measuring the Information Society*, show that fixed broadband prices have been falling rapidly (Figure 18). However, while the pace of reduction in developing countries has been faster, there remains a very substantial

Figure 16: The relationship between ICT prices and GNI per capita, 2011



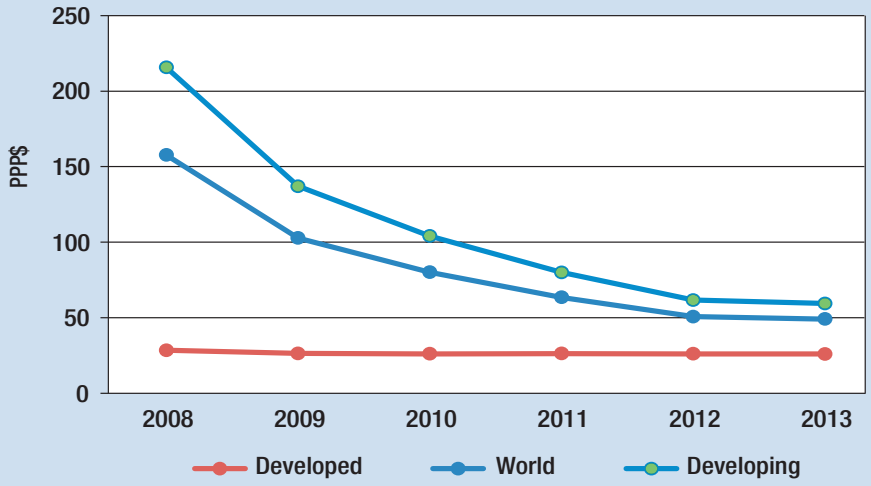
Source: ITU, Measuring the Information Society, 2012, p. 78.

Figure 17: ICT Price Basket, mobile telephony, by development category, 2008-2013



Source: ITU, Measuring the Information Society, 2014, p. 111.

Figure 18: Fixed broadband prices, 2008-2013

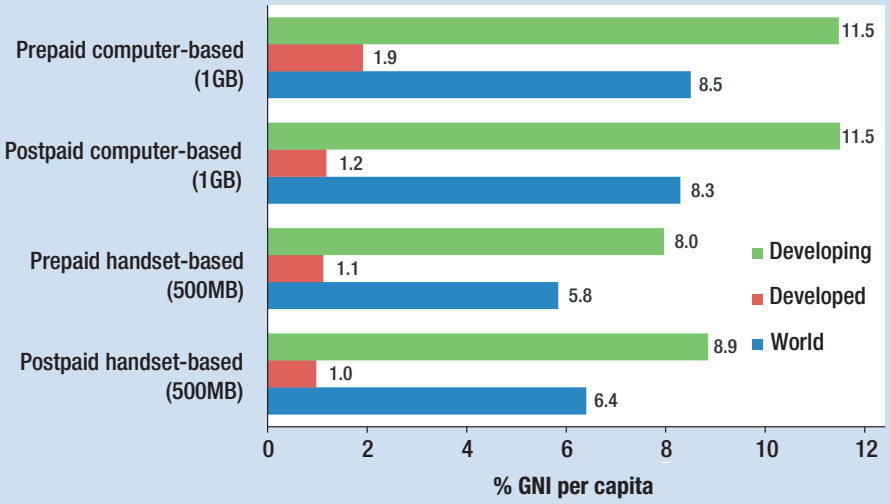


Source: ITU, Measuring the Information Society, 2014, p. 128.

gap between developed and developing countries, with prices costing on average just 1.7 per cent of GNI p.c. in the former but as high as 31 per cent in the latter.[178]

Mobile broadband prices are more relevant to mass markets in developing countries. An ITU study in 2012 found that mobile broadband was highly affordable in developed countries (generally between 1 per cent and 2 per cent of GNI p.c.) but much less so in developing countries (averaging between 11 per cent and 25 per cent of GNI p.c. for different mobile plans). These differences are illustrated in Figure 19.

Figure 19: Mobile broadband prices as a percentage of GNI p.c., by development category, 2013



Source: ITU, Measuring the Information Society, 2014, p. 114.

D. THE GENDER GAP IN ICT ACCESS AND USE

The data presented so far in this chapter illustrate digital divides between countries. The WSIS outcome documents were equally concerned with the need to address digital divides within countries, including those between women and men. The *Geneva Declaration of Principles* insisted that women 'should be an integral part of, and key actors in, the Information Society,' and that the Information Society should enable 'women's empowerment and their full participation on the basis of equality in all spheres of society and in all decision-making processes.'[179]

In developed countries, where mobile phones and Internet access are close to ubiquitous, there does not appear to be a significant gap in ICT access and use between women and men, though there may be differences in types of use. However, there does appear to be a significant digital divide between women and men in developing countries, sufficient for the World Bank to suggest that women 'represent two-thirds of the untapped market for mobile growth.'[180]

Few countries and communications operators publish gender-disaggregated data. Data published by the ITU (Figure 20) suggest that the gender gap in Internet usage between men and women was about 11 per cent worldwide in 2013, but more substantial (16 per cent) in developing countries than in developed countries (2 per cent), with men more likely than women to use cybercafés. There were, however, some countries, such as Jamaica, in which research showed that women were more likely to access the Internet than men.[181]

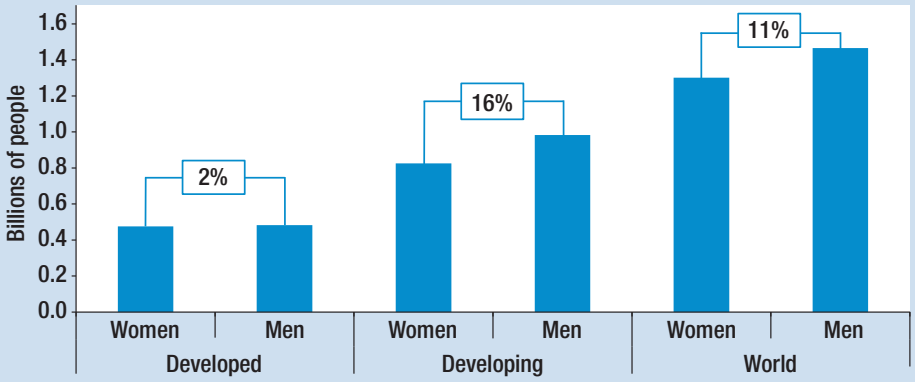
Household surveys conducted by Research ICT Africa (RIA) during 2011 also found that men were more likely than women to own a mobile phone or to use a computer in eight of the eleven African countries surveyed and more likely to use the Internet in ten of these. Men's average monthly expenditure on mobile use was higher in nine of the eleven countries studied, in some cases by substantial margins.[182]

It is generally agreed that the gender gap in ICT adoption and use stems primarily from gender-based inequalities in women's and men's social and economic lives rather than from ICT-specific factors.[183] The RIA study, for example, identified 'a close relationship between Internet access differences by gender and other variables, such as level of income and level of education.'[184] DESA, likewise, has concluded that:

> *The causes of this gender divide can stem from disparities between men and women in terms of a lack of education, lack of income, social attitudes towards female use of technology, women having to balance their roles of mother and worker and lack of Internet content relative to women's needs.*[185]

The importance of addressing the gender gap in ICT access has been emphasized by many stakeholders, including the World Bank and the GSMA. ECLAC and UNCTAD have published reports, respectively,

Figure 20: The gender gap in Internet usage, 2013



Source: ITU, Measuring the Information Society, 2013, p. 12.

on *Women in the Digital Economy*[186] and on *Empowering Women Entrepreneurs through Information and Communications Technologies*,[187] illustrating ways in which ICTs can help women overcome difficulties posed by lack of access to money, time constraints, restrictions on mobility and lack of access to education and knowledge resources. The Broadband Commission[188] and the Partnership on Measuring ICT for Development have both established working groups concerned with women/gender and ICTs. In 2014, the Partnership published an assessment of *Measuring ICT and Gender*, which took stock of existing data sources and emphasized the need for more attention to be given in these to gender disaggregation.[189]

E. SPECIFIC TARGETS

Previous sections described the findings of the *Final WSIS Targets Review* concerning general targets. This section briefly summarizes findings concerning more specific targets. Measurement of many of these was particularly affected by the data challenges outlined in Box 3, especially the relatively small number of countries that supplied data to the Partnership. More detailed findings can be found in the *Review*.

1. Target 2 – primary and secondary schools

This target[190] seeks 'to connect all secondary schools and primary schools with ICTs.' The indicators adopted for it in 2010 were concerned with learner-to-computer ratios and the proportions of schools with access to radio, television, computers and the Internet. It was not possible for the Partnership to undertake a comprehensive review of these indicators because of data shortages, especially for LDCs. Such data as were available indicated that the ratio of computers to learners was much higher in Europe than in developing countries, and suggested similar differences in Internet access. The large majority of schools in Europe and the United States, for example, had Internet access as early as 2006, while Nepal and Bangladesh reported figures around 5 per cent in 2011/2012.

2. Target 3 – science and research centres

This target[191] aims 'to connect all scientific and research centres with ICTs,' and is measured by indicators that focus primarily on infrastructure. Only 16 countries provided information on the proportion of research centres with broadband access. However, the *Review* concluded from other sources that:

> *While the ICT revolution has not occurred at a uniform pace in all regions, to a large extent it has led to the creation of dynamic networks, cross-border collaboration processes, and internationalization of research and higher education.*[192]

Particular attention was paid to the development of National Research and Education Networks (NRENs), partnerships between higher education and research institutes, which act as specialized Internet Service Providers offering high-speed backbone networks and dedicated research facilities. By 2013, there were 170 NRENs in 137 countries, compared with only 98 countries in 2005. However, only 26 of the 54 countries surveyed in Africa had established NRENs, including only 14 of Africa's 34 LDCs. Regional RENs have been established in all major world regions, including three in sub-Saharan Africa.

3. Target 4 – public libraries, museums, post offices and national archives

This target[193] focuses on the connectivity of a range of public facilities that can improve their own service delivery through access to ICTs and provide public ICT/Internet access to the communities they serve. There are more than 330,000 public libraries worldwide, and 640,000 post offices, half a million of them in developing countries. As the Review noted:

> *Public libraries and post offices are in a unique position to provide public access to ICTs: they are open to the public, their branches are widely spread and they constitute an established source of information.*[194]

Only limited data were available for the *Review*. A survey by IFLA in 2009/2010 found that 59 per cent of European respondent countries offered Internet access in at least 80 per cent of public libraries, but that just half of those in Latin America and the Caribbean did so. Library access in Africa was much lower, with 14 of 22 respondent countries offering access in less than 20 per cent of libraries.

Data on post offices were available from 74 countries, but were not representatively spread across development groupings. They suggested

that broadband access is much higher in developed than developing countries (59 per cent against 21 per cent), but that few post offices offer public access to the Internet (19 per cent against 9 per cent), implying that there is considerable scope for improved facilities access.

4. Target 5 – health centres and hospitals

This target[195] aims 'to connect all health centres and hospitals with ICTs.' Insufficient data were submitted by governments to the Partnership, particularly from LDCs, to enable detailed analysis. Most respondent countries had more than 75 per cent of hospitals and health centres connected to the Internet, with strong growth in some since an earlier survey in 2009/2010, but respondent countries were too unrepresentative to allow generalized findings.

The *Review* drew on other information to supplement respondent data. The WHO's Global Observatory indicates that the number of countries with national e-health strategies grew from 55 in 2009 to 85 in 2013 (from 28 per cent to 44 per cent of WHO member-states). There has been strong growth in take-up of WHO's HINARI programme, which makes access to biomedical journals available free or at low cost to hospitals and health centres in developing countries. The number of HINARI-connected institutions grew from 792 in 2003 to 4,274 in 2010 and 5,584 in 2013. More data concerning health centres and hospitals are available in the Global Observatory's third global e-health survey.[196]

5. Target 6 – local and central government departments

This target[197], as revised in 2010, aims 'to connect all central government departments and establish websites.' The limited data available suggest mixed progress, with 'many countries still not utilizing the full potential of ICT in government,' but significant growth in the number of countries offering websites and public services online. All countries that responded to the Partnership's questionnaire claimed to have universal or almost universal Internet access for central government organizations. Most responding developed countries reported that more than 75 per cent of government employees were using computers and the Internet, though most respondent developing countries reported figures between 35 per cent and 50 per cent.

All 193 countries that responded to DESA's *UN E-Government Survey* in 2014 claimed to have a web presence (up from 173 in 2003 and 190 in 2012). Of these, 105 claimed to provide links to regional and/or local governments on national websites, but this was true of only a third of the countries in Africa. As many as 70 per cent of countries responding to the Partnership questionnaire reported that they had a government portal online in 2012, compared with just 26 per cent in 2003. Data gathered for the 2014 *E-Government Survey* suggest that many countries now provide interactive services, including transaction services, which were rarely offered in 2004. According to the Survey, 101 countries allowed the creation of personal e-government accounts by 2014, with 73 enabling income taxes to be paid online and 60 allowing online business registration. Other services were available in fewer countries.

The *Review* concluded that:

> *… use of ICT has come to dominate the government sector in the last decade. It is no longer a question of whether to use ICT to further government functioning and operations, but a question of which is the most effective way for ICTs to help in the delivery of development objectives. Progress on the use of ICT in government is evident in all regions of the world and across all countries. …* [However,] *despite this progress, wide disparities remain across, and between, countries …. It appears that governments that have benefited most from the opportunities offered by ICT for development are generally the early adopters of ICT. A major global challenge in the utilization of e-government for economic and social development is the inequitable access to, and use of, ICT.*[198]

6. Target 7 – educational curricula

WSIS Target 7[199] aims 'to adapt all primary and secondary school curricula to meet the challenges of the Information Society, taking into account national circumstances.' This reaches beyond connectivity in enabling schools to take advantage of ICTs, including educational content and teacher capabilities.

On the basis of available evidence, the *Review* concluded that, 'for the majority of countries, there appears to be more emphasis on training teachers

to teach using ICT than on training teachers to teach basic computer skills or computing.'[200] This reflects the value of teachers being able to integrate ICT into diverse learning contexts. However, the extent and practice of teacher training varies greatly between countries. There is also great variation in the use of computer-aided and (less commonly) Internet-aided instruction.

7. Target 9 – content and language

WSIS Target 9[201] is concerned with the content available to Internet users, enjoining stakeholders to 'encourage the development of content and put in place technical conditions in order to facilitate the presence and use of all world languages on the Internet.' It is related to Action Line 8 which is concerned with cultural and linguistic diversity (see Chapter 5).

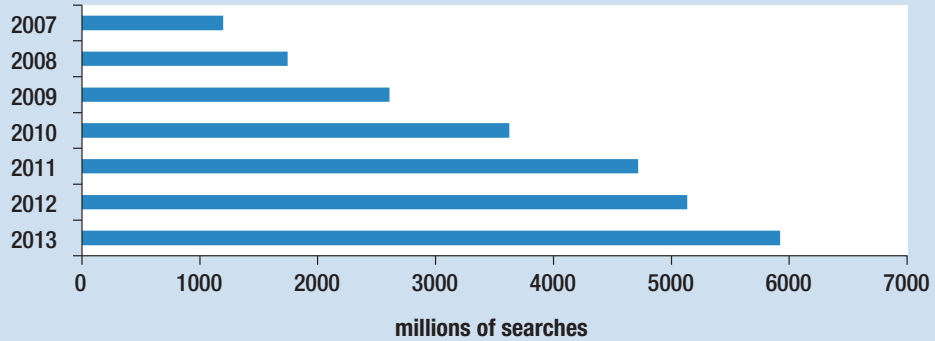
The number of active websites is estimated to have increased between 2005 and 2013 from around 34 million to around 185 million.[202] The Web is now so large that it is no longer comprehensively indexed by search engines, though these figures provide a useful proxy illustrating growth in Web usage over time. The number of searches made through the largest online search engine, Google, in 2013 exceeded 2 trillion, amounting to almost 6 billion daily (Figure 21).

The character of online services and applications is also changing: most data traffic by volume is now video content, while an increasing proportion of Web traffic takes place on social networks that allow users to create and share content interactively rather than merely accessing that made available by website publishers.[203] The spread of smartphones has, meanwhile, resulted in the emergence of mobile applications ('apps'), over a million of which were available for the Apple and Android platforms by early 2014, complementing traditional websites and web-based social media.

The number of Internet domains provides a useful proxy for content providers on the World Wide Web. This grew more than fourfold, from 59.7 million 245.2 million, between 2003 and 2013.[204] However, the proportion of domains registered in developed countries has remained fairly constant, at about 80 per cent. Though a much higher volume of content is now generated in developing countries, this suggests that Internet content overall has continued to be generated primarily in Europe and the Americas. The number of people per domain has fallen dramatically, from 106 to 29, between 2003 and 2013, though here too there are large discrepancies between countries. The figure for Germany in 2013 was just 2.8, while in China it was 38.8, in Kenya more than 175 and in Burkina Faso more than 500.[205] The introduction of internationalized domain names, including those in non-Latin scripts, is summarized in Chapter 7.

Overall, the *Final WSIS Targets Review* found that there has been 'exceptional growth since 2003 in the numbers of people, businesses and organizations engaged in content creation, in the number of people accessing content, … the volume of content accessed,' and the linguistic diversity of that content. However, content generation continues to be dominated by countries in Europe and North America. Chinese has joined English as one of the predominant languages on the Internet.

Figure 21: Daily Google searches, 2007-2013



Source: Final WSIS Targets Review, p. 290, derived from www.statisticbrain.com, data published in 2014.

Linguistic diversity is spreading through increased diversity of websites and structural changes such as the introduction of internationalized domain names, but also through social media and user-generated content, which enable users rather than publishers to determine language. The most significant emerging trend in this context is automated translation, which partially overcomes the resource constraints of manual translation.

8. Target 11 – businesses

No business-related target was included in the *Geneva Plan of Action*. An additional target[206], 'to connect all businesses with ICTs,' has been proposed by UNCTAD, and was assessed in the *Final WSIS Targets Review.*

UNCTAD's review of this target suggests that 'Business size, economic activity and location determine the extent to which businesses use broadband Internet.' Data from 64 countries at various dates between 2008 and 2012 suggest that, while almost all large businesses use computers, usage in smaller businesses is less established and more variable, with almost 80 per cent of microbusinesses reporting computer use in Singapore but less than 20 per cent doing so in Oman, Jordan and Lesotho. UNCTAD concludes that 'Automated business processes are [now] the norm in large and medium-sized businesses worldwide and in almost all businesses in high-income countries,' but that the most significant change now underway is 'the current widespread and growing use of mobile phones by small businesses in developing countries.'[207]

F. MEASURING E-READINESS AND IMPACT

The WSIS targets and indicators are concerned primarily with the supply of access and services rather than social and economic outcomes. A number of attempts have been made since the 1990s to achieve a more holistic understanding of 'e-readiness', *i.e.* the extent to which societies are equipped to take advantage of the information revolution encompassed by improved connectivity and new services, and of impact, *i.e.* the extent to which societies have been transformed by ICTs. The *Tunis Agenda* noted the launch of two such measures, the ICT Opportunity Index and the Digital Opportunity Index, which resulted from work by the ITU and the Partnership on Measuring ICT for Development.[208]

The leading index of this kind today is the ICT Development Index (IDI), established in 2009 and updated in the ITU's annual publication *Measuring the Information Society*. The IDI 'aims to capture the evolution of the information society as it goes through its different stages of development, taking into consideration technology convergence and the emergence of new technologies.'[209] It is a composite index including sub-indices concerned with access, usage and the skills required to make effective use of ICTs, all three of which are needed to indicate 'the development potential of ICTs or the extent to which countries can make use of ICTs to enhance growth and development.' Its eleven indicators are set out in Table 2. The ITU recognizes that these may need to change from time to time to reflect changing circumstances, and definitions of core indicators were accordingly updated in 2013.[210] Greater weight is attached to access and usage than to skills.

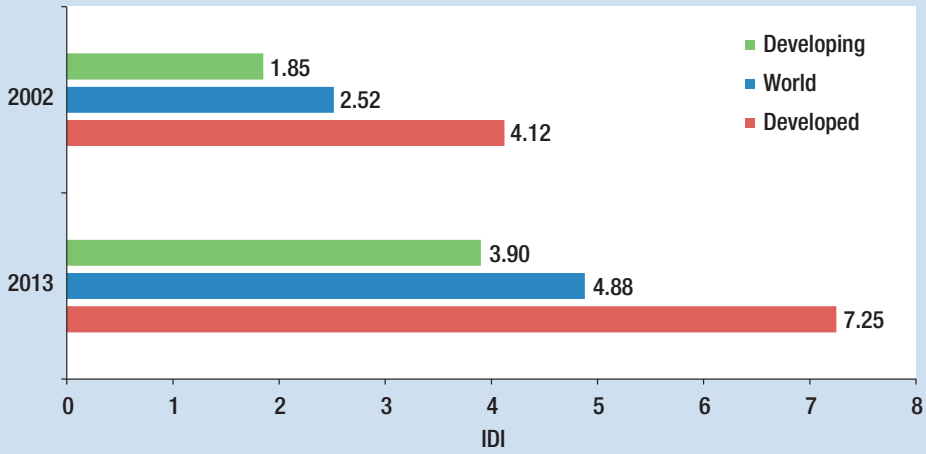
Table 2 Indicators in the ICT Development Index

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

Source: ITU, Measuring the Information Society, 2014, p. 65.

The IDI can be used to benchmark changes in ICT performance and preparedness between countries and over time. The most recent Index, for 2013, was published in late 2014 (Figure 22). It showed that developed countries continue to enjoy a substantial advantage over developing countries in ICT development, but that considerable progress has been made by both groups in the period since WSIS. The pattern for ICT access and usage indicators closely follows that for the Index as a whole, but there are notable differences between sub-regions where ICT skills are concerned.

Figure 22: IDI values by development group, 2002 and 2013

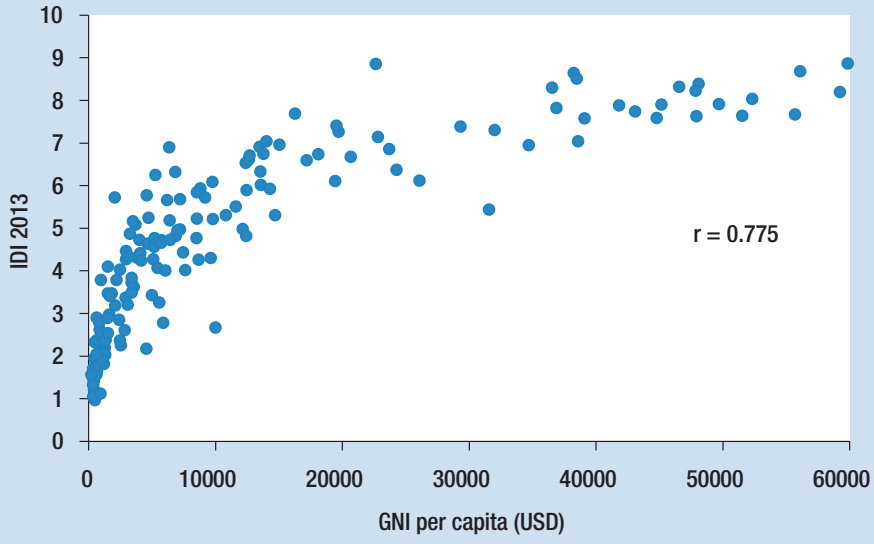


Source: ITU, Measuring the Information Society, 2014, p. 65.

As illustrated in Figure 23, a strong correlation can be observed between IDI rankings and GNI per capita. The highest IDI rankings are achieved by countries in Europe, North America and highly developed countries in the Asia-Pacific region. As well as high income levels, the ITU notes that leading countries in IDI rankings have 'highly liberalized and competitive ICT markets that are at the forefront of innovation, and people that have the skills to make use of ICTs.'[211]

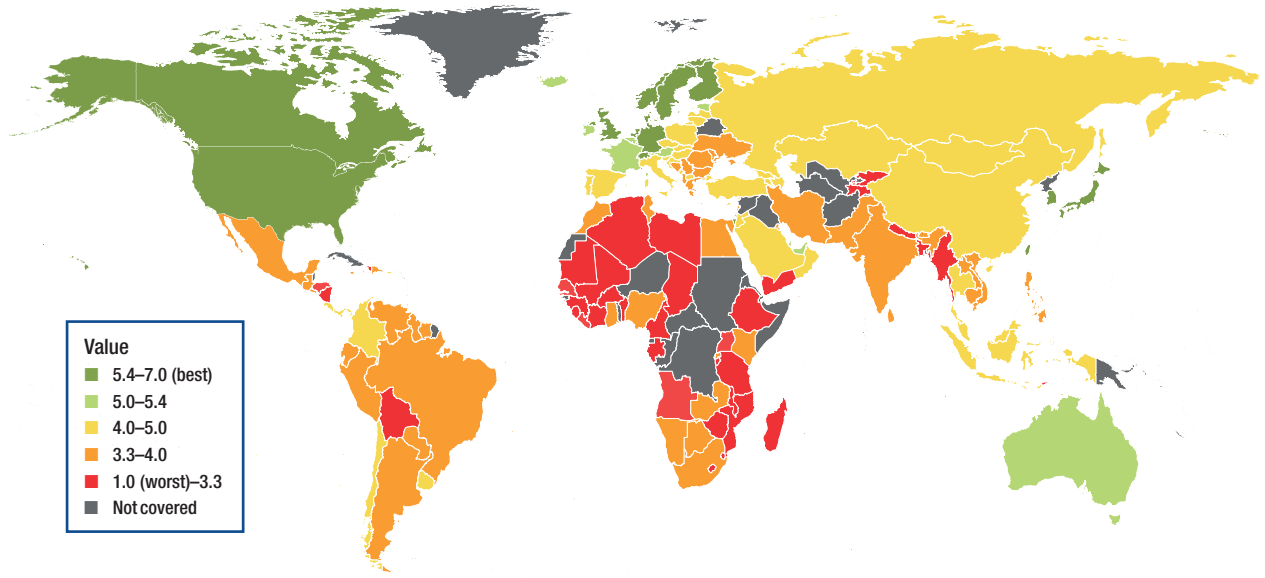
The Networked Readiness Index (NRI) is a more detailed composite index published in the annual *Global Information Technology Report* of the World Economic Forum (WEF) and the Institut Européen d'Administration des Affaires (INSEAD).[212] It was originally built around three sub-indices, made up from clusters of indicators concerned with the political and commercial ICT environment, ICT readiness (including infrastructure, affordability and skills) and ICT usage (by individuals, businesses

Figure 23: IDI values in relation to GNI per capita, 2013



Source: ITU, Measuring the Information Society, 2014, p. 60.

Figure 24: Networked Readiness Index, 2014



Source: Global Information Technology Report, 2014, p. 9.

and governments). In 2012, an additional sub-index was added, concerned with social and economic impact. The Index now includes 27 quantitative indicators derived from ITU, World Bank and other UN datasets, and 27 qualitative indicators derived from WEF's annual Executive Opinion Survey of more than 15,000 businesses.

The outcome of the Index assessment published in 2014, in Figure 24, illustrates how the digital divide between developed and developing countries in connectivity and access extends to this wider assessment of ICT readiness and impact.

As with the IDI, the top performing countries in the Index come from Europe, North America and East Asia. However, large intraregional disparities are also found within all regions. The *Global Information Technology Report* for 2014 suggests that developing countries, particularly LDCs, are hampered in their efforts to improve ICT readiness and impact by skill shortages and unfavourable business climates. In the ECLAC region, for example, it concludes that:

> *persistent weaknesses in the broader innovation system hinder the overall capacity of the region to fully leverage ICTs to foster its competitiveness potential, highlighting the rise of* [a] *new digital divide … between countries that are achieving positive economic and social impacts related to the use of ICTs and those that are not.*

In sub-Saharan Africa it finds 'severe weaknesses… in the region's business and innovation ecosystems, which result in very low economic and social impacts.'[213]

G. THE FUTURE OF THE WSIS TARGETS AND FUTURE MEASUREMENT

The WSIS Targets that were adopted in 2003 have a number of limitations as tools for measuring the development of an Information Society. These result from weaknesses in the range of targets selected, in modalities for measurement, and in availability of data.

- Critics of the targets have argued that they are insufficiently comprehensive. Most are concerned with connectivity and access (inputs) rather than with developmental aspects of ICTs (impacts). They do not include important aspects of the Information Society, such as the gender distribution of ICT access and use, connectivity and use of ICTs by businesses, and the growth of ICT services such as websites. They do not address the impact that ICTs have on or through development sectors such as health and education. They do not enable measurement of innovations

in the ICT environment since WSIS, such as broadband networks and social media.

- The terminology used in the targets is unclear, lacking definitions of the ICTs and levels of connectivity that should be measured. As early as 2011, the Partnership found it necessary to adjust the meaning of these terms in light of changing expectations brought about by rapid adoption of mobile phones and expectations for broadband deployment. It is difficult to say whether a number of the targets have been met in terms that were intended at the time of WSIS.

- No benchmarks or indicators were established for the targets at the time of WSIS, making it impossible to measure progress accurately against previous experience. Indicators were not agreed by the Partnership until 2010, when it proved difficult to identify reliable proxies or data sources for many of the targets.

- It has proved difficult to obtain reliable data for measuring progress against the targets. Many countries do not collect relevant data, or do so only for the most basic indicators. The response rate from developing countries, and particularly LDCs, to the Partnership's questionnaire ahead of the *Final WSIS Targets Review* was poor, with such low levels of response to some indicators that it was not possible to generalize findings. Extensive estimation was needed to compile data even for the most fundamental target, 'that more than half the world's inhabitants [should] have access to ICTs within their reach and make use of them.'

The Partnership on Measuring ICT for Development identified the root of these weaknesses in 2014, noting that the Targets 'were not framed with measurement in mind and were developed without prior consultation with the statistical community.'[214] They are much less precisely defined than the MDGs, which were adopted by the United Nations General Assembly in 2000, which have been measured through a small number of specific indicators for which data can be comprehensively obtained.

The Partnership has emphasized that future measurement of WSIS Targets needs to be more systematic and scientific if it is to meet the needs of policymakers and other stakeholders. The United Nations University (UNU) reviewed experience, on behalf of the Partnership, in the *WSIS Final Targets Review*. It recognized that, as well as improvements in the quality and measurability of targets and indicators, revisions will be needed to bring them into line with the very rapid changes that have taken place in technology and services since WSIS. The pace of change 'makes it very difficult to set targets and indicators that have a life as long as ten years.'[215] Some targets and indicators that were agreed in 2003 may, therefore, no longer be relevant. In its reflection on the targets, ESCAP also emphasized 'the possibility that some of the indicators will become obsolete as technology evolves,' and that 'the relevance of targets and indicators should be examined more frequently, not only to remove outdated goals, but also … to introduce new ones when necessary.'[216]

UNU recommended in its review that any future targets should be linked to the goals and timetable established for the post-2015 development agenda. To be more valuable than their predecessors, it recommends that they 'should go beyond ICT access and infrastructure, and address inequality and quality issues, such as inequalities between specific population groups (men and women) and quality of access.' To be more effective, it recommends that they should be developed through open consultation, involving available statistical expertise, and that their introduction and implementation should be supported by 'high-level endorsement and awareness building among policymakers.' The targets and indicators selected should meet a number of critical criteria. In particular they should be:

- *… time-bound, concrete and measurable, to be able to track progress;*
- *… ambitious but realistic and achievable, based on the assessment of historical and current trends of progress;*
- *… clear and easy to understand for policymakers and other stakeholders*
- *… relevant to policy intervention; and*
- *where possible, based on internationally-agreed statistical standards.*[217]

At its 2014 Plenipotentiary Conference, the ITU agreed to 'promote the activities required to define and adopt new indicators, including e-application indicators, for the purpose of measuring the real impact of ICTs on countries' development.'[218] It

adopted the Connect 2020 Agenda, which sets out targets for the future Information Society within four overarching goals which are concerned with:

- growth (including targets for 55 per cent of households to have Internet access and 60 per cent of individuals to be using the Internet by 2020, and for ICTs to be 40 per cent more affordable by that date);
- inclusiveness (including targets concerned with access levels in LDCs, rural coverage, gender equality and accessible communications for those with disabilities);
- sustainability (including targets concerned with cybersecurity, e-waste and greenhouse gas emissions); and
- innovation and partnership.[219]

Implementing future targets will also require improvements in the statistical capabilities of reporting countries. ESCAP noted in its review of WSIS implementation that 'At the time of the Summit, there may have been an expectation that progress in statistical capacity to measure ICT would closely follow this fast-changing sector, yet this has not been the case.' It emphasized that the capacity of countries with weaker statistical systems will need to be taken into account when establishing targets and indicators, but that this should also be addressed by building on the Partnership's existing work to build the capacity of NSOs.[220] Integration of WSIS Targets with the SDGs would also help by bringing them within a more comprehensive framework for measuring developmental outcomes.

H. SUMMARY – THE CHANGING DIGITAL DIVIDE

The evidence presented in this chapter shows that there has been a dramatic improvement in global connectivity and access to ICTs since WSIS. Mobile phone networks now extend to the large majority of rural areas. There has been a substantial reduction in the divide in basic voice telephony as a result. For the first time, most people in most communities can communicate with one another at a distance.

There has been no comparable shift in the digital divide where fixed telecommunications are concerned. In practice, the principal mode of access in all countries has shifted from fixed to mobile networks and devices. In low-income countries mobile subscriptions make up more than 90 per cent of all connections. Mobile phones are used for a variety of purposes in addition to telephony, including SMS texting, sharing of audio and video files and, for an increasing number of users, access to the Internet. Mobile broadband is being deployed more rapidly and used more extensively than fixed broadband.

The growth in Internet use has been substantial in almost all countries, facilitated by falling prices for Internet access and the increased potential of mobile networks and devices. However, Internet use has grown less rapidly than mobile telephony, and there remains a very substantial gap in access between developed and developing countries, particularly LDCs. Problems of affordability continue to undermine the value of connectivity for low-income individuals and communities.

While the digital divide in basic services is shrinking, there is a growing gap both between and within countries in the quality of connectivity as measured by speed and bandwidth. This has raised concerns that a growing broadband gap will widen rather than narrow other development divides. Broadband networks are becoming available more rapidly in urban areas of developing countries than in rural areas. 'In many respects,' as one UN agency summarized it, 'barriers to accessing and making use of information follow existing patterns of exclusion in society.'[221] Those who are poor, who lack educational qualifications, who live in rural areas or who experience social marginalization are less likely to make use (or extensive use) of ICTs than others in their societies. Women are also less likely to be connected than men. Here, too, the risk arises that a new digital divide will increase rather than diminish differences in opportunity and empowerment between advantaged and disadvantaged groups.

The WSIS Targets were intended to enable assessment of progress towards the Information Society from the technological and market context of 2003. The adequacy of the targets for this purpose has been limited, and significant improvements have been recommended by the Partnership on Measuring ICT for Development to make them more effective and more comprehensive in the future.

The years since WSIS have also seen very rapid changes in the range of technologies and services that are available to support implementation of WSIS outcomes. These changes are described in Chapter 4.

NOTES

136 *Geneva Plan of Action*, paras. 5-6.

137 ITU, UNCTAD, DESA, UIS, ECA, ECLAC, ESCAP, ESCWA, ILO, UNEP/Basel Convention, UNU, OECD, the World Bank and Eurostat.

138 The Partnership's work and achievements are summarized at http://www.itu.int/en/ITU-D/Statistics/Pages/intlcoop/partnership/default.aspx (accessed 14 November 2014).

139 ITU, 2010a, *Core ICT Indicators: 2010* (Geneva, United Nations publication).

140 ITU, 2014b, *Manual for Measuring ICT Access and Use by Households and Individuals* (Geneva, United Nations Publication).

141 UNCTAD, 2009, *Manual for the Production of Statistics on the Information Economy* (New York and Geneva, United Nations publication).

142 UNESCO, 2009, *Guide to Measuring ICT in Education,* (Montreal, UNESCO Institute for Statistics).

143 *Geneva Plan of Action*, para. 6.

144 These indicators differ from those mentioned in Box 3, though they draw on these to some extent. They can be found in ITU, 2010b, *Monitoring the WSIS Targets.*

145 Partnership on Measuring ICT for Development 2011, *Measuring the WSIS Targets: a statistical framework*.

146 See ITU, 2014a, *Final WSIS Targets Review: Achievements, Challenges and the Way Forward* (Geneva, United Nations publication), p. 1-9. The Partnership undertook a metadata survey in 2013 to identify available statistical sources for the *Final Review*. This was followed by a questionnaire, sent at the end of 2013 to 195 countries, seeking data relevant to the Targets. Only 30 per cent of countries submitted responses to this, many providing data only on some indicators. For some indicators, the response rate was less than 10 per cent, too low for generalizations to be made. Returns from LDCs, and from countries in sub-Saharan Africa, were particularly low. It should also be noted that data available for the *Review* relate mostly to 2011 and 2012, while the Targets were intended to be achieved by 2015.

147 Partnership on Measuring ICT for Development, 2011. *Measuring the WSIS Targets: a Statistical Framework*, http://www.uis.unesco.org/Communication/Documents/measuring-wsis-targets-statistical-framework.pdf

148 ITU, 2014c, p. 3.

149 This implied that 129 million people living in rural Africa were outside network coverage out of a global total of 450 million rural dwellers outside coverage areas.

150 *Groupe Speciale Mobile*, the most widespread standard for mobile telecommunications.

151 GSMA, 2014a, Mobile Access – The Last Mile, *GSMA Intelligence*, July.

152 Data from http://www.censusindia.gov.in/2011census/hlo/Data_sheet/India/Communication.pdf; see also ITU, 2014c, pp 3-4.

153 GSMA, 2014b, The Mobile Economy 2014, *GSMA Intelligence*.

154 Contribution by IFLA to the open consultation for the CSTD review, available at http://www.unctad.org/Sections/un_cstd/docs/cstd_wsis10_ifla_en.pdf (accessed 14 November 2014).

155 ITU, 2014a, pp. 247, 264.

156 ITU, 2013a, chart 1.1, p. 2.

157 Aggregate data can be found in ITU web site at http://www.itu.int/en/ITU-D/Statistics/Pages/stat/default.aspx (accessed 14 November 2014).

158 Updated figures concerning subscription densities for the various ICTs discussed in this part of the chapter, including estimates for 2014, can be found in the 2014 edition of the ITU's report *Measuring the Information Society (MIS)*. However, the regional distribution of countries in the *MIS* report differs from that in the *Final WSIS Targets Review*. In order to maintain consistency with other WSIS+10 review processes, this chapter has used figures from the *WSIS Targets Review* where these concern regional variations, supplementing these with additional information from the 2014 *MIS* report where appropriate.

159 See GSMA, 2014b, and ITU, 2014c, p.3.

160 ITU, 2014f, p.2. The figure for sub-Saharan Africa in this report is 1.3 per cent, significantly less than the 3 per cent figure for the whole of Africa identified in the Final WSIS Targets Review, p. 344.

161 Cisco has suggested that a third of mobile data traffic was offloaded to fixed networks via Wi-Fi and other technologies in 2012. ITU, 2013p. 4.

162 Report by ITU, as facilitator of Action Line C2, to WSIS+10 High Level Event, http://www.itu.int/wsis/review/inc/docs/ralfreports/WSIS10_ALF_Reporting-C2.Summary.pdf

163 ITU, 2014c, pp 4-7.

164 http://www.itu.int/en/ITU-D/Statistics/Documents/statistics/2014/ITU_Key_2005-2014_ICT_data.xls

165 Ibid.

166 It also proposed Internet access rates of 50 per cent in developing countries and 15 per cent in LDCs.

167 Data from the ITU Statistics Database, at http://www.itu.int/en/ITU-D/Statistics/Documents/statistics/2014/ITU_Key_2005-2014_ICT_data.xls

168 GeSI, 2008, SMART 2020: *Enabling the Low Carbon Economy in the Information Age, A report by the Climate Group*.

169 The ITU publishes annual data for Internet access and usage at global, regional and national levels. These include access through any device (including mobile phones), from any facility (private, public or commercial) at least once within a given time period (now three, previously twelve, months). This is not, therefore, a measure of regular but of occasional use, and may mask differences in usage between developed and developing countries and between countries in which PC or mobile access is predominant. Household data were available from 39 per cent of countries for measuring this indicator, but from a lower proportion of developing countries and few LDCs. Estimates have been made for other countries. Data quality varies, and is subject to methodological variations. As with telephony data, those currently available relate to the years 2011 and 2012, well before the WSIS Target date of 2015.

170 Aggregate data from the ITU Statistics Database, http://www.itu.int/en/ITU-D/Statistics/Documents/statistics/2014/ITU_Key_2005-2014_ICT_data.xls.

171 ITU, 2014c, p. 11. The figure for Europe was 78 per cent while that for Africa was 11 per cent.

172 Ibid.

173 ITU, 2011a, *Measuring the Information Society* (Geneva, United Nations publication) p. 111.

174 Ibid., pp. 120-121.

175 The overall Basket is made up of three sub-baskets derived from data for fixed telephony, mobile telephony and fixed broadband. Since 2012, the ITU has also collected mobile broadband prices for several different types of broadband plans.

176 Contribution by ESCAP to the open consultation for the CSTD review, available at http://www.unctad.org/Sections/un_cstd/docs/cstd_wsis10_escap_en.pdf (accessed 14 November 2014).

177 Broadband Commission, 'Broadband Targets for 2015', http://www.broadbandcommission.org/Documents/Broadband_Targets.pdf.

178 ITU, *Measuring the Information Society,* 2014, p. 79.

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180 The World Bank, 2011a, *World Development Report 2012: Gender Equality and Development* (Washington, The International Bank for Reconstruction and Development and The World Bank).

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188 Broadband Commission, 2013a, *Doubling Digital Opportunities: Enhancing the Inclusion of Women & Girls in the Information Society* (Geneva, UNESCO Publication).

189 UNCTAD, 2014b, *Measuring ICT and Gender: an Assessment* (New York and Geneva, United Nations Publications).

190 ITU, 2014a, p. 51-81.

191 Ibid., p. 83-115.

192 Ibid., p. 83.

193 Ibid., p. 117-149.

194 Ibid., p. 117.

195 Ibid., p. 151-171.

196 See http://www.who.int/goe/survey/2013survey/en/.

197 Ibid., p. 173-199.

198 Ibid., p. 197.

199 Ibid., p. 201-235.

200 Ibid., p. 214.

201 Ibid., p. 271-325.

202 Data from Netcraft, available at http://news.netcraft.com/archives/category/web-server-survey/ (accessed 14 November 2014).

203 By the end of 2013, the number of daily active users of Facebook, the leading global social network, had risen to more than 750 million, with high proportions of Internet users in most countries making use of file-sharing services such as YouTube and microblogs such as Twitter and Weibo. ITU, 2014a, p. 280.

204 These data include both generic top-level domains (gTLDs) and country code top-level domain (ccTLDs).

205 ITU, 2014a, p. 297.

206 Ibíd., p. 363-376.

207 Ibíd., p. 366.

208 *Tunis Agenda*, para. 115.

209 ITU, 2013a, p. 17-76.

210 For example, the reference period for Internet use was reduced from twelve to three months.

211 ITU, 2014c, p. 46.

212 World Economic Forum and INSEAD, 2014, *The Global Information Technology Report 2014: Rewards and Risks of Big Data* (Geneva, World Economic Forum), p. 3-34.

213 Ibid., pp. 26-27.

214 ITU, 2014a, p. 85-89.

215 Ibid., p. 377.

216 ESCAP, 2014, 'Progress towards the WSIS Targets in ESCP and Regional Perspectives on Measuring ICT Development Objectives,' http://www.unescap.org/sites/default/files/ESCAP%20review%20of%20the%20WSIS%20Targets%20and%20regional%20perspectives_0.pdf

217 ITU, 2014a, pp. 392-396.

218 ITU, *Final Acts of the Plenipotentiary Conference (Busan, 2014),* Resolution 131.

219 Ibid., Resolution WG-PL/9; http://www.itu.int/en/connect2020/Pages/default.aspx.

220 ESCAP, 2014, 'Progress towards the WSIS Targets in ESCP and Regional Perspectives on Measuring ICT Development Objectives,' http://www.unescap.org/sites/default/files/ESCAP%20review%20of%20the%20WSIS%20Targets%20and%20regional%20perspectives_0.pdf

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CHAPTER 4

THE DEVELOPMENT OF ICT TECHNOLOGY AND SERVICES

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THE DEVELOPMENT OF ICT TECHNOLOGY AND SERVICES

Information and communication technologies and markets are in continual evolution. This is not just a matter of infrastructure and connectivity, but also innovation in the types of technology available, the capacity and capabilities of networks and devices, the range of applications and services, and the ways in which these are used by governments, businesses and individuals. The pace and scale of innovation since WSIS has been extremely rapid. Today's networks and devices are capable of much more complex and sophisticated tasks than those available in 2005, while entirely new services have changed the ways in which people interact with one another and with organizations. Together these developments have transformed the potential and modalities of WSIS implementation, posed new challenges and altered the nature of digital divides. Thanks to them, in the words of one contribution to the CSTD ten-year review of WSIS, 'the developing world is constantly trying to catch up to fast-moving changes in the wealthy economies, especially in ICTs.'[222] This chapter outlines the evolution of ICT technology, networks and services since WSIS and considers the impact of these trends.

A. THE CHANGING ICT ENVIRONMENT

The pace of change in technological capabilities of ICTs is encapsulated in what is widely known as 'Moore's Law,' the observation that the capacity of critical ICT components, and so of networks and devices, has been doubling every eighteen months to two years for the past five decades. The implications of this are extremely powerful. It implies that the capabilities of networks and devices in 2015 will be more than thirty times those when the *Tunis Agenda* was agreed. Although there are suggestions that Moore's Law is now decelerating,[223] the rate of growth in ICT capabilities is still expected to grow extremely quickly over the next decade.

The *Geneva Plan of Action* acknowledged that the Information Society is 'an evolving concept that has reached different levels across the world, reflecting the different stages of development,' and that 'technological and other change is rapidly transforming the environment in which the Information Society is developed.'[224] Some technical advances could be anticipated at the time. New wireless technologies were already being deployed, promising improvements in bandwidth and connectivity. Investment in broadband networks, which were expected to play an important part in future, was commended in the *Tunis Agenda*. It was difficult, however, for Summit participants to predict the extent and impact of these changes in the decade following 2005, or fully anticipate other developments in ICT technology and services which have arisen since then.

The Partnership on Measuring ICT for Development recognized the importance of incorporating this dynamic change in implementation and assessment of WSIS outcomes, developing indicators in 2011 in the light of technological developments such as broadband access to public facilities.[225] The *WSIS+10 Vision for WSIS Beyond 2015*, which was agreed in 2014, likewise emphasized that:

> *Several new trends have emerged in the inclusive Information Society such as broadband, social networks, mobility, digital inclusion, massive open online courses … and e-participation, amongst others. Many of these trends bring rapid innovation, diffusion and uptake of mobile technologies, as well as, improved access to ICTs, which has led to the great expansion of the gamut of opportunities that ICTs offer to promote inclusive and sustainable development.*[226]

The CSTD has addressed the changing ICT environment in its follow-up to the implementation of WSIS outcomes. In its midterm review, *Implementing WSIS Outcomes*, it drew attention to five 'new themes in changing times' which had emerged since WSIS.[227] A report by the United Nations Secretary-General prepared for the CSTD in 2014 addressed five recent 'emerging trends' and looked towards longer-term technology developments.[228] The following paragraphs outline these changes and their implications.

1. The transition to broadband

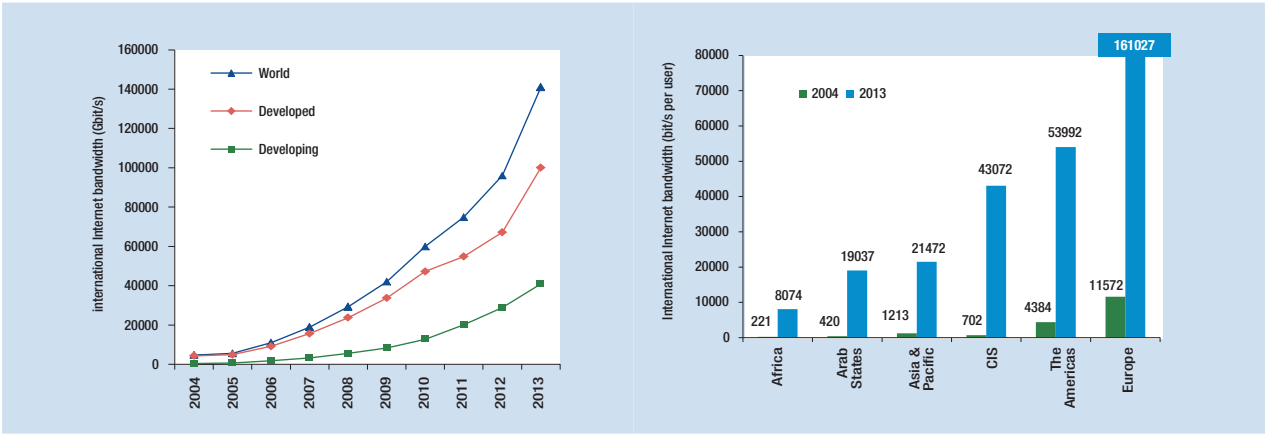
The WSIS outcome documents recognized the importance of broadband at the cutting edge of progress towards an Information Society, urging the development and strengthening of broadband infrastructure at international, regional and national levels. As noted in Chapter 2, defining broadband is not simple. The traditional threshold of 256kb/s is too slow for many of today's applications and some analysts, including the World Bank and Broadband Commission, now describe broadband as 'a cluster of concepts, as high-speed Internet access which is always-on and capable of multiple service provision simultaneously.'[229]

There has been very considerable growth in international bandwidth capacity since WSIS, as illustrated in Figure 25. Almost all countries are now connected to high-speed international submarine cable networks.[230] Developing countries now account for almost 30 per cent of international bandwidth, compared with 9 per cent in 2004.[231] However, as illustrated in Figure 26, there are still very large differences in international bandwidth per Internet user (and even bigger differences in bandwidth per inhabitant) between different world regions.

The decade since WSIS has seen rapid growth in the availability of broadband networks within developed countries, where broadband has rapidly become the norm for household access, but deployment in developing countries has been slower. Estimated average fixed broadband penetration rates in 2014 averaged 27.5 connections per 100 citizens in developed countries, but only 6.1 per cent in developing countries and 0.3 per cent in LDCs.[233] Terrestrial broadband backbone infrastructure has been increasingly deployed in developing countries, by private sector companies and through public-private partnerships, but this has not translated into greater fixed broadband connectivity among end-users. Indeed, fixed broadband penetration growth rates declined in developing countries over the period between 2011 and 2014.[234] Mobile broadband access, however, has grown much more rapidly than fixed, especially in developing countries where local fixed infrastructure is less widespread.

By 2010, broadband was widely seen as an essential element in national ICT strategies, emphasized in regional agreements for infrastructure development.[235] The Broadband Commission, launched by the ITU and UNESCO in 2010, described it as a 'game-changer' for development, which could improve productivity and economic growth and contribute to the achievement of the MDGs and to the post-2015 development agenda.[236] Governments in developed countries now promote superfast broadband for domestic access, while new mobile technologies offer much greater bandwidth and Internet access capabilities in all countries.[237] Broadband investment is highlighted by UN Regional Commissions and other agencies in all development regions. The availability of higher-quality connectivity is driving changes in business practice and consumer behaviour, from video-streaming to computerized stock trading. This in turn is putting pressure on spectrum availability, with policy and regulatory implications discussed below.

Figures 25 and 26: International bandwidth, and international bandwidth per Internet user, 2004 & 2013



Source: ITU, Measuring the Information Society 2014, p.10.[232]

2. *The transition to mobility and development of mobile networks and devices*

The most dramatic change in access to communications since the Tunis Summit has been the rapid spread of mobile telephony. Before mobile networks, teledensity[238] in many LDCs was less than 1 per cent.[239] By 2010, mobile teledensity in developing countries had risen to about two-thirds of population, greatly exceeding expectations at the time of WSIS.[240] It was also clear that mobile telephones could offer viable Internet access, contrary to expectations at the Summit.

The trend towards mobility has continued since 2010. Eighty-six per cent of telephone subscriptions worldwide are now mobile, including 89 per cent in developing countries and 98 per cent in sub-Saharan Africa.[241] Its impact has been most dramatic in developing countries where, for the first time, it has enabled a generation to communicate instantaneously at a distance. This has significant social and economic impacts, for example enabling people to exercise more independence within their families and facilitating contact between diasporas and home communities. Third generation (3G) networks,[242] that enable Internet access, are now predominant in developed countries and are increasingly available in developing countries (though not yet in many rural areas), and higher-capacity (4G) networks are beginning to be deployed. Mobile devices have become the primary mode of Internet access for many users in both developed and developing countries, a trend that commentators expect to continue.

Mobile devices have evolved as rapidly as mobile networks. Three trends, which have accelerated since 2010, continue to transform the market:

- Mobile phones had become multipurpose digital devices rather than merely telephones, with many additional functions (as radios, personal organizers, cameras, audio/video players, Internet access and social networking devices). This has enabled users to combine different functionalities and given mobile phones a central role in many people's work and social lives.
- Mobile phones are now used extensively for Internet access, thanks to the spread of 3G networks and availability of Wi-Fi connections, with high proportions of Internet users in many developing countries obtaining access primarily through mobile devices.[243] However, the World Wide Web Foundation suggests that only a minority of developing country mobile phone subscribers are yet using their phones to go online.[244] Mobile Internet users continue to make use of cybercafés and other public access facilities where these add value.[245]
- The price of both mobile handsets and mobile usage has been falling.[246] Competition, increased capacity and regulatory intervention have led to price reductions in many markets though affordability remains a challenge in low-income countries (see Chapter 3).

Three new trends have emerged since 2010.

- Smartphones, which have many of the features of personal digital assistants (PDAs), have enhanced the capabilities of mobile handsets and been rapidly adopted, especially in developed countries where they can make effective use of broadband connectivity. The installed base of smartphones exceeded that of PCs in 2011 making them 'the most pervasive computing and Internet access device.'[247] Smartphone sales grew that year at three times the rate of PC sales. Although smartphones are less prevalent in developing countries, falling prices and the dynamics of the global market are expected to increase their presence rapidly.[248]
- The availability of smartphones has led to a new market emerging for mobile applications ('apps'), small computer programmes that allow mobile devices to substitute for computers and the World Wide Web. By early 2014, more than a million apps were available on both Apple and Android platforms.[249] A high proportion were developed and marketed by small enterprises, taking advantage of low entry costs and skill requirements.
- Tablet computers incorporate the capabilities of PCs in portable devices designed to be continuously online and use cloud services. The installed base of name-brand tablets rose from zero to an estimated 285 million between 2010 and 2013, by which time it was growing at around 11 per cent *per annum*.[250] As with smartphones, the rapid spread of tablets in

developed country markets is expected to be followed by increased adoption in developing countries, where they are seen by some governments and international agencies as important new development tools.

3. The development of mobile services

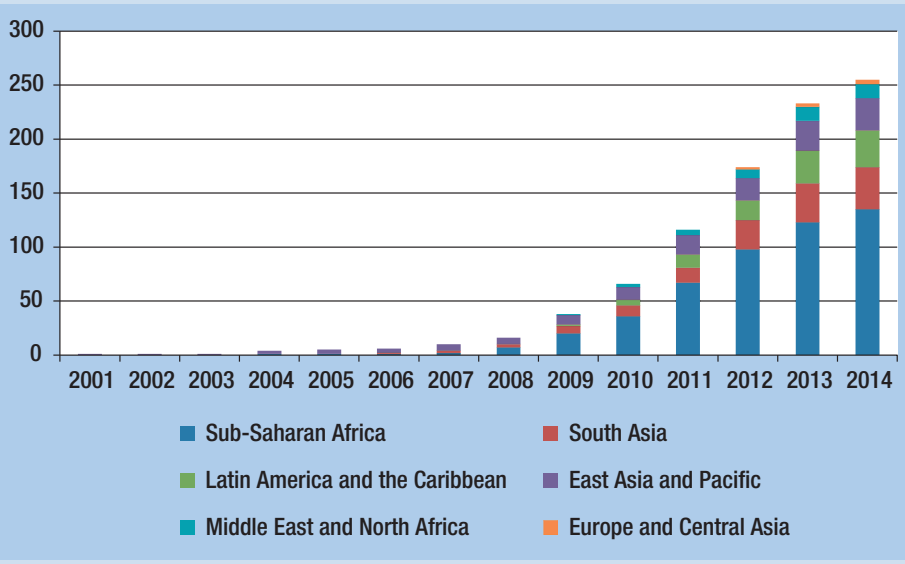
The growth of mobile services has been as dynamic as that of mobile access and devices. The emergence of smartphones and mobile apps exploiting the functionality of 3G handsets has expanded the range of value added applications that can be accessed on mobile devices, building on experience with SMS-based services such as mobile money (see below). Their potential is illustrated by the ITU's m-Powering Development initiative, launched in 2012,[251] which seeks to extend the benefits of mobile networks and services in rural areas, focusing on 'health, education, agriculture, commerce, banking, sport' and other fields that foster sustainable development, improving economic activity, particularly in rural and remote

Box 5: Mobile money

The development of mobile money illustrates the potential of mobile applications for development. Mobile money services enable use of telephones as digital wallets, facilitating transactions between mobile account holders and small-scale capital accumulation. Development agencies see potential for them to act as platforms for international remittances.[252] Although less than half of providers offered an international remittance service in 2013, 45 per cent reported their intention to introduce this during the next year.[253]

The GSMA's Global Adoption Survey reported that 255 mobile money services were available in 89 national markets by the end of 2014, the majority in Africa, with more than 50 of these enjoying competition. This market growth is illustrated in Figure 27. These services had over 200 million registered accounts, and, in nine countries, there were by then more mobile money than bank accounts. More than 100 mobile money providers now offer mobile insurance, credit or savings services as well as banking and transactions, highlighting their potential for deepening financial inclusion.[254]

Figure 27: Growth in mobile money services, by region, 2001-2014



Source: based on GSMA, State of the Industry, 2014, Mobile Financial Services for the Unbanked, p. 15.

Much attention has been paid to the rapid take-up of mobile money in Kenya since 2007. By 2014, Kenya's leading provider MPESA[255] had accumulated 15 million mobile money accounts, equivalent to 35 per cent of national population, and has been said to account for transactions equivalent to up to 60 per cent of national GDP.[256] However, this rate of take-up is exceptional. East African countries accounted for 34 per cent of registered accounts worldwide in 2013.[257] Several explanations have been offered for the high rate of growth in East Africa and slower growth elsewhere, including the variable willingness of financial service regulators in different countries to allow telecommunications businesses to provide banking services.[258] Nevertheless, ICT companies and development agencies expect rapid growth in mobile money, particularly as 3G networks and smartphones become more widely available.

areas, and fostering services in areas which may be economically unviable for operators. A number of services and applications in these fields are described in sections of Chapter 5 concerned with Action Line C7. The important example of mobile money is illustrated in Box 5.

4. User-generated content and social media

The character of online services has changed substantially since WSIS. The first generation of Web services, prevalent at the time of WSIS, made static content or information, and some transaction services, available to end-users through websites managed by governments, businesses, organizations and some skilled individuals. 'Web 2.0' services, which have become prevalent since WSIS, enable interactive exchange of information between end-users alongside static information. This has led to a rebalancing in Internet content and use from information resources to interactive communication.

Social media services are now, after search engines, the most commonly used websites both worldwide and in most countries.[259] Data reported in the *Final WSIS Targets Review* show that Facebook, YouTube, Twitter and Wikipedia feature among the most used websites in most countries for which data are available, while Chinese language equivalents are equally predominant in China.[260] By the end of 2013, the most prominent social network, Facebook, registered more than 1.2 billion monthly and more than 750 million daily active users, equivalent to 40 per cent of daily users of the Web. Its growth since launching in 2004 is illustrated in Figure 28.[261]

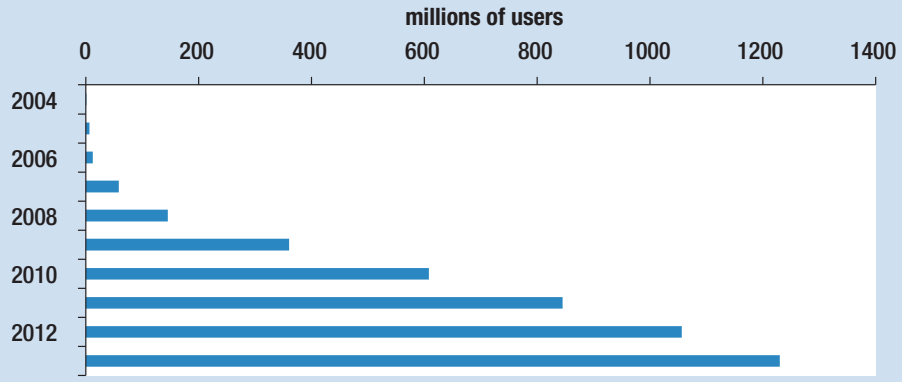
The growth of Web 2.0 services has wide-ranging implications for implementing WSIS outcomes. Citizens and communities have taken advantage of them to develop new forms of social and political engagement. Businesses have adjusted marketing strategies and business models to target advertising and develop more responsive customer relations. Governments have begun to offer online information and transaction services on social media platforms and use them to facilitate consultation processes with citizens. These developments are considered further in Chapter 4.

5. Cloud computing and the cloud economy

A new model of computing and communications known as cloud computing, based on 'convenient, on-demand network access to a shared pool of configurable computing resources,'[262] has developed rapidly since WSIS. The increased capabilities of communications networks have made it cost-effective, where high-speed broadband connectivity is available, for computers and mobile phones to access data and applications online rather than storing these on terminal devices.

Cloud computing has numerous advantages for business and other users with access to the necessary computing and communications assets. Instead of investing in hardware, software and IT management, cloud users can procure these flexibly as and when required. Cloud services can be accessed from multiple locations, using mobile as well as PC platforms. Where adequate communications are available, cloud advocates claim that up to 40 per cent of IT costs can be saved.[263]

Figure 28: Facebook monthly active users, 2004-2013 (millions)



Source: Final WSIS Targets Review, p. 311.

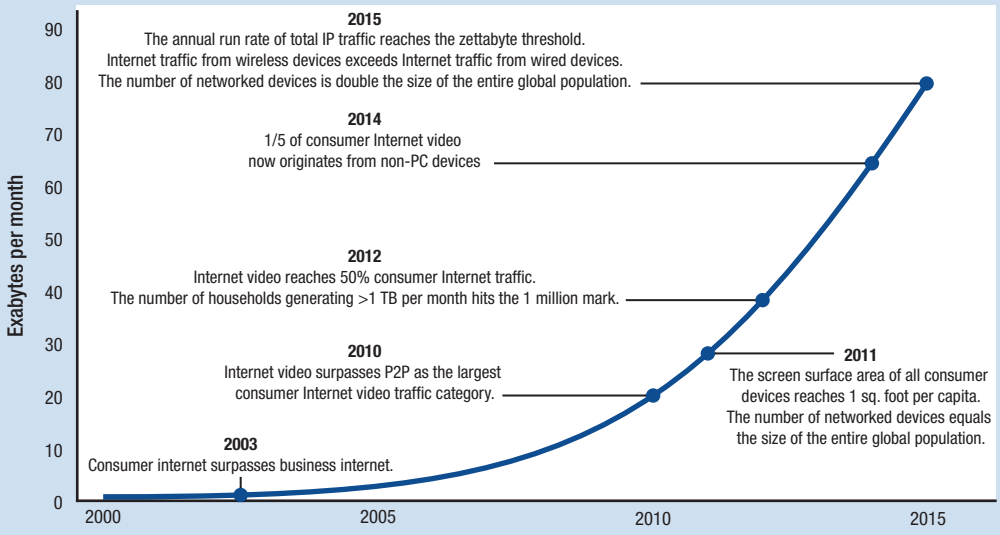
Cloud provisioning has become the standard model for online services such as email, web search, social networking and online retail, initiating a shift in the relationship between citizens and services. Companies prominent in these markets, such as Amazon and Google, have built extensive estates of data centres, mining user data in order to tailor user experience and target advertising, a primary source of revenue within their business models. Cloud services made available by cloud providers, including data storage, business management and software development tools, are increasingly used by businesses and governments in developed countries, and the cloud is expected by many commentators to become the prevalent paradigm for business and government data management and analysis in the next decade.[264]

Reliance on cloud services requires high-quality communications infrastructure, including an expectation of uninterrupted service.[265] As a result, cloud computing is more advanced in developed countries, where communications networks generally offer more reliable connectivity at higher speeds, posing the risk that a 'cloud divide' could emerge between developed and developing countries, particularly LDCs. Data centre investment costs are also very high, with substantial economies of scale,[266] leading some to fear that cloud markets will be dominated by a small number of global businesses, using proprietary standards and beyond the reach of national regulation. There were more than 1,000 secure data servers per million inhabitants in high-income economies in 2011, while there was only one such server per million inhabitants in LDCs.[267] Some governments have concerns about loss of sovereignty over data and applications that are outsourced to global cloud providers, including the risk that data may be accessed by third parties. These concerns have intensified as a result of recent revelations concerning surveillance of global Internet traffic, and some countries are investing in national cloud facilities that enable data to be retained in-country.[268]

6. *Datafication, data management and big data analysis*

Datafication is the process by which data and data management are becoming critical resources in business and government, not just within the ICT sector but across whole economies. It is driven by the increased capacity to gather, store and analyse data which has taken place since WSIS. Organizations and people are undertaking more and more interactions online, which are increasingly managed through centralized databases in the cloud. Data and metadata[269] generated through this can be retained and analysed at low cost. It has been estimated that the volume of data created is now doubling every two years, as illustrated in Figure 29.

Figure 29: The growth in data volume, 2000-2015



Source: Cisco Systems, 'Entering the Zettabyte Era',[270] cited in INSEAD and World Economic Forum, Global Information Technology Report, 2012.[271]

Datafication has been growing most rapidly in developed countries, where it can take advantage of more reliable, high-quality communications infrastructure and available capital investment, but is also expected to increase in developing countries, particularly emerging markets, as their computing and communications capabilities improve.

The terms 'big data' and 'big data analysis' describe the gathering and analysis of large-scale datasets for administrative or commercial purposes. Governments and businesses believe that datafication improves the efficiency and cost-effectiveness of service delivery, reduces labour costs, and simplifies access for end-users.[272] As noted earlier, the business models of free online services are built around analysis of users' data to tailor services and target advertising. Data on citizens, businesses and other organizations can be gathered through interfaces such as national identity schemes and censuses, taxation and the education, health, welfare and justice systems. Systematic analysis of these, as individual datasets and in combination with one another, can enable governments to target resources and deliver services more effectively. However, the value of big data can only be unlocked if data gathered are accurate, reliable and timely, if National Statistical Offices gather data effectively, if decision-makers engage with the development needs and challenges identified, and if financial and logistical resources are available to target resources towards those needs and challenges. Concerns have also been raised about the implications of data retention and analysis for privacy, data sovereignty and security, and about the loss of middle-ranking jobs to algorithms.

In 2009, the United Nations Secretary-General initiated the United Nations Global Pulse to support efforts to 'accelerate discovery, development and scaled adoption of big data innovation for sustainable development and humanitarian action'.[273] The potential of big data analysis for improving development outcomes was also emphasized in the 2013 report of the High Level Panel of Eminent Persons on the post-2015 development agenda, *A New Global Partnership*,[274] which called for 'a data revolution for sustainable development, with a new international initiative to improve the quality of statistics and information available to citizens.' Better data, both aggregated and disaggregated, it argued, 'will help governments track progress and make sure their decisions are evidence-based,' as well as enhancing public accountability. It recommended the establishment of a multi-stakeholder Global Partnership on Development Data which could develop a global strategy to fill data gaps, expand data accessibility and build baseline data for measuring targets to be established for the post-2015 development agenda. A UN Global Working Group on Big Data for Official Statistics was launched in June 2014.[275]

Four other developments are associated with big data gathering and analysis.[276]

- Remote sensors, both terrestrial and satellite, are increasingly used to monitor environmental and other variables, natural and man-made, in technical areas such as meteorology, agriculture, pollution and the impact of climate change.
- Crowdsourcing and citizen science gather data provided through mobile phone networks or the Internet by non-professionals to extend the range, diversity and scope of data collection. Crowdsourcing, which has been used in emergency response, conflict management and transparency initiatives, is commended in the High Level Panel report on *A New Global Partnership*.
- Social media analytics (SMA) apply big data approaches to data and metadata posted on online social networks, using these to assess behaviour and sentiments in user communities, allowing earlier identification of potential health or other problems, but also raising concerns about monitoring of users' behaviour and opinions.
- The term 'open data' refers to the provision of public access to information owned by governments or generated through publicly-funded activity. According to DESA, by 2014, 93 respondent countries had enacted freedom of information legislation enabling public data access, while a further 35 have relevant constitutional provisions.[277] While there is widespread support for the development of open data, experience shows that those with relevant financial and technical capabilities are best equipped to make use of it, and that initiatives to address this disparity are needed if open data are to be used more inclusively.

7. The Internet of Things

The Internet of Things (IoT) concerns the extension of connectivity beyond people and organizations to objects and devices used in daily life. Businesses and governments already extract data from connected objects and devices, for example through radio-frequency identification (RFID) tags, Global Positioning Systems (GPS) and remote sensor networks. The Internet of Things takes this further by enabling any object or device – 'everything from tyres to toothbrushes,' in the words of the ITU[278] – to be connected, respond to users' instructions and gather information which can be used in big data analysis. Advocates of the Internet of Things expect it to enable a step change in the administrative and commercial functions of government and business, from inventory management to distributed computing, and in the ways in which people conduct their daily lives. The ITU has envisaged 'a plethora of innovative applications and services, which will enhance quality of life and reduce inequalities whilst providing new revenue opportunities for a host of enterprising businesses,' including 'tangible applications in … medical diagnosis and treatment, cleaner water, improved sanitation, energy production, the export of commodities and food security.'[279] IoT applications also have the potential to improve the design and management of urban environments, in which an increasing proportion of the world's population now lives.[280]

Most of these predicted applications have yet to appear. However, the number of networked devices overtook that of people worldwide in 2011, and has been estimated to reach 15 billion (around twice the human population) in 2015 and 50 billion by 2020.[281] Internet-connected sensors are now widely used to monitor weather patterns, pollution levels, traffic management and other aspects of daily life, increasing the capacity of governments to intervene in short-term crises and to develop better informed and more effective long-term policy responses.

The Internet of Things poses a number of challenges to policymakers concerned with the ICT sector and wider public policy issues. Its implementation requires increased availability of IP addresses, and is therefore strongly enabled by transition to Internet Protocol version 6 (IPv6) (see Chapter 7). As the number of connected devices grows, it will generate further growth in data volumes and put additional pressure on spectrum resources. An increasing proportion of online interactions will take place between machines rather than people, requiring new standards and norms for machine-to-machine (M2M) communication. The increased data gathering and analysis associated with the IoT have also intensified concerns about privacy and surveillance that have emerged in discussions of datafication, big data and cloud computing (see above).

8. Smart systems

Smart systems are industrial and other processes which use ICTs to enable more efficient production, distribution and consumption. Improved efficiency should lower costs, reduce environmental footprints (including waste generation and carbon emissions), and improve the availability and affordability of goods and services. Automated systems are now widely used in sectors such as international finance, where they have enabled faster activity at lower cost, though concerns have been raised about the risks involved in areas such as automated share trading.

The Global e-Sustainability Initiative (GeSI) has identified four sectors in which it particularly expects substantial financial and environmental savings to be made:[282] smart motor systems in manufacturing, smart logistics in the management of transport and storage, smart buildings (including improvements in building design, management and automation), and smart grids for electricity generation and distribution.

The potential of smart systems can be illustrated through two examples.

- ICTs are increasingly used to improve efficiency in the supply chains for international trade. RFID and GPS technologies track consignments along transit routes, minimizing the need for checkpoints. Automated data-sharing and recording of transactions improve cost-effectiveness and fraud prevention. 'Single window' data-sharing networks expedite the transit of goods along trade routes and in ports and airports. Although mostly used to date in developed countries, these could substantially lower costs in developing countries where checkpoints are frequent and ports and airports often overstretched.[283]

- Smart grids enable more efficient generation and distribution of electricity, including real-time demand-side management. GeSI claims that their deployment 'improves efficiency, energy monitoring and data capture across the power generation and [transport and distribution] network,' and that they could reduce losses in power transport and distribution in a country such as India by 30 per cent, achieving substantial financial and carbon savings.[284]

B. POLICY RESPONSES

The developments in ICT technology and services described above, many of which were not anticipated at the time of WSIS, have great potential to enhance the impact of ICTs on social and economic development and facilitate implementation of WSIS outcomes. However, successful deployment of innovations such as cloud computing and big data analysis requires availability of reliable, high-quality infrastructure that is capable of transmitting very large volumes of data, at low cost, both nationally and internationally. This has raised concerns about the emergence of a new kind of digital divide, between developed and developing countries and between transition economies and LDCs.

High levels of investment in developed countries have enabled them to establish near-ubiquity in broadband access and are driving continued upgrades in the quality and speed of networks available to both businesses and citizens. While most developing regions are also experiencing significant investment, broadband access remains limited in most and rare in some developing countries. Infrastructure investment is therefore crucial to developing countries' capacity to engage fully with the new developments in ICT technology and markets described in this chapter, and to exploit their potential for implementing WSIS outcomes.

This is not simply a matter of network availability, but also of the reliability, security, quality and cost-effectiveness of networks. Cloud users, including businesses and governments, need assurance that the networks and services on which they depend will not be vulnerable to technical failure but will be continuously operational. The reliability of communications networks depends on reliable power infrastructure. It requires sufficient redundancy[285] in network configuration to ensure that connectivity can be maintained if network components fail. The security of data transmitted over data networks or held in the cloud also depends on effective cybersecurity measures by governments, network operators and others in the communications ecosystem.

These factors favour cloud development in countries with more extensive fixed broadband networks, especially where markets are competitive (with more alternative traffic routes as well as lower prices), and where there are facilities such as Internet Exchange Points (IXPs) (see Chapter 7) that maximize the efficiency of local networks. Developing countries that exhibit strong positive growth in ICT capabilities are better placed to take advantage of the innovations that have been described in this chapter than countries which lack that positive growth trajectory.

A number of policy and regulatory dimensions were identified, by contributors to the consultation for this ten-year review, as important in building enabling environments for the development and exploitation of new technologies and services. Some stressed the role of competition in encouraging investment, facilitating redundancy and reducing costs of access for broadband and cloud services. Some emphasized the need for regulatory interventions to foster efficiencies in network use, including infrastructure sharing and open access principles for interconnection. The modernization of communications regulation to address converged and rapidly developing technologies and markets has been a theme of programmes initiated by the ITU and other sectoral bodies since the Summit (see Chapter 5, Action Line C6).

Other policy and regulatory challenges arise from the need to adjust legal frameworks governing business aspects of communications for the digital age, including the introduction and status of digital transactions and electronic signatures, requirements governing privacy, data protection and data sovereignty, and the adoption of new standards for technology development and document exchange. Many developing countries still lack legislative frameworks in these areas. Without them, businesses and citizens are less likely to trust electronic transactions and the growth of electronic commerce, with its potential benefits,

is likely to be inhibited. As the Internet transcends international borders, online transactions also raise complex issues of international taxation, intellectual property, fraud management and consumer rights. Efforts to address the challenges of cybersecurity (see Chapter 5, Action Line C5) are critical to confidence in new technologies and services, and to the pace at which their adoption can contribute to implementing WSIS goals.

C. SUMMARY

The developments in technology and services described in this chapter, together with the rapid growth in communications and computing capacity encapsulated in Moore's Law, have transformed the potential scope for implementation of WSIS outcomes since the Summit. Very rapid growth in data availability enables more sophisticated analysis of social and economic development, new interventions by governments and businesses, and greater access to information and knowledge for citizens and non-governmental actors. Cloud computing has potentially profound effects on business costs and the ability of small firms to innovate, as well as on global patterns of production, distribution and consumption. The Internet of Things, as it develops, will reshape the relationship between people and the devices on which they depend. Smart systems are expected to have substantial impacts on the costs and environmental consequences of non-ICT infrastructure, stimulating development and affecting global policies on sustainability and climate change. The social, economic and cultural impacts of these developments are likely to be equally profound, intensifying the dependence of individuals, communities and businesses on communications networks and digital devices, and accelerating changes in economic production and consumption, social interaction, knowledge gathering, relationships between citizens and governments, transport, employment and other sectors.

As a result of new developments in technology and their impact, many of the policy, technology and service choices that were appropriate in 2005, when many fewer people had access to ICTs and more limited bandwidth was available, have become outdated, while entirely new means of implementing WSIS outcomes have become available to governments and other stakeholders. These trends are critical to understanding the implementation of WSIS outcomes since the Summit, and the relationship between the Information Society and the post-2015 development agenda. They have led to new policy challenges, concerning both the ICT sector and wider public policy.

ICT technology and services continue to develop rapidly. If Moore's Law continues to apply, the capacity of communications and computing devices will multiply a further thirtyfold by 2025, making them more than one thousand times as capable as they were at the time of WSIS. As in 2005, this makes it difficult to predict what new services and applications will arise from technological advances, or what impacts these will have on social and economic outcomes, which will depend not just on technology but also on wider developments including patterns of economic growth and international cooperation. Further new developments in technology and services should be expected, even if they are difficult to predict. As noted in a report by the United Nations Secretary-General in 2014:

> *Further waves of innovation, including new interfaces between people and devices, such as [wearable computers], speech-based computing and automated translation suggest directions in which consumer technology and applications may evolve…. The World Wide Web Consortium advocates development of the 'semantic Web', which would enable automated agents to perform online tasks without users' direct intervention. Research into self-regulating algorithms, artificial intelligence and organic computing also suggests trajectories for the next generation of innovation.*[286]

This context of continuing change suggests that the objectives of WSIS implementation today should reach beyond the targets set at WSIS to take advantage of today's technologies and services, and of emerging opportunities. The trends discussed in this chapter are not final destinations for policymakers, investors or users of ICT goods and services, but starting points for further innovation, which will pose more new challenges for governance institutions as they seek to implement WSIS outcomes in a continually evolving technological environment, as part of a post-2015 development agenda. Policy approaches aimed at

achieving long-term, high-level goals, such as those in that Agenda, are more likely to be successful if they are sufficiently adaptable and accompanied by flexible implementation mechanisms that respond to new circumstances, challenges and opportunities as they arise. Achieving this will require more substantial monitoring and measurement of the emerging Information Society, including the developmental impact of ICTs, and more effective coordination between Information Society and public policy goals in both national and international contexts.

NOTES

222 Contribution by David Townsend & Associates to the open consultation for the CSTD review, available at http://www.unctad.org/Sections/un_cstd/docs/cstd_wsis10_david_townsend_associates_en.pdf (accessed 18 November 2014).

223 See *e.g.* M Smout, 2014, The End of Moore's Law and the Future of Computers. ForrestBrown. 31 October.

224 *Geneva Plan of Action*, para. 2.

225 WSIS Final Targets Review p. 5.

226 ITU, 2014f, p. 24, preamble.

227 CTSD, 2011, p. 113-132.

228 ECOSOC, 2014b, *Information and communications technologies for inclusive social and economic development* (Report of the Secretary-General E/CN.16/2014/3).

229 Broadband Commission, *The State of Broadband 2014: Broadband for All*, p. 16.

230 At the time of WSIS, one of the most significant constraints on the emerging Information Society in some developing countries concerned the lack of connectivity to international submarine cable networks. This was a particular problem for coastal countries in East and West Africa and for landlocked countries in much of the continent, which still relied on more expensive, lower capacity satellite infrastructure. Competitive submarine cable connections around the African coast became available around the turn of the decade. Since then, terrestrial backbone networks and wireless local access networks have been more critical determinants of connectivity on the continent. (Two African coastal countries and some small island states in the Pacific, however, remain unconnected to submarine cable.)

231 ITU, 2014c, p. 9.

232 Note that the regions in Figure 26 differ from those in the WSIS Final Targets Review. CIS refers to the Commonwealth of Independent States.

233 ITU, 2014c, p.5.

234 From 18 per cent to 6 per cent: see ITU, 2014c, p. 4.

235 Such as the ECLAC's *eLAC* plans (see Chapter 8) and the outcomes of the 2007 *Connect Africa* summit (see Chapter 6).

236 Broadband Commission, 2013b, *Transformative Solutions for 2015 and Beyond: Manifesto* (Geneva, UNESCO publication).

237 Further advances in mobile broadband include the emergence of LTE (Long Term Evolution) and 4G networks, which have much higher data transfer capabilities, potentially reaching 100Mb/s. WiMAX technology, first introduced in 2008, also has much higher data capabilities.

238 That is, the proportion of inhabitants with a telephone, typically measured by the number of telephones per 100 population.

239 See *e.g.* ITU, *The Missing Link*, 1984.

240 See Chapter 3.

241 Aggregate data by ITU, published at http://www.itu.int/en/ITU-D/Statistics/Documents/statistics/2014/ITU_Key_2005-2014_ICT_data.xls (accessed 7 January 2015). Prepaid services and innovative tariffs targeted at so-called 'bottom of the pyramid' markets,' have encouraged rapid adoption in lower income groups.

242 Supporting data transfer rates of at least 200kb/s.

243 By the end of 2010, as many as 98 per cent of Kenya's Internet subscribers held subscriptions on mobile networks: Communications Authority of Kenya, 2014, *Sector Statistics Reports*, available at http://ca.go.ke/index.php/statistics (accessed 18 November 2014).

244 As few as 9 per cent, for example, in Pakistan: World Wide Web Foundation, 2013, The Web Index Report.

245 For example, when screen size and download speeds are especially important.

246 Prepaid vouchers have enabled low-income users to manage usage more cost-effectively, while operators have introduced tariff packages geared towards low-income users. Smartphone prices have also been falling – see *e.g.* http://www.mobilenewscwp.co.uk/2014/01/07/smartphone-prices-forecasted-to-fall-to-average-of-180-this-year/.

247 WEF and INSEAD, *Global Information Technology Report 2012*, p. 71.

248 Their touchscreen capabilities and icon-based functionality have facilitated access to the Internet and reduced dependence on traditional literacy.

249 Together, these platforms accounted for 96 per cent of smartphones shipped in that year's second quarter (ITU, 2014a, p. 274).

250 https://www.abiresearch.com/press/big-brand-tablet-installed-base-to-surpass-285-mil.

251 See ITU webpage available at http://www.itu.int/en/ITU-D/Initiatives/m-Powering/Pages/default.aspx (accessed 18 November 2014).

252 The World Bank estimated remittances were worth US$400 billion by 2013 globally and in countries such as Bangladesh substantially exceeded the value of foreign direct investment: available at -world-bank (accessed 18 November 2014).

253 C Pénicauld and A Katakam, 2013, State of the Industry: Mobile Financial Services for the Unbanked, *GSMA Mobile Money for the Unbanked*.

254 Ibid.

255 MPESA is operated by the telephone company Safaricom

256 http://fortune.com/2014/05/09/kenyas-mobile-wallet-tech-expands-to-eastern-europe/

257 C Pénicauld and A Katakam, 2013, *op. cit.*

258 See K Donovan, 2012, Mobile Money for Financial Inclusion, (Washington, The World Bank).

259 These include social networks (such as Facebook and LinkedIn); online chat and instant messaging services (such as Yahoo Messenger, WeChat and Mxit); voice/video-over-Internet and file transfer services (such as Skype); audio and video file-sharing websites (such as YouTube, Flickr, and Instagram); blogs (facilitated by platforms such as Wordpress and Blogspot); microblogs (such as Twitter and Weibo); wiki sites (including the online encyclopedia Wikipedia); and peer-to-peer e-commerce sites (such as e-Bay).

260 Information in this paragraph is derived from ITU, 2014a, pp. 271-326.

261 Other social media websites have seen similarly rapid growth. YouTube reported in February 2014 that its content receives more than one billion unique visitors monthly, those visitors watching approximately six billion hours of content. Twitter, which enables users to publish messages of up to 140 characters online, had built a user community of some 646 million by January 2014. It was estimated in 2013 that over 90 per cent of Chinese Internet users have at least one social media account, the most popular sites providing microblogging, social networking and video file-sharing services.

262 See P Mell and T Grance, 2011, The NIST definition of cloud computing, *National Institute of Standards and Technology*, NIST Special Publication 800-145. The cloud economy is analysed in depth in UNCTAD, *Information Economy Report*, 2013.

263 UNCTAD, *op. cit*. See also *e.g.* http://www.datacenterknowledge.com/archives/2010/01/26/cloud-customers-report-capital-cost-savings/

264 See L Columbus, 'Roundup of Cloud Computing Forecasts and Market Estimates, 2014', at http://www.forbes.com/sites/louiscolumbus/2014/03/14/roundup-of-cloud-computing-forecasts-and-market-estimates-2014/ (accessed 7 January 2015). See also contribution by the United States of America to the open consultation for the CSTD review, available at http://www.unctad.org/Sections/un_cstd/docs/cstd_wsis10_usa_en.pdf (accessed 18 November 2014).

265 In particular, it requires high levels of redundancy (duplicate capacity) in infrastructure as well as low levels of latency (the time taken for communications between user devices and data servers).

266 It can cost as much as half a billion dollars to establish a cluster of data centres (UNCTAD, 2013, p. 36).

267 Ibid., p. xiv.

268 UNCTAD, *op. cit*., *e.g.* p. 84

269 Data about data.

270 Cisco, 2014, The Zettabyte Era - Trends and Analysis, June, available at http://www.cisco.com/c/en/us/solutions/collateral/service-provider/visual-networking-index-vni/VNI_Hyperconnectivity_WP.html (accessed 7 January 2015). (accessed 18 November 2014).

271 World Economic Forum and INSEAD, 2012, *p. 49*.

272 The *UN E-Government Survey* for 2014 found, for example, that 'governments are … increasingly using open data and data analytics to improve accuracy in forecasting citizens' demands of public utilities or to screen for irregularities in public procurement …,' that 'predictive analysis is [being] used to identify issues before problematic scenarios develop, and [that] sentiment analysis is deployed in engaging citizens in public consultation and decision-making processes.' See DESA, 2014, p. 14.

273 http://www.unglobalpulse.org/about-new. In its view, according to an ECLAC study, 'big data analytics turns imperfect, unstructured and complex data on the well-being of people into actionable information which narrows time and information gaps for public policy decision-making, providing a timely response to specific situations and for rapid feedback on the effectiveness of policy actions' V Jordan et al., *Broadband in Latin America: Beyond Connectivity* see http://www.slideshare.net/raulespinozac/broadbandin-latinamerica.

274 United Nations, 2013. See also Chapter 2 of this report.

275 ITU, 2014c, p. 29; http://unstats.un.org/unsd/newsletter/globalstat_unsd_calendar.htm.

276 ECOSOC, 2014b.

277 DESA, *UN E-Government Survey*, 2014 p. 169.

278 ITU, 2005b, *ITU Internet Reports 2005: The Internet of Things, Executive Summary*, (Geneva, United Nations publication), http://www.itu.int/osg/spu/publications/internetofthings/InternetofThings_summary.pdf.

279 Ibid.

280 On smart cities see ECOSOC, 2013c, *Science, technology and innovation for sustainable cities and peri-urban communities* (Report of the Secretary-General E/CN.16/2013/2).

281 World Economic Forum and INSEAD, 2012, *The Global Information Technology Report 2012: Living in a Hyperconnected World* (Geneva, World Economic Forum), p. 171-318.

282 GeSI, 2008.

283 The potential for single window and other trade facilitation ICT applications in developing countries is explored in L Adam, D. Souter et al., 2012, 'ICTs for regional trade and integration in Africa', eTransform Africa.

284 GeSI, *op. cit.*

285 *That is,* the duplication of routing capability.

286 Much attention is also being paid to the development of driverless cars, to automated payment systems and to the continued potential of ICTs for enabling creative disruption of business models in other economic sectors. ECOSOC, 2014b.

CHAPTER 5

IMPLEMENTING THE WSIS ACTION LINES

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The *Geneva Plan of Action* established a series of Action Lines concerned with different aspects of the Information Society, each derived from a principle identified in the *Geneva Declaration*.[287] Most of these are concerned with the application and impact of ICTs, rather than their availability and access (the primary concern of the Targets in Chapter 3). In the *Tunis Agenda*, it was agreed that these Action Lines and the mandates assigned in the *Geneva Plan*, should provide a framework for coordinating implementation of WSIS objectives involving all relevant stakeholders.

The eleven main and eight subsidiary Action Lines are listed in Table 3, together with the UN agencies that now have lead responsibility for their facilitation. Action Lines do not have independent financial resources.

Annual Action Line facilitation meetings, open to all stakeholders, have been held since 2007.[288] These meetings were initially clustered over a two-week period, but achieved what were generally considered low levels of participation, leading to a review and reorganization in 2009. Since then, facilitation meetings have been integrated with other sessions in the WSIS Forum, which is described in Box 6 below.

Table 3: WSIS Action Lines

Action Line	Mandate	Lead facilitator (2014)
C1	The role of public governance authorities and all stakeholders in the promotion of ICTs for development	DESA
C2	Information and communication infrastructure	ITU
C3	Access to information and knowledge	UNESCO
C4	Capacity building	ITU and UNDP
C5	Building confidence and security in the use of ICTs	ITU
C6	Enabling environment	ITU
C7	E-government	DESA
	E-business	UNCTAD
	E-learning	UNESCO
	E-health	WHO
	E-employment	ILO
	E-environment	ITU
	E-agriculture	FAO
	E-science	UNESCO
C8	Cultural diversity and identity, linguistic diversity and local content	UNESCO
C9	Media	UNESCO
C10	Ethical dimensions of the Information Society	UNESCO
C11	International and regional cooperation	DESA

Source: ITU, http://www.itu.int/wsis/implementation/facilitators.html.

Box 6: The WSIS Forum

The WSIS Forum was established in 2009, following consultation among stakeholders, as a framework to improve participation in Action Line facilitation and develop a wider range of discussions to support implementation of WSIS outcomes. It is hosted by ITU and co-organized with UNCTAD, UNDP and UNESCO. It has since become a regular feature of the ICT and ICT4D calendar, held annually in Geneva, usually around the time of World Telecommunication/ICT Day in May. As well as Action Line review meetings, sessions of the Forum have included high-level panels, workshops on ICT-related issues, publication launches, the presentation of WSIS Project Prizes[289] and other activities. Action Line meetings within this framework have focused on exchanging information among stakeholders concerning their different activities and, in most cases, on consideration of one or two specific issues within each Action Line's mandate. They have attracted larger attendances than the earlier clustered meetings and enabled synergies to develop between Action Lines and other sessions.[290]

A review of Action Line implementation and processes was undertaken during 2013-2014 through an online consultation and Multi-stakeholder Preparatory Platform, which culminated in the WSIS+10 High Level Event which was coordinated by ITU (see Box 2 in Chapter 2).[291] The *WSIS+10 Statement on the Implementation of WSIS Outcomes*, (referred to below as the *WSIS+10 Statement*) which was agreed at this Event, includes an overview of implementation and review of challenges experienced in relation to the Action Lines. The *WSIS+10 Vision for WSIS Beyond 2015* (referred to below as the *WSIS+10 Vision*), also agreed at the Event, includes sections concerned with the 'further enhancing' of each Action Line. Each of these documents recognized that the developments in information and communications technology and markets, which are summarized

in Chapter 4, have had profound impacts on implementation of the Action Lines since WSIS. The *Statement* emphasized that:

> *The uses of ICTs have developed considerably and become a part of everyday life since the second phase of the WSIS in 2005, accelerating social and economic growth, sustainable development, increasing transparency and accountability, where applicable, and offering new opportunities to leverage technology, in developed and developing countries.*[292]

The *Vision* added that:

> *Many of these trends bring rapid innovation, diffusion and uptake of mobile technologies, as well as, improved access to ICTs, which has led to the great expansion of the gamut of opportunities that ICTs offer to promote inclusive and sustainable development.*

These developments and trends therefore form an integral part of assessing implementation of the Action Lines.

This chapter draws on the assessment of the Action Lines undertaken through the Multi-stakeholder Preparatory Platform that culminated in the WSIS+10 High Level Event which is described above, on the reports of Action Line facilitators to that process, and on contributions made in the consultation for CSTD's ten-year review. It is divided into eighteen sections, each related to one of the Action Lines. The first part of each section summarizes the Action Line mandate, briefly describes work which has been undertaken through Action Line facilitation since WSIS, and summarizes the further enhancements that were agreed in the *Vision for WSIS Beyond 2015*. The second part outlines the most important developments in technology, markets and implementation activities that have taken place within the area covered by each Action Line's mandate since WSIS and that form the basis for further enhancements.

Only a small proportion of the activities undertaken by international agencies, governments and other stakeholders to implement WSIS outcomes have been reported through Action Line meetings and procedures. This chapter should therefore be read in conjunction with Chapter 8, which outlines the work of diverse stakeholders involved in WSIS implementation.

A. 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.[293] Goals and targets identified 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 organizations and financial institutions were asked in the *Plan of Action* to develop strategies for the use of ICTs to support achievement of the MDGs and in 'sustainable development, including sustainable production and consumption patterns,' giving this Action Line particular relevance to the development of SDGs.[294]

The Action Line has been facilitated by DESA, in conjunction with the ITU and UN Regional Commissions, alongside Action Lines C11 and C7 (e-government). Activities reported through it since 2005 reflect the diversity of its mandate. Many international agencies have worked on issues concerning the relationship between citizens and governments. The ITU, ECE, the Internet Engineering Task Force (IETF) and international standards bodies concerned with ICTs have played important roles in the establishment of international standards, such as those for Next Generation Networks and new wireless technologies, working alongside ICT sector businesses. New forms of multi-stakeholder cooperation, including public-private partnerships, have emerged.

The *WSIS+10 Vision for WSIS Beyond 2015* reaffirmed the importance of 'effective participation of governments and all other stakeholders … in developing the Information Society, through inclusive

engagement and cooperation among all stakeholders.' It encouraged 'greater regional and international dialogues and collaboration' in promoting ICT4D, as well as encouraging development of national ICT policies, strategies and regulatory frameworks, 'taking into account different national circumstances.' Critical development objectives identified in the *Vision* include affordable access, the narrowing of socio-economic inequalities, and monitoring and evaluation.[295]

Developments since WSIS

The *Tunis Agenda* encouraged governments to give 'appropriate priority to ICTs' in their national development strategies, in poverty reduction strategies, and in sectoral programmes concerned with health, education and other development sectors. It encouraged them 'to elaborate … comprehensive, forward-looking and sustainable national e-strategies, including ICT strategies and sectoral e-strategies as appropriate,' as 'an integral part' of these national development plans.[296] It was envisaged that these would be incorporated in development agreements with multilateral and bilateral donors. The *Agenda* recommended regional cooperation and sharing of relevant knowledge and experience to assist in national capacity-building and strategy development.

There has been considerable growth since WSIS in the number of national e-strategies, which have been actively promoted by UN Regional Commissions. In Africa, for example, ECA has supported National Information and Communication Infrastructure Plans (NICIs) through its African Information Society Initiative (AISI) since the mid-1990s. In 2005, 27 African countries had developed national policies. By 2013, this had risen to 48.[297] ECLAC has supported the development of national e-strategies within a series of regional ICT strategies known as *eLAC*s, which have fostered sharing of experience and good practice (see Chapter 8).

The content of regional and national strategies has also developed in the period since WSIS in response to technological innovation and the growing capacity of infrastructure. The Connect Africa summit in 2007, like other initiatives around the time of WSIS, focused on infrastructure issues, including the connection of population centres to broadband networks, but also stressed the importance of regulatory frameworks to promote affordable access, 'the development of a critical mass of ICT skills required by the knowledge economy,' cybersecurity and the introduction of flagship e-government services.[298] A later review of African e-strategies identified five main areas of focus, the emphases between these varying in different countries:

- the potential macroeconomic value of ICTs in improving productivity, stimulating trade and attracting foreign direct investment;
- the potential for the development of new economic sectors, such as business process outsourcing;
- the role of e-government in improving administration;
- the role of ICTs in specific development sectors such as health and education; and
- the potential of ICTs for empowering citizens and increasing citizen participation in social and economic development.[299]

A number of contributions to the consultation process for this report describe national experiences of strategy development and policy implementation.[300] The main focus of many e-strategies today is on broadband infrastructure and applications. In 2011, the Broadband Commission set a target that all countries should have a national broadband plan by 2015, and/or should include broadband in their universal access/service definitions.[301] The World Bank published a *Broadband Strategies Handbook* to assist governments in this context in 2012.[302] Alongside infrastructure deployment, many strategies encompass the development of a broadband ecosystem including broadband suppliers, business, government and consumers, incentives to ensure widespread access, and measures to stimulate demand such as e-government services and subsidized equipment.[303] By 2012, INSEAD reported that broadband strategies had been adopted in 119 countries (62%) and were under development in a further twelve.[304]

Ensuring that national strategies remain up-to-date has been a challenge in the context of rapid technological and market change. Some countries have now implemented several generations of e-strategies,[305] but there has been concern in others that strategies have not been adjusted to

address new opportunities and difficulties such as those described in Chapter 4. To address this, UNCTAD has emphasized that:

> *Developing countries should define, as part of their national ICT plans, mechanisms for ongoing policy review, assessment and monitoring. This is important to ensure that evolving ICT strategies are consistent with the development goals set out and to maximise the positive contributions of investments in ICT and in capability development.*[306]

The interface between strategy and implementation has been another important challenge for governments, leading to what has been described as a 'design:reality' gap in ICT and ICT4D deployments.[307] ESCWA, for example, has observed that 'Some countries … are … good at drafting comprehensive ICT strategies that end up getting sidestepped because of a dearth of funds, the non-existence of a realistic implementation plan, the lack of a monitoring and evaluation process or more pressing national priorities.'[308]

The development of multi-stakeholder cooperation in implementing WSIS outcomes is discussed in Chapter 8.

B. ACTION LINE C2 – INFORMATION AND COMMUNICATION INFRASTRUCTURE

The mandate for Action Line C2 describes 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 areas;
- policies to facilitate access to the public facilities and locations identified in WSIS targets;
- policies to enable full inclusion of disadvantaged social groups;
- 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.[309]

This Action Line has been facilitated by the ITU. Since 2010, Action Line meetings have focused on 'broadband infrastructure for connecting the unconnected,' the digital switchover,[310] and regulatory aspects of backbone connectivity.

The *WSIS+10 Vision* reaffirmed the central importance of infrastructure in enabling connectivity, and emphasized the particular importance today of broadband infrastructure for achieving 'sustainable connectivity' and access for all:

> *Broadband connection based on converged services and enhanced radio frequency spectrum and satellite orbit management supported by efficient backbone, new technologies, policies which promote innovation, national broadband plans based on reliable data, and international standardization are the keys for such achievement.*[311]

As well as network infrastructure, the *Vision* drew attention to the development of affordable, interoperable network and consumer equipment, to policy and financing mechanisms such as universal access funds and public-private partnerships, backed by appropriate market liberalization mechanisms, and to the need to secure emergency telecommunications.[312]

Developments since WSIS

There have been very significant developments in infrastructure and connectivity since 2005, which are summarized in Chapters 3 and 4. These have been financed primarily by the private sector but with significant government and IFI funding in some cases. Many developed and developing countries have adopted universal access/service strategies to stimulate network deployment in underserved areas and for marginalized groups. Financial mechanisms, including universal access/service strategies, are discussed in Chapter 6.

As well as reaching much wider geographic areas, there have been substantial changes in the nature

and quality of infrastructure since WSIS, including the predominance of mobile networks and the spread of broadband capabilities (see Chapter 4). While mobile networks have led the way in expanding infrastructure and access since WSIS, some stakeholders believe their adequacy to meet future needs remains in question, particularly when growing demands from cloud computing and the Internet of Things are taken into account.[313] Contributions to the open consultation for the CSTD ten-year review of WSIS cited measures that will be needed if infrastructure networks are to support these innovations, such as more dynamic approaches to spectrum management, (including spectrum reallocation, the digital transition in broadcasting and the availability of television white space), the establishment of more IXPs, and a more rapid transition to IPv6.

Other infrastructure challenges identified in the ITU's contribution to the WSIS+10 review include the exceptionally rapid growth in data traffic, which is straining the capacity of networks and exacerbating spectrum shortage; the need for new approaches to convergence between broadcasting and mobile networks; and the development of affordable easy-to-use devices offering all potential users the wider range of services that have become available.[314] These issues, which are concerned with the enabling environment for infrastructure, are discussed under Action Line C6.

Action Line C2 is also concerned with the use of ICTs in emergencies. Here, too, there have been significant advances since WSIS. These include measures to lessen the impact of disasters, through more widespread and sophisticated use of satellites, sensors and other ICTs in early warning systems, and improvements to build resilience to earthquakes and other natural disasters into the design of networks. They also include measures to ensure the maintenance of communications and other services at times of crisis, including contingency plans for emergency deployment of wireless communications networks, to facilitate information gathering from affected populations, and to disseminate advice in the aftermath of crisis. More widespread mobile networks have made it easier to maintain communications in disaster-affected areas than was previously the case. Mobile networks and social media also facilitate crowdsourcing of information on local needs.[315] Experience has shown, however, that these need to be integrated with other aspects of disaster preparedness and management if they are to be effective.[316]

C. 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.'[317] Its remit covers a range of issues which affect the ability of individuals and organizations to gain access to information and knowledge. It proposes an open systems approach to the creation and availability of content and software, the strengthening of public domain resources and availability of access facilities. Objectives for Action Line C3 include:

- access to public information and resources;
- community access to the Internet and ICTs, through facilities including schools, libraries and telecentres;
- access to both proprietary and open source software;
- access to scientific journals and other data sources for research and community development; and
- access to ICTs for vulnerable social groups, including those with disabilities.[318]

Action Line C3 has attracted interest from many organizations, providing a framework for sharing experience and the emergence of multi-stakeholder partnerships concerned with access to knowledge. Since 2008, this Action Line has focused on open access, open systems and open standards. According to its lead facilitator UNESCO, 'Participating agencies agreed in 2008 that open standards are important in maximizing opportunities for software innovation, in both proprietary and open source models of development.'[319] It has paid particular attention in recent years to promoting access to scientific data and knowledge, and to improving access for people with disabilities.

The *WSIS+10 Vision* reiterated the importance of universal access to information and knowledge, reaching beyond connectivity and infrastructure to encompass media and information literacy, multilingual and culturally diverse content and the preservation of digital heritage. It reiterated support for 'sustainable multi-purpose community public access points providing affordable or free-of-charge access' for all, and urged stakeholders to cooperate in eliminating 'discrimination in publication of user generated content and access to this information.'[320]

Developments since WSIS

Two factors have fostered growth in access to information since WSIS: growth in the number of people active online and growth in the volume of content that is now available. The World Wide Web provides Internet users with access to far more information, derived from sources the world over, than could be accessed by previous generations making use of locally accessible newspapers, libraries and broadcast services. Some commentators now consider abundance of information to be at least as much of a problem for users as was its scarcity. Search engines and other resources, including online encyclopedias and price comparison sites, help users to navigate their way through this increased volume of information. User-generated content has greatly increased the volume of information on the Internet and added greater granularity: much of the information that individuals now use is located in interest groups with which they choose to be associated. However, as is clear from Chapter 3, there remain substantial differences in the extent to which users can access information in different countries.

The mode by which information access is primarily obtained has also changed since WSIS. At the time of the Summit, telecentres, cybercafés and other public access facilities were expected to play the leading role in enabling access to information, at least for lower-income users in developing countries. The rapid spread of mobile telephony and the increased range of information services which are now available have made public facilities of this kind less important in providing basic services for most users than was expected in 2005. Innovative access models for 'bottom of the pyramid' markets, as they are sometimes called, have played an important part in achieving this, including the introduction of affordable prepaid usage tariffs. However, public access facilities continue to be important resources for enabling access to information for many users, especially in developing countries where individual access is more expensive in relation to incomes, and personal computers are less widely available.[321]

Reviewing Action Line C3 for the WSIS+10 High Level Event, UNESCO noted that, while access to ICT networks and services has greatly expanded since WSIS, more attention needs to be paid to users' capabilities to take advantage of what networks and services can offer. UNESCO and other stakeholders have emphasized that access to communications should 'be accompanied by greater access to the resources that people, businesses and communities require in order to transform information into knowledge that can enhance their lives and livelihoods.'[322] For greater value to be achieved, governments and other stakeholders need to pay as much attention to issues of capacity-building (Action Line 4) and content, including content in local languages (Action Line 8). Contributors to the consultation for CSTD's ten-year review placed particular emphasis on the importance of developing content that is relevant to the needs of marginalized groups, including indigenous peoples.

Another important strand of activity within this Action Line concerns ensuring equal access to ICTs and the Internet for people with disabilities. Innovations such as voice-activated computing and communications devices, which have been developed since WSIS, illustrate the potential for technology to enhance the accessibility of ICTs to people with disabilities, facilitate their engagement with social and economic opportunities, and foster their empowerment.

D. ACTION LINE C4 – CAPACITY-BUILDING

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.'[323] Objectives identified in the *Geneva Plan* include:

- measures to include ICTs in education and training at all levels of society, including distance and lifelong learning;
- the promotion of 'e-literacy' skills, particularly for women and girls, young people and disadvantaged groups; and
- capacity-building initiatives for, among others, 'leaders and operational staff in developing countries and LDCs,' 'local communities, especially those in rural and underserved areas' and information professionals.[324]

This Action Line has been implemented in association with Action Line C7 (education). It has provided a framework for UN and other agencies to share experience and explore the implications of new technology and markets. In 2009, for example, the Action Line focused on emerging trends that challenge established capacity-building paradigms, including the growing availability of open educational resources and social networking tools that allow more interactivity and collaborative learning. Recent facilitation meetings have addressed leadership in capacity-building, mobile learning and 'developing national e-skills for a knowledge society.'[325]

The *WSIS+10 Vision* emphasized that 'Everyone should have an opportunity to acquire the necessary skills and knowledge to benefit fully from the information society,' and that, therefore, 'capacity building, digital literacy and competences are essential for all.' It urged the development of programmes to address conventional and digital literacy, including 'ICT and ICT-enhanced education for skills development and lifelong learning beyond the classroom.' More specifically, it called for the development of training programmes on the demand and supply sides of ICT resources (for 'creators, maintainers and operators' and for 'beneficiaries'), and ICT-related capacity-building for those in national leadership roles.[326]

Developments since WSIS

Capacity-building was widely recognized in contributions to the open consultation for the CSTD ten-year review of WSIS as a critical enabling factor in the Information Society, which concerns both technical issues and the skills required by users of ICTs. Capacity-building initiatives since WSIS have focused on a number of different levels.

- 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 e-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.

A great deal of experience has been gained by governments and other stakeholders in these areas since WSIS. A report by the United Nations Secretary-General noted in 2012 that individual capacities can be seen to develop from inclusion, through engagement, to empowerment.[327] 'Capacity-building at the individual level,' it noted, crucially depends upon 'the social context of the individual and opportunities for learning,' which is a collaborative as well as individual process.[328] Capacity-building cannot therefore be separated from other aspects of the social and economic environment. Evidence from Latin America and elsewhere, published by the ITU, shows that people who have attained secondary or tertiary educational levels use the Internet more than those with a lower level of education.[329]

Contributions to the open consultation process for the CSTD ten-year review of WSIS identified a number of areas in which stakeholders felt more attention was needed for capacity-building. A number emphasized the research and other skills that users need to gain full advantage from the range of online information sources now available to them.[330] Others stressed skills related to employment, enterprise and applications development in the ICT sector, and the desirability of incorporating these in educational and online training opportunities for both girls and boys.

The ITU, World Bank and other agencies have paid particular attention since WSIS to building the capacity of policymakers and independent regulatory authorities.[331] Initiatives in these areas

have faced two challenges: that of adapting experience gained in countries that have already moved towards more competitive and regulated regimes for countries that do not share the same economic, administrative or sectoral characteristics, and that of adapting past experience to the rapidly changing technologies in present markets. A report by the United Nations Secretary-General in 2010 noted that efforts to build policy capacity 'have often been inefficiently designed to reflect the needs and experience of the regions,' and that 'many initiatives have failed to produce a practical and lasting impact in the development of regulatory and policy capacity.'[332] Reviewing experience over the past decade, the ITU suggests that more attention should be paid to sharing good practice in capacity-building, improving understanding and integration between capacity-building, training and education, developing standards for capacity-building and making full use of mobile as well as more conventional platforms.[333]

Developments concerning education are described under Action Line C7 below.

E. ACTION LINE C5 – CONFIDENCE AND SECURITY

While most Action Lines are concerned with maximizing the benefits that can be derived from ICTs and the Information Society, Action Line C5 is primarily concerned with problems that may inhibit use and undermine those benefits. People are less likely to use ICTs if they lack confidence in the security and reliability of networks or services, fear that private information will be compromised, or are concerned about the risk of fraud. Cybersecurity and related issues have therefore been increasingly important themes for governments and other stakeholders since WSIS.

The *Geneva Declaration* recognized that 'a global culture of cyber-security needs to be promoted, developed and implemented in cooperation with all stakeholders and international expert bodies.'[336] The objectives in the *Plan of Action* 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 (which is required for e-business); and
- the security of online transactions.[335]

Sessions concerned with cybersecurity and related issues have been a regular feature of the WSIS Forum since 2009.[336] A roadmap for work within Action Line C5 was published by the ITU in 2010, built around partnerships between governments and the private sector.[337] Issues concerned with confidence and security have played a prominent part in the IGF and other international meetings as the Internet has become more important in all aspects of economic and social life.[338] Growing attention has been paid to the risks posed to national security, business integrity and individual welfare by insecure networks and cyber-criminality, and to child protection issues. Cybersecurity was also high among the priorities identified by many contributors to consultation processes for the CSTD ten-year review of WSIS.

The *WSIS+10 Vision* reaffirmed that 'Confidence and security continue to be prominent among the main pillars of the Information Society.' It encouraged 'further strengthening of the trust and security framework …, with initiatives or guidelines with respect to rights to privacy, data and consumer protection' and 'the development of assessment frameworks to measure readiness of countries on various aspects of confidence and security in the use of ICTs.' Specific recommendations were made concerning open standards and the participation of developing countries in standard-setting processes, the establishment and functioning of Computer Incident Response Teams (CIRTs), and the protection and empowerment of children online.[339]

Developments since WSIS

Although issues of cybersecurity have been increasingly prominent in international discussions concerning the Information Society, there is no universally agreed definition of cybersecurity. The ITU has defined it as meaning

> *the collection of tools, policies, security concepts, security safeguards, guidelines, risk management approaches, actions, training, best practices, assurance and technologies that can be used to protect the cyber*

environment and organization and user's assets. Organization and user's assets include connected computing devices, personnel, infrastructure, applications, services, telecommunications systems, and the totality of transmitted and/or stored information in the cyber environment.

According to the ITU, therefore, cybersecurity 'strives to ensure the attainment and maintenance of the security properties of the organization and user's assets against relevant security risks in the cyber environment,' in terms of its availability, integrity and confidentiality.[340]

Different stakeholders have interpreted the scope of cybersecurity in different ways, some including and some excluding related areas that are also covered by this Action Line, such as cybercrime, privacy and child protection. Responses to the open consultation for the CSTD ten-year review of WSIS show widespread concern that threats have increased substantially over the decade since WSIS, and changed in character as the Internet has become more widely available and come to play a more important part in social and economic life.

Many problems associated with cybersecurity are specific to ICTs and the Internet, including spam and malware, hacking of websites and user accounts, and the threat posed by distributed denial of service attacks.[341] Others are rooted in criminality and abuse that preceded the Internet but which can now be undertaken in new ways, such as fraud and the distribution of child sex abuse images. While some cybersecurity issues are primarily technical, others can be addressed only through partnership between technical entities, those responsible for law enforcement and public policy professionals. The borderless nature of the Internet poses particular challenges for detection and enforcement of online criminality, leading to calls from some stakeholders for greater multilateral and multi-stakeholder cooperation on cybersecurity issues.

In 2007, the ITU launched the Global Cybersecurity Agenda,[342] a framework for international cooperation structured around five pillars of activity concerned with legal frameworks, technical and procedural measures, organizational structures, capacity-building, and international cooperation.[343] It and other agencies have published reports and guidelines addressing evolving threats posed to cybersecurity. The International Multilateral Partnership against Cyber Threats (IMPACT), a partnership between the ITU, governments and other stakeholders, is one among a number of initiatives that have provided research capability and assisted individual countries in implementing cybersecurity.[344] National level Computer Emergency or Incident Response Teams (CERTs/CIRTs) have been established in an increasing number of countries, helping to protect national environments against cyber-attacks, with support from international partnerships including the ITU and the Forum of Incident Response and Security Teams (FIRST).[345]

Other international initiatives have addressed cybersecurity issues since WSIS, responding to new threats that have emerged as technology has changed. These include the Budapest Convention on Cybercrime,[346] which came into force in 2004 and seeks to harmonize national legal approaches, improve investigative techniques, and increase cooperation to address cross-border challenges. By 2014 it had 64 signatory countries.[247] An African regional convention on cybersecurity was developed by ECA and the African Union in 2013.[348] In contributions to the CSTD ten-year review of WSIS, a number of stakeholders stressed the value of multi-stakeholder cooperation in this context, bringing together the technical expertise of ICT sector businesses and Internet professionals and the legal competence of governments.

Reviewing this Action Line for the WSIS+10 High Level Event, the ITU identified significant achievements since WSIS, including the growing number of national cybersecurity strategies in place, the growth in legislative frameworks for electronic documents and transactions, increased incident response capabilities, and a decrease in the volume of spam and phishing attacks occurring on the Internet. However, it felt that intergovernmental cooperation in cybersecurity remains fragmented, that closer cooperation is needed among governments and between them and the private sector, and that more effort is required to integrate cybersecurity into national e-strategies. Challenges for the future that it identified include the need to improve awareness of the threats posed at all levels of government and society, risks associated with technological innovations such as cloud computing and M2M communications, the need to share

standards and develop metrics for measuring cybersecurity threats, and the increasing complexity of malware.[349]

F. ACTION LINE C6 – ENABLING ENVIRONMENT

The *Geneva Declaration* set out two principles for 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.' It asserted that:

> *The rule of law, accompanied by a supportive, transparent, pro-competitive, technologically neutral and predictable policy and regulatory framework reflecting national realities, is essential for building a people-centred Information Society. Governments should intervene, as appropriate, to correct market failures, to maintain fair competition, to attract investment, to enhance the development of the ICT infrastructure and applications, to maximize economic and social benefits, and to serve national priorities.* [350]

The concept of an enabling environment includes a wide range of policy, legal and regulatory frameworks, not just for the ICT sector but also for investment promotion and enterprise development, intellectual property, Internet governance and the impact of ICTs on public policy domains such as the environment. The *Geneva Plan of Action* therefore established a wide-ranging mandate for Action Line C6, calling 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.'[351]

The *Tunis Agenda* reiterated 'the importance of creating a trustworthy, transparent and non-discriminatory legal, regulatory and policy environment. To that end,' it continued, 'ITU and other regional organizations should take steps to ensure rational, effective and economic use of, and equitable access to, the radio-frequency spectrum by all countries, based on relevant international agreements.'[352]

In addition to this legal and regulatory framework, issues identified in the mandate for Action Line C6, some of which intersect with other Action Lines, included:

- efficient and equitable spectrum management;
- implementation of national Internet Exchange Points (IXPs);[353]
- consumer protection legislation;
- online privacy;
- 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
- the development of internationalized domain names for the Internet.[354]

Recent Action Line facilitation meetings have focused on specific aspects of sectoral development, including cloud computing, the role of ICTs in improving governance, and the ability of the ICT sector to respond to changing consumer behaviour and demand.[355]

In reviewing this Action Line, the *WSIS+10 Vision* reiterated the need for governments 'to continue to create a trustworthy, predictable, pro-competitive, supportive, transparent and non-discriminatory, legal, regulatory and policy environment that supports innovation, entrepreneurship, investment and growth.' It encouraged the development of frameworks that would foster broadband deployment; promote digital inclusion and empowerment; nurture investment, innovation and entrepreneurship; support small- and medium-sized enterprises; foster 'an intellectual property rights framework that balances the interests of creators, implementers and users;' and ensure confidence and security in the development and use of ICTs.[356]

Developments since WSIS

There have been extensive developments in the legal and regulatory frameworks that constitute the enabling environment for the Information Society since WSIS, as policymakers and regulators have responded to rapid changes in technology,

services and markets. These fall into two main areas, concerned with communications regulation and with the legal and regulatory framework for e-commerce and new services.

The two decades before WSIS saw extensive changes in the structure of the telecommunications sector, including the privatization of many fixed operators, the liberalization of existing communications markets, the introduction of new markets on a competitive basis, and the establishment of independent regulatory agencies. By 2001, 124 independent telecommunications regulators had been established worldwide, a number that grew further, to 159, by 2012.[357] These regulators have played a major part in establishing competitive markets, attracting inward investment and expediting the roll-out of national networks. Important areas of regulatory intervention have included interconnection, wholesale and retail pricing, and measures to ensure ubiquitous access to telephony, the Internet and, more recently, broadband services. Regulators have paid particular attention to ensuring that operators do not exploit market dominance to the detriment of competitors or consumers.[358]

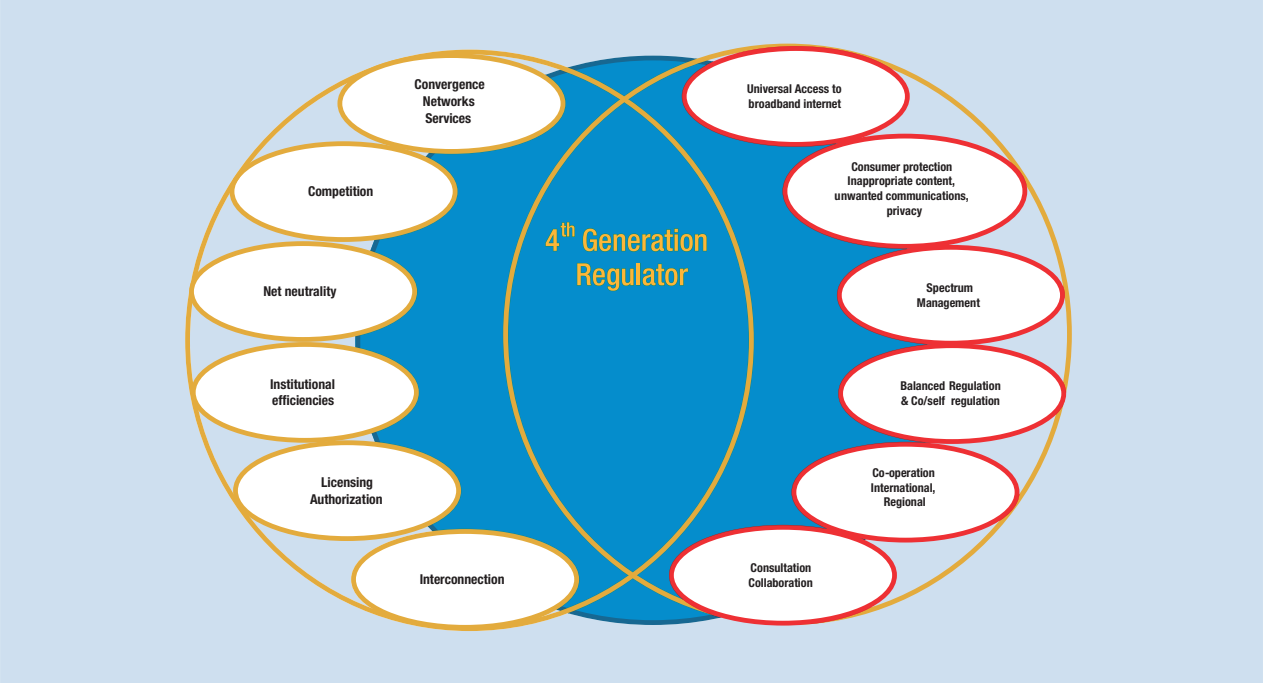
Important changes in the structure of communications regulation have resulted from changes in the technology and architecture of communications markets since WSIS. Convergence between telecommunications and other communications sectors, including broadcasting, has resulted from digitalization and the deployment of Next Generation Networks (NGNs) which make use of packet switching to route communications traffic.[359] This in turn has led to restructuring in the sector, from distinct networks for different modes of communication (such as broadcasting and telephony) towards a market in which any digital network can carry any service providing any content to any user. In response to this, since WSIS, many regulators have adopted technology- and service-neutral regulation, allowing operators the flexibility to choose the services they offer and the technologies they use to provide them, and an increasing number of countries have created converged regulators responsible for all communications sectors. Most national communications markets are also now dominated by global communications businesses rather than local operators, while the growth in mobile data communications means that regulators pay much more attention to the availability of spectrum.[360] These factors have led to further changes in the emphasis of regulatory intervention.

The ITU has played a leading role in developing understanding and sharing experience in the changing role of communications regulation through its annual Global Symposium for Regulators (GSR),[361] its periodic World Telecommunication Policy Forum and the publication of reports on *Trends in Telecommunication Reform*.[362] It has summarized the challenges facing regulators today, in what it has called *Fourth Generation Regulation*, illustrated in Figure 30.[363]

Revised national legal frameworks have also been widely introduced since WSIS to facilitate e-commerce and new services.

- Legal frameworks for digital transactions and data management are essential if businesses and citizens are to be able to take advantage of opportunities provided by new technology. In particular, e-commerce requires legal frameworks that enable online transactions and digital signatures. A key principle in these is 'electronic equivalence', giving digital agreements the same legal effectiveness as paper documents. Revisions also need to be made to legislation to protect consumer rights in the digital age.
- Legislation concerning data protection, data sovereignty and privacy is crucial to confidence in the integrity and security of online transactions and other activity, for both companies and users. By 2014, 79 countries had enacted privacy or data protection legislation, while 90 countries had no relevant legal or constitutional provision.[364] Legislation is more common in developed than developing countries, but differs between jurisdictions, with no harmonized framework regulating data transfers across borders.
- Modern ICTs and the Internet have altered the context for management of intellectual property, making it easy, quick and cheap to make exact copies of digital content and share these on new platforms including websites and social media.[365] IP rights holders have responded by changing business models[366] and introducing new mechanisms for digital rights management, while many ISPs and online service pro-

Figure 30: 'Fourth generation regulation'



Source: UNCTAD based on ITU, Trends in Telecommunication Reform – Special Edition, 4th Generation Regulation: Driving Digital Communications Ahead, www.itu.int/trends-special.

viders have adopted 'notice-and-take-down' procedures, removing content which has been uploaded in violation of copyright when this is brought to their attention.

- The *Geneva Declaration* declared standardization 'one of the essential building blocks of the Information Society.' 'The development and use of open, interoperable, non-discriminatory and demand-driven standards that take into account needs of users and consumers' it described as 'a basic element for the development and greater diffusion of ICTs and more affordable access to them, particularly in developing countries.'[367] A number of stakeholders have emphasized the importance of open standards that encourage innovation by enabling interoperability between hardware, software and information systems.

In reviewing this Action Line before the WSIS+10 High Level Event, the ITU noted the ongoing challenge of regulatory reform in an era of rapid change. Many developing countries still lack legislation in areas identified above. A number of international initiatives have been undertaken since WSIS to address this deficit. The ITU and other multilateral agencies, including the World Bank and WTO, have implemented programmes to harmonize different aspects of communications and trade regulation. The OECD, UNCTAD, the European Union and the United Nations Commission on International Trade Law (UNCITRAL) have developed frameworks and guidelines for e-commerce legislation. In its review, the ITU recommended that a more holistic approach be taken to the ICT sector and cross-sector regulation, to avoid conflicts and confusion between different regulatory approaches to new services.[368] Mobile money (see Chapter 4) is one area which has been identified as requiring consistent cross-sectoral regulation in order to maximize its value to business, consumers and national development.

G. ACTION LINE C7 – ICT APPLICATIONS

The seventh principle agreed 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, to poverty reduction and to internationally agreed development goals including MDGs.[369] Eight sectors were identified in the

Geneva Plan of Action, which have functioned as independent Action Lines since WSIS:

- E-government
- E-business
- E-learning
- E-health
- E-employment
- E-environment
- E-agriculture
- E-science.[370]

Each of these areas of activity has seen extensive innovation since the Summit, much of it responding to new technology and services, which has provided opportunities for experience-sharing and coordination. However, the work reported through these Action Lines represents only a fraction of that which has occurred within these fields since WSIS. Further information concerning the wider range of implementation activity by diverse stakeholders is summarized in Chapter 8.

1. E-government

E-government is concerned with the use of ICTs for administration and the delivery of public services. DESA, which leads the UN's work on e-government, has defined it as 'the use and application of information technologies in public administration to streamline and integrate workflows and processes, to effectively manage data and information, enhance public service delivery, as well as expand communication channels for engagement and empowerment of people.'[371]

The mandate for the C7 Action Line on e-government identified three priorities.

- to implement e-government strategies focused on 'applications aimed at innovating and promoting transparency in public administrations and democratic processes, improving efficiency and strengthening relations with citizens;'
- to develop e-government services adapted to the needs of citizens and businesses; and
- to support international cooperation on e-government.[372]

DESA monitors the implementation of e-government in biennial *E-Government Surveys*[373] and maintains a Knowledge Base of Innovative E-Government Practices that can be accessed by policymakers and other stakeholders.[374] Other intergovernmental agencies are also involved in e-government facilitation. In 2010, the ITU and United Nations Regional Commissions published a review of the global status of national e-strategies,[375] illustrated with examples from the WSIS Stocktaking Database. UNDP focuses on the improvement of democratic practice, including parliamentary and election processes, and citizen engagement.[376]

The *WSIS+10 Vision* reaffirmed the potential of e-government for sustainable development 'by promoting effective and efficient public service delivery to all people ensuring transparency, participation, collaboration.' It urged continued efforts to implement e-government strategies 'focusing on applications aimed at innovating and enhancing transparency, accountability and efficiency, as appropriate,' including international cooperation, capacity-building and knowledge sharing, and adaptiveness.[377]

Developments since WSIS

Experience of e-government has increased greatly since WSIS, including greater use of transactional services and mechanisms for citizen participation in decision-making processes, and growing use of new technologies and services such as those described in Chapter 4. DESA has identified five stages that are underway in the progress from initial experience in e-government to what it calls 'connected governance':

- *Emerging e-government* – based around one or more static websites offering little or no interaction with citizens.
- *Enhanced e-government* – offering more information about policy and governance, and access to archived official documents.
- *Interactive e-government* – enabling citizens to download official forms online.
- *Transactional e-government* – enabling citizens to engage directly with government online, for example by paying taxes through interactive websites.
- *Connected e-government* – in which governments develop an integrated back-office infrastructure for e-government, and provide opportunities for online consultation and citizen engagement.[378]

This overall process can be considered as transition from a government-centred to a citizen-centred (or 'people-centred') approach.[379]

The 2014 *E-Government Survey* reports that there are wide disparities in e-government deployment between countries. While these are broadly consistent with levels of economic development, DESA notes that 'factors other than national income are equally important' in determining the extent and success of e-government deployment, 'including high-level political support and leadership, strengthened institutional capacity, public accountability and citizen engagement.' Other important factors are adequate e-government programmes, ICT infrastructure and education, online payment systems and secure data sharing across government agencies. Nevertheless, it suggests that governments are increasingly using open data and data analytics 'to improve accuracy in forecasting citizens' 'demand of public utilities,' as well as using 'predictive analysis … to identify issues before problematic scenarios develop, and sentiment analysis … in engaging citizens in public consultation and decision-making.'[380]

Major developments in e-government have been enabled by changes in the availability of ICTs since WSIS. Computerization has become the norm in government administration, making it easier for governments to enable datafication in administration and introduce interactive service delivery platforms that can be accessed by citizens. Intranets connecting government departments have become commonplace, at least in developed countries, where big data analysis has also begun to influence decision-making. Cloud computing allows governments to store and analyse larger volumes of data cost-effectively, but also raises concerns about data sovereignty and security.[381]

Not all experience has been positive. A relatively high failure rate has been reported for e-government projects. Programmes are frequently reported to have exceeded budgets or failed to achieve expected outcomes. This has been attributed to a 'design:reality gap', a mismatch between the expectations raised in programme design and the difficulties of achieving objectives on the ground where project implementation is hampered by inadequate power and communications infrastructure, lack of training and slower-than-expected adoption of new services by citizens.[382] Some stakeholders have pointed out that e-government is 'not a substitute for 'good' government and sustained public sector capacity.' There is no guarantee that digitalization will lead to better or more efficient public services without complementary organizational change and high performance in other areas of administration.[383]

Mobile applications have enabled new modalities for the delivery of government services. Basic information and services can now be made accessible to more users in developing countries through mobile phones, while more complex services can be accessed through smartphones and computer terminals in cybercafés and workplaces. Where mobile money services (see Box 5 in Chapter 4) or Internet banking has become established, mobile government (m-government) services can also facilitate payments. The recent growth in m-government is illustrated by region in Figure 31.

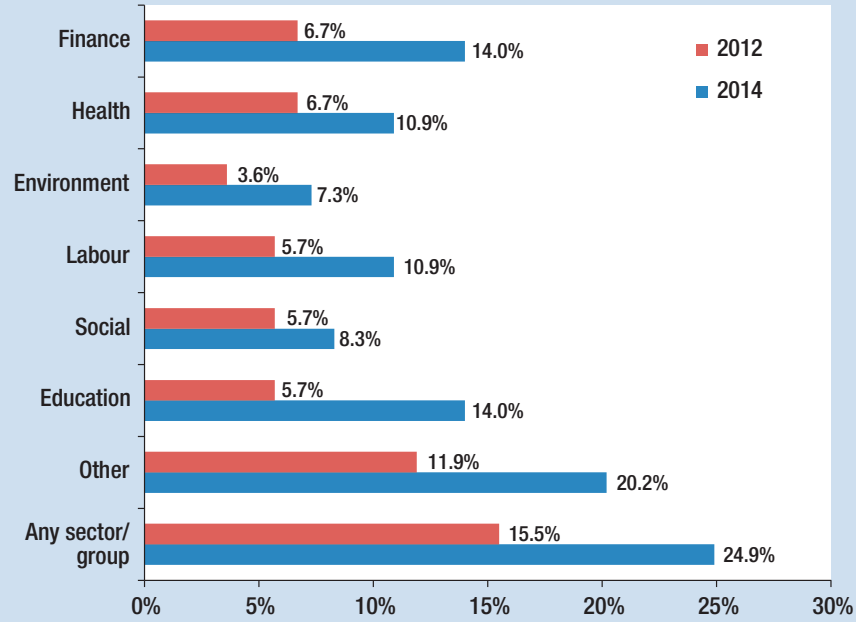
Social media also offer new platforms for interaction between governments and citizens. The 2014 *E-Government Survey* found that 118 countries are using social media for consultation and 71 for service delivery, increases from 78 and 14 countries in 2012.[384]

ICTs enable governments to communicate more extensively with citizens, and consult people about issues that affect their lives. Open data and better mechanisms for citizen participation are said to facilitate transparency and accountability in government, to have improved the quality of decision-making by enhancing policymakers' understanding of local circumstances and priorities, and to have reduced corruption. DESA recommends that 'to increase the chance of success for their e-participation strategy,' governments should adopt a multi-channel strategy, enabling them to 'benefit from those platforms and channels that are being used by citizens rather than creating new ones.'[385]

However, digital divides within countries mean that participatory mechanisms may not benefit all groups. DESA has expressed concern that infrastructure and human capacity constraints will inhibit deployment of e-government in countries that have not yet shown much progress in this area.[386]

Summarizing the evolution of e-government in 2014 survey, DESA suggests that e-government is entering a new phase:

Figure 31: Mobile government services, 2012 and 2014



Source: UNCTAD, derived from United Nations E-Government Survey 2014.

> *Lowering costs is still an important consideration in service delivery, but adding public value is gradually taking over as the primary goal of e-government. … [E]-government goals are constantly evolving to meet emerging challenges and increase public value. Emphasis is now being placed on deploying a portfolio of e-services that spans functions, business units and geographies….*

At the same time, DESA notes that:

> *Experience shows that one of the main lessons learned is that an information society requires considerable public administration improvements before embarking on the myth that technology and data-based solutions solve everything. It is important to have information serving society and not the other way round.*[387]

2. E-business

E-business is concerned with the use of ICTs for business administration, including transactional (e-commerce) relationships between government and business (G2B), between businesses (B2B), and between businesses and consumers (B2C). The mandate of this Action Line calls on governments, international organizations and the private sector to promote the use of ICTs by businesses, particularly in developing and transition countries. Governments are enjoined to 'stimulate private sector investment, foster new applications, content development and public/private partnerships,' paying particular attention to job creation and to small- and medium-sized businesses.[388]

Facilitation of the C7 Action Line on e-business has been led by UNCTAD, which has played a leading role within the UN system in analysing the scope and potential of e-business for development through its annual *Information Economy Reports*[389] and other studies. Other UN agencies with more specialist responsibilities have supported its work, including the International Trade Centre (ITC), which has paid particular attention to the potential of mobile communications for SMEs, and the Universal Postal Union. Facilitation meetings since 2010 have focused on: the potential of mobile money, particularly for SMEs; the impact of ICTs on rural economies; and ways of promoting domestic ICT manufacturing, software and service sectors.[390] The availability of adequate power and communications infrastructure has also been discussed.

The *WSIS+10 Vision* stressed the need to facilitate the use of ICTs for e-business, 'including by

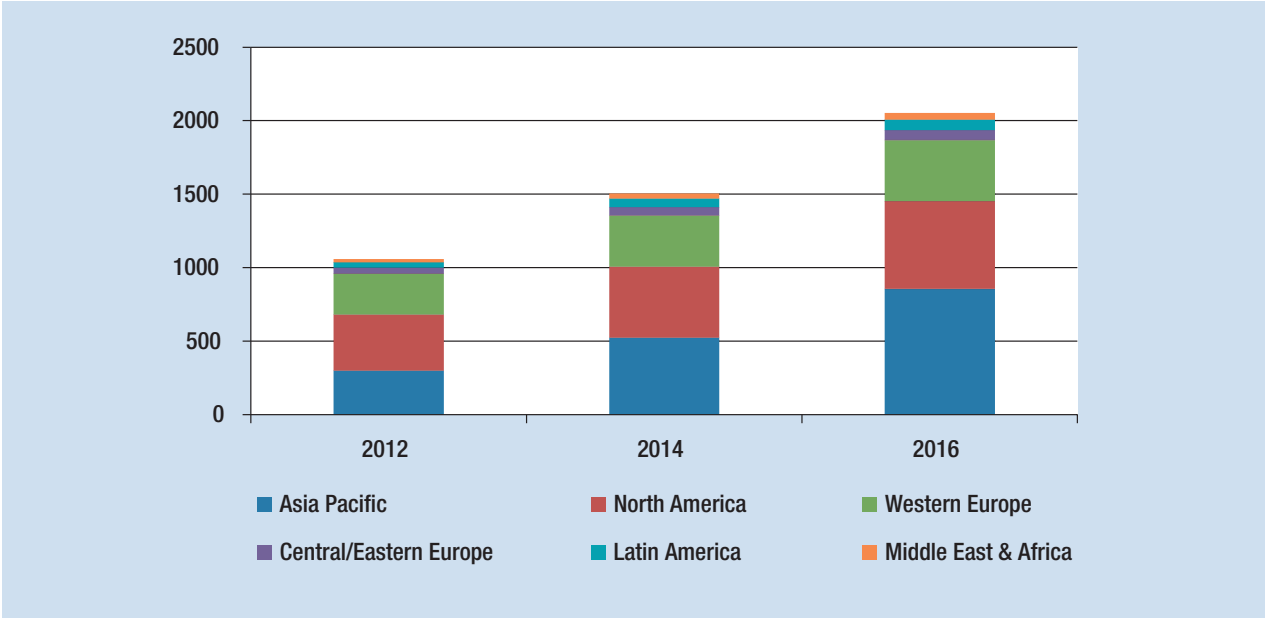
creating an enabling environment for selling and buying goods or services via ICT networks,' and the value of 'stimulating the development of new e-business applications, content and services,' including those that take advantage of mobile devices and social media. It placed emphasis on 'job creation, trade and innovation as part of broader strategies for poverty reduction through wealth creation,' on the integration of micro-, small- and medium-sized businesses, and on youth and women entrepreneurs. The need for improved data to assess e-business experience was also acknowledged.[391]

Developments since WSIS

Like e-government, e-business is now much more extensive than it was at the time of WSIS and has been transformed by the innovations in technology and services described in Chapter 4. Computerization of business administration is now the norm in large and medium-sized businesses worldwide and almost all businesses in developed countries. High-speed international broadband has facilitated the globalization of software development, content and other sectors, creating opportunities for both transnational corporations and innovative start-ups. The spread of ICTs has had a major impact on established business sectors, while entirely new ICT sectors have emerged, exploiting opportunities created by technology and service innovation, including social media and mobile apps. The availability of lower-cost access to high-technology resources through cloud computing has added new opportunities for enterprise by local businesses, including those located in developing countries. The changing ICT environment has also transformed the context for media and cultural industries, challenging historic business models but also offering new ways of developing and disseminating content and other cultural goods and services.

Overall trends in e-business activity are difficult to measure, and available data are limited. In 2006, UNCTAD found that, while 116 countries had national ICT master plans, only 28 had official statistics on the use of ICTs by businesses.[392] It has been estimated that by 2014, B2C e-commerce sales worldwide had reached USD1.5 trillion *p.a.*, and that they will rise to US$2.35 billion by 2017.[393] As Figure 32 shows, developed countries dominate the global market for e-commerce, though emerging economies in Asia, led by China and Indonesia, are reducing the gap significantly. Latin American and African economies have played a relatively small role to date.

Figure 32: E-commerce sales by region, 2012 (actual), 2014 (estimated) and 2016 (projection)



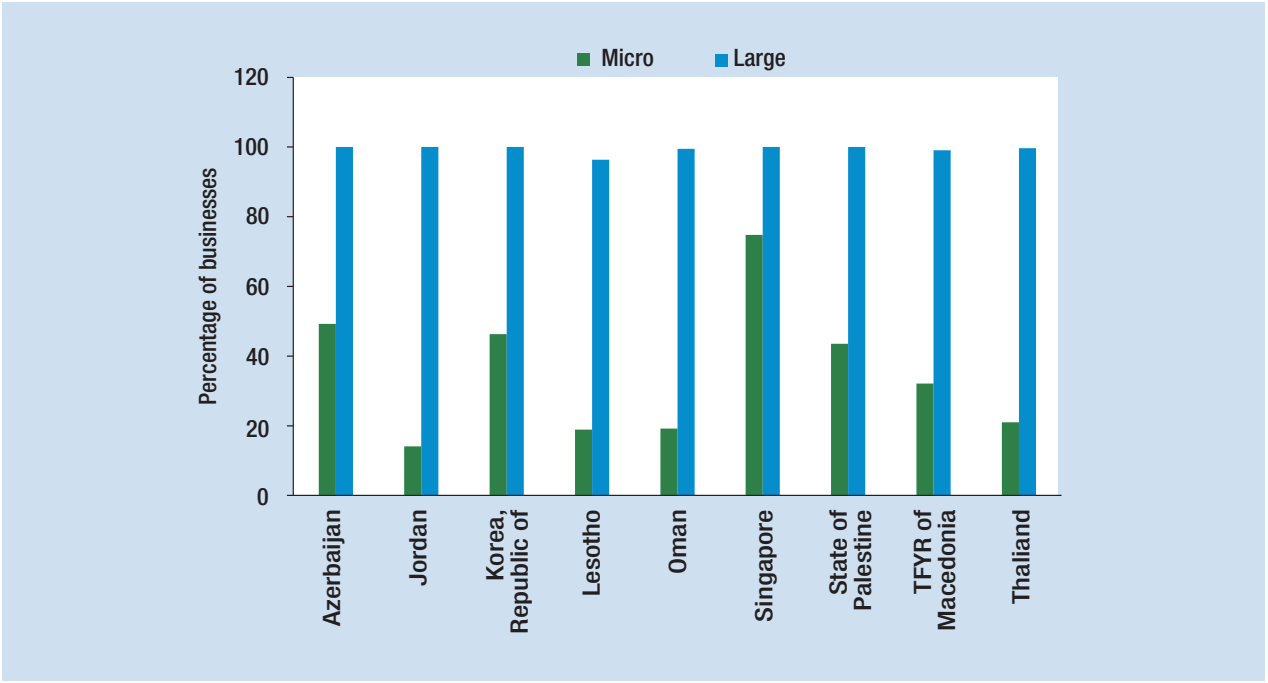
Source: UNCTAD, derived from http://www.emarketer.com/Article/Ecommerce-Sales-Topped-1-Trillion-First-Time-2012/1009649, accessed 20 January 2015.

UNCTAD and other agencies have emphasized the importance of a positive enabling environment for business innovation. Many innovations in ICTs have been made by start-up companies, including a few that have led to the establishment of what are now among the world's largest companies. Supportive frameworks for ICT innovation have included incubators, such as those initiated by the World Bank's *info*Dev facility,[394] and ICT hubs that foster collaborative working among ICT-oriented SMEs.[395] Local software industries have emerged in a number of developing countries, aimed at either domestic or export markets.[396] The cloud economy offers opportunities for enterprise development in areas such as systems integration and local information services.[397] ICTs and the Internet have also generated new opportunities for businesses on a smaller, less sophisticated scale, in areas such as equipment repair and maintenance, web design, provision of access and support services to businesses and individuals, and airtime resale.[398] However, the capacity of small ICT businesses to develop and flourish is dependent on the wider business environment, including regulations concerning business establishment and the availability of capital.

Not all businesses on the demand side of the ICT economy benefit equally from e-business and e-commerce. Some sectors, such as financial services, derive significantly more advantage from ICTs than others, such as mining. There are also considerable differences between the experiences of larger and smaller businesses in developing countries. The use of mobile phones by small businesses in developing countries is now approaching ubiquity, though the use of computers and the Internet remains more limited, especially among micro-enterprises. Figure 33 illustrates the gap in computer access between larger and smaller businesses from selected economies that provided evidence used in the *Final WSIS Targets Review.*

ICTs have helped small-scale enterprises to diversify livelihood opportunities, enabling more cost-effective sourcing of supplies, greater market reach, and better market prices. In particular, they have enabled improved supply chain management and reduced information asymmetries between producers, traders, retailers and consumers, thereby improving market efficiency.[399] They have facilitated innovative enterprise support by governments and independent agencies. However, gains from ICTs

Figure 33: Computer use by large and small businesses, data from selected economies, 2008-2012



Source: Final WSIS Targets Review, p. 370.

are more likely to be made by entrepreneurial than subsistence producers and depend on the extent to which small businesses adapt to take advantage of them. There is evidence, too, that women entrepreneurs are disadvantaged by comparison with male counterparts in many contexts, as a result of more limited educational experience, constraints on time and mobility, and difficulties in obtaining capital. ICTs can alleviate some of these disadvantages, for example by enabling women to communicate with suppliers and consumers without travel, and providing easier access to finance through mobile money services.[400] However, more evidence is needed about the distribution of ICT use by businesses in order to assess the extent to which they are leading to gains in overall economic welfare, and/or redistributing wealth to those who make increasingly effective use of them.

3. E-learning

The *Geneva Declaration* asserted that everyone '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.'[401] E-learning promotes the use of ICTs in all stages of education, training and personnel development, including continuous education, with the aim of equipping young people and adults with the skills required.

This Action Line shares the mandate of Action Line C4. Among aspects particularly relevant to e-learning are:

- the inclusion of ICTs in educational policy and practice, and of the Education For All goals established by UNESCO;[402]
- the use of ICTs to enhance educational inclusiveness, including issues concerned with gender, locality and indigenous peoples; and
- distance learning.[403]

The Action Line has been facilitated by UNESCO, which believes e-learning is 'a cornerstone to building inclusive knowledge societies.'[404] Action Line discussions have focused on emerging themes in e-learning policy and practice including low-cost devices for education, mobile learning, the use of social networks for education, Open Educational Resources (OER), the capabilities of teachers to implement ICT curricula, and the use of ICTs in education management information systems (EMIS).[405]

The *WSIS+10 Vision* endorsed the potential for ICTs to enable 'equitable access to quality education and lifelong learning for all,' in formal, non-formal and informal settings, enabling young people to acquire the 'media and information literacy skills, competencies and values that they need to live and work in a digital age,' while contributing to 'the protection, dissemination and reproduction of indigenous knowledge' and enabling 'wide participation in traditional cultural expression.'[406] It called for the integration of ICTs in curriculum development and delivery, and into training, at all levels. It emphasized the importance of incorporating ICTs in teachers' professional development and the development of e-learning content in local languages, commended the potential of OER, free and open source software (FOSS) and Massive Online Open Courses (MOOCs) (see below), and supported the use of ICTs in EMIS.

Developments since WSIS

Education is a catalyst for other development sectors. ESCWA has summarized the role of e-learning, and the changing environment for it since WSIS, as follows:

> *… it [has become] obvious that a change in the educational systems is necessary in order to prepare the youth for the knowledge society, and offer them a better future and more job opportunities. The skills needed to enter the knowledge society are foreign languages, mathematics, science, and information technology. Other skills needed include communication, leadership, responsibility, self-esteem, and logical as well as critical thinking. To achieve these goals, ICT could be employed effectively in teaching and learning based on its ability to transform traditional classrooms and teaching methods from lecture-based into more interactive places where students' independent thinking is developed. Furthermore, social media and mobile platforms, with their interactive, participatory and open nature, could help [in] modernizing education. These platforms represent a good opportunity for interacting with a great number of peers for the purpose of learning, discussion, debating, and feedback.*[407]

E-learning has benefited from the growing pervasiveness and intensification of ICTs in educational practice and institutions since WSIS. Quantitative evidence from the *Final WSIS Targets Review*, summarized in Chapter 3, shows that ICTs are more widely deployed in education in developed than developing countries, but that there is considerable variation among developing countries, some of which have invested significantly more than others.[408] ICTs are much more available in tertiary than secondary, and secondary than primary, institutions. There has been growth in lifelong learning[409] and distance learning applications, taking advantage of new media applications.

International agencies have encouraged national governments to adopt national strategies for ICTs in education. The Global e-Schools and Communities Initiative (GeSCI)[410] has summarized deployment and experience with these as follows:

> *… developing countries either have, or are, in the process of developing, national policies for the use and integration of ICTs in education and training at all levels, including in curriculum development, teacher training, institutional administration and management, and in support of the concept of lifelong learning. Implementation is more patchy with vast numbers of schools and students not yet benefiting from the improvements that ICT can bring to learning and teaching.* [411]

Experience has shown that governments and educators face considerable challenges in leveraging value, including the affordability of ICT equipment, connectivity and electrical power, the availability of suitable content, the skills of available teaching staff, quality assurance, and child safety online.[412] Children's ability to make use of educational resources is dependent on other socio-economic factors, including their health, nutrition and family responsibilities. Gender is also an important factor. GeSCI notes that 'There is … more cognizance now of the importance of removing the gender barriers to ICT education and training and promoting equal training opportunities in ICT-related fields for women and girls.'[413]

The following points briefly summarize significant developments in ICT-enabled education since WSIS.

- Computers have increasingly been deployed in schools for both administrative and educational use. Evidence concerning their impact on educational outcomes is mixed. Some have reported positive results from computers in the classroom, but the OECD found in 2010 that it is difficult to demonstrate any consistent relationship between ICT availability at school and educational attainment.[414] UNESCO has criticized overemphasis on the availability of equipment in schools, warning that 'equipment [may be] oversold and underused, resulting in the paradox of high access but null significant use,' and suggesting that more focus should be placed instead on 'teaching and learning strategies and the ways in which technology solutions can make them more efficient.' [415]
- A number of countries have provided child-centred or low-cost computers to school-age children, through programmes such as One Laptop per Child, which was launched at WSIS. Assessments of their impact have also been mixed.[416] Increased attention is now being paid to the use of commercially-manufactured tablet computers in education.
- The potential of mobile phones for supplementing formal education and delivering informal learning has been increasingly explored by educationalists. A report for the African Development Bank in 2012 noted that 'Currently, mobile phones are predominantly being used to support learning outside of school and informal education,' and emphasized the limited capabilities of handsets that are currently generally available in developing countries,[417] though potential applications are expected to grow as smartphones become more prevalent.[418]
- Increased attention has been paid since WSIS to the training of teachers, both to teach ICT skills and to make use of ICT resources in other disciplines. UNESCO has developed an ICT Competency Framework for Teachers which identifies the skills that teachers need to make effective use of ICTs and help students do so, including three levels of professional development: technology literacy, enabling students to use ICTs to learn more efficiently; knowledge deepening, enabling

them to apply acquired knowledge to real-world problems; and knowledge creation, enabling them to build the knowledge base required by more harmonious and prosperous societies.[419]

- Increased attention has been paid to Open Educational Resources (OERs), educational materials that are made available to developing country institutions with reduced copyright restrictions and that can be adapted for local use.[420] Since 2008, there has also been growing experience with Massive Open Online Courses (MOOCs), established courses made available online by existing educational institutions, including some prestigious universities so that they can be used by a much wider community of students.[421]

- ICTs have become much more widely used in Educational Management Information Systems (EMIS), for mainstream business functions (such as payroll), class scheduling, managing examinations and qualifications, and other purposes.[422]

- The Partnership on Measuring ICT for Development dropped the requirement to connect universities and colleges with ICTs from WSIS Target 2 in 2010 because this had already, by that date, effectively been achieved. The period since WSIS has also seen wider development of National Research and Education Networks (NRENs), which enable high bandwidth interconnection between national higher education institutions and facilitate research partnerships with other regions (see Target 3 in Chapter 3).

In its review of this Action Line, UNESCO emphasized the need for more research into the best ways of integrating ICTs in education and of ensuring that ICT-enabled education reduces rather than increases educational divides. It looked forward to further opportunities for building distance, lifelong and online education through initiatives such as OERs and MOOCs.[423]

4. E-health

The mandate for Action Line C7 on e-health advocates collaboration between international organizations, governments, health professionals and other stakeholders to promote positive health outcomes using ICTs. Critical areas of health practice identified include access to locally-relevant medical knowledge, particularly content on sexual and reproductive health and MDG priority diseases (HIV/AIDS, malaria and tuberculosis); the use of ICTs to monitor and control the spread of communicable diseases; the development of international standards for the exchange of health data; and the use of ICTs in humanitarian disasters and emergencies.[424]

This Action Line is facilitated by the World Health Organization (WHO). In 2005, WHO established the Global Observatory for e-Health (GOe), which has undertaken several surveys of e-health experience and implementation to inform discussions in the Action Line and the work of agencies developing e-health initiatives.[425] In 2009, it declared that future Action Line priorities would include the legal and regulatory environment for e-health and improvements in systems for monitoring disaster and emergency response, which require international collaboration and investment.[426]

The potential of e-health was reaffirmed in the *WSIS+10 Vision*. This encouraged the development and implementation of national e-health strategies, 'focusing on implementing a sound enabling environment, integrating ICTs to support the priorities of the health sector, and providing reliable, affordable and sustainable connectivity for health services, health systems and the general public to improve the health of all people.' Particular reference was made to ensuring inclusion of remote and underserved areas, and to ensuring trust in e-health, through the adoption of standards which facilitate data-sharing while respecting privacy. More attention was recommended for applications to support the flow of information between health professionals, the use of ICTs to monitor public health, and preparation for natural emergencies.[427]

Developments since WSIS

As in education, the much greater reach and capabilities of ICTs have had extensive implications for the deployment and practice of e-health since WSIS. ICTs now play an important role in many areas of health management and service provision in an increasing number of countries. These include health informatics (administration and record-keeping), logistics management (for example, in the coordination of drug stocks),

health promotion (such as campaigns to reduce the incidence of malaria or improve sanitation), epidemiological monitoring, training and diagnostic support for clinicians, patient support (such as reminders to take medication), patient monitoring and even, where infrastructure and resources are available, surgical procedures. Such applications are now common in developed countries, and are becoming more common in developing countries, enabling improvements in the resourcing and provisioning of health services as well as changing the experience of patients and clinicians. ICTs have been used in each of the areas identified above in order to address the health-related MDGs, which are concerned with maternal and child health and efforts to combat HIV, malaria and tuberculosis.[428]

WHO has identified five essential components in strategic approaches to e-health: 'structural engagement in the delivery of health services; engagement with stakeholders and the private sector in improving the availability and appropriateness of technologies; learning how to use the tools; creation of standardized norms and practices; and evaluation and monitoring of the application and impact of ICTs to health.'[429] It has strongly supported the development of national e-health strategies that, it believes, 'can make the best use of resources while providing a solid foundation for investment and innovation, and achieving longer-term goals such as health sector efficiency, reform or more fundamental transformation.'[430] By 2014, 85 countries had e-health strategies in place, an increase of seven over 2012.[431] As in other application areas, the spread of mobile phones has facilitated information sharing for improving awareness of public health issues and for clinical support. WHO reported in 2013 that 'well over 100 countries are using mobile phones to achieve better health, or exploring how they can do so.'[432]

In its report on Action Line implementation, WHO wrote that a major effort is still needed to meet WSIS commitments in this area, including increased attention to funding and to the development and implementation of national e-health strategies. It has identified four main barriers to the implementation of e-health: 'a lack of suitably qualified or experienced professionals to develop and implement … projects; inadequate infrastructure to support programmes; a lack of adequate business models to support broad and sustainable eHealth delivery; and a lack of political commitment.'[433]

Developments concerning the use of ICTs in emergencies are described under Action Line C2.

5. E-employment

The mandate for Action Line C7 on employment urges the promotion of 'new ways of organizing work and business with the aim of raising productivity, growth and well-being through investment in ICTs and human resources.' It draws attention to the development of best practices for both workers and employers, the potential of teleworking, and the desirability of increasing women's employment in science and technology.[434] This Action Line has not been regularly reviewed at the WSIS Forum.[435]

The *WSIS+10 Vision* commended ICTs as 'a key enabler for providing a platform for innovative employment opportunities, particularly for the youth, women, persons with disabilities and indigenous peoples.' It urged the development of e-employment portals and online recruitment services, the promotion of teleworking (with appropriate labour standards), and training to enable people to enhance employment credentials through the use of ICTs.[436]

Developments since WSIS

The Information Society is sometimes described as one in which information rather than capital or labour becomes the critical factor in economic production. In such a society, information skills will be in high demand and will offer higher returns to employees. The overall impact of ICTs on employment is, however, mixed, including job creation and displacement as well as enabling new work patterns and modalities.

The ICT sector has generated jobs in equipment manufacturing, software development, business process outsourcing, equipment retail and support services such as web design, equipment maintenance, airtime resale and access provision through telecentres and cybercafés. The overall employment gain from these is difficult to ascertain. One analyst has estimated that digitalization may have created six million jobs globally in 2011.[437] A World Bank report suggested that the mobile sector may have created around 100,000 jobs in Kenya between 2000 and 2010.[438] More research is needed in this area.

At the same time, ICTs have reduced employment in sectors and occupations where labour can be automated, goods can be virtualized or online services can replace traditional businesses. An increasing number of clerical, administrative and management roles are susceptible to automation, raising concerns that employment markets will become divided into high- and low-skilled work, with fewer jobs at mid-skill levels.

Significant job migration has resulted from the globalization of production and support services, redistributing work from countries with higher to those with lower labour costs. Some developing countries have identified business process outsourcing (BPO) and other ICT-enabled services (ITES) as significant opportunities for economic growth.[439]

The World Economic Forum has summarized the overall impact of ICTs on employment as follows:

> *Across developed economies, digitization improves productivity and has a measurable effect on growth. However, the result can be job losses because lower-skill, lower-value-added work is sent abroad to emerging markets, where labor is cheaper. By contrast, emerging markets are more export-oriented and driven by tradable sectors. They tend to gain more from digitization's effect on employment than from its influence on growth.*[440]

While there has been some substitution of office work by telecommuting, this has not reached levels anticipated at the time of WSIS. Many manual roles are not susceptible to virtualization, while low labour costs in developing countries mean that computerization and automation do not yield the same level of savings as in developed countries. However, the relationship between ICTs and employment is expected to change further in light of the technological, service and market changes described in Chapter 4.

6. E-environment

There was considerable interest at WSIS in the potential of ICTs to address environmental challenges by improving monitoring and early warning systems and assisting recovery from natural disasters. The remit for the Action Line on e-environment addressed this and e-waste.[441] Action Line meetings focused on e-waste in the five years following WSIS. More attention has been paid since 2010 to the impact of ICTs on climate change, their potential role for improving energy and productive efficiency and the relationship between ICTs and sustainable development, including the 'green economy'.

The *WSIS+10 Vision* focused on three aspects of the environment. It advocated cooperation between the ICT, environmental, meteorological and other communities on issues related to climate change. It urged appropriate measures to minimize negative impacts of ICTs on the environment, in particular e-waste, including standards development. It also commended the use of ICT equipment in meteorological and environmental monitoring, early warning systems and disaster preparedness.[442]

Developments since WSIS

The environmental impact of the Information Society is much better understood today than at the time of WSIS. Developments have been most significant in three areas: e-waste, climate change and smart systems.

Most attention was paid at WSIS to e-waste. Rapid improvements in technology, turnover of software generations and new services that require equipment with enhanced capabilities have led to a high rate of churn in hardware, particularly end-user devices.[443] The UN Environment Programme (UNEP) has estimated that the volume of electronic waste, currently 50 million tonnes per annum,[444] could increase as much as fivefold in some developing countries between 2007 and 2020. Less than 20 per cent of e-waste is recycled, much of the remainder being disposed of in developing countries.[445] The Secretariat of the Basel Convention, the main global instrument for policy development on e-waste, has warned that:

> *Uncontrolled dumping of obsolete e-products and rudimentary material recovery processes without adequate protective measures have resulted in environmental pollution while exposing millions of people to toxic substances and emissions, particularly in less developed nations and countries with economies in transition.*

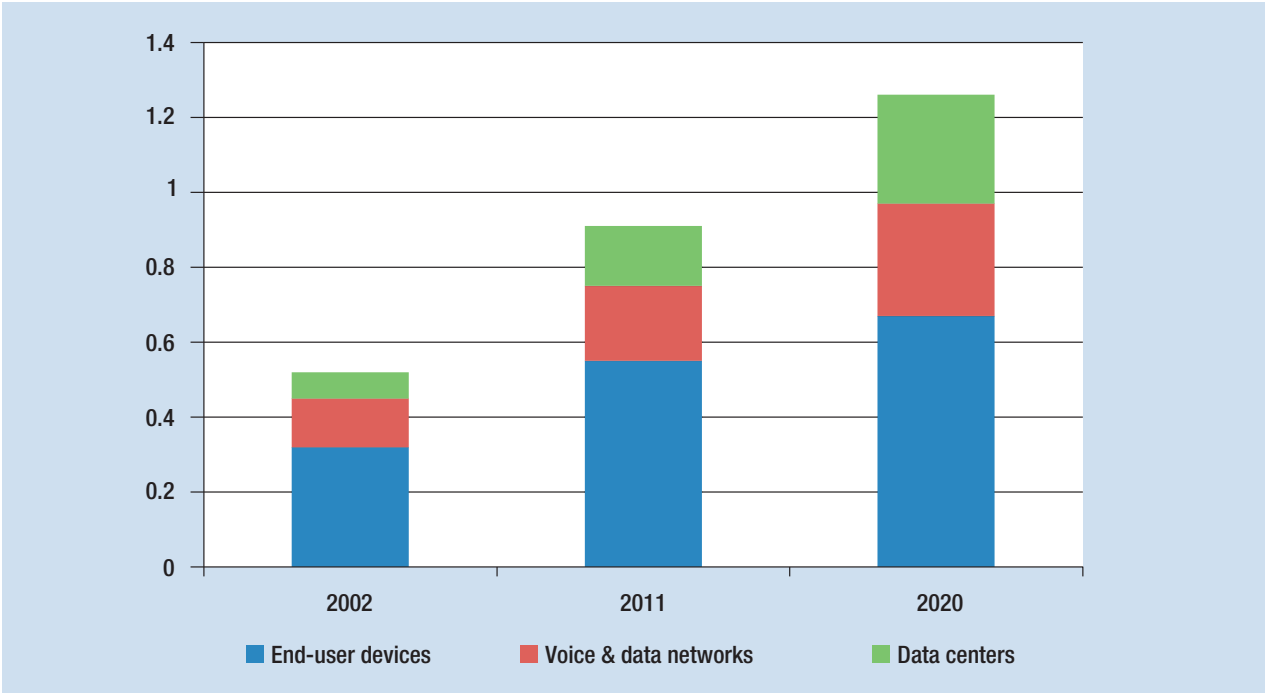
It believes that there is scope for considerable improvements in levels of 'environmentally sound dismantling and disposal,' but that sustainable solutions must also address the problems caused by the short lifecycles of current products.[446]

Much more attention has been paid since WSIS than before to the impact of ICTs on greenhouse gas (GHG) emissions, which are the principal cause of man-made climate change. The Global eSustainability Initiative (GeSI) estimates that GHG emissions from the sector grew at 6.1% from 2002 to 2011 and will grow at 3.8 per cent *p.a.* between 2011 and 2020, compared with overall emissions growth of 1.5 per cent p.a. during the latter period. As a result, the sector's contribution to total emissions will rise from 1.3 per cent in 2002 to 1.9 per cent in 2011 and 2.3 per cent in 2020. Terminal devices accounted for 60 per cent of these emissions in 2011, with voice and data networks contributing 22 per cent and data centres 18 per cent. GeSI believes that improvements in end-user devices will lead to a reduced growth rate (2.3 per cent p.a.) in emissions from these between 2011 and 2020, but predicts higher growth rates for networks (4.6 per cent p.a.) and data centres (7.1 per cent p.a.).[447] Its projections are illustrated in Figure 34.

International agencies and businesses have sought to mitigate the growth in electronic waste and carbon emissions through the design and implementation of more energy-efficient networks, devices and data centres, and by extending the lifespan of devices that are energy-efficient. A Mobile Phone Partnership Initiative (MPPI) was launched in 2002 to address the recycling and disposal of mobile phones,[448] followed in 2008 by a multi-stakeholder Partnership for Action on Computing Equipment (PACE) to develop guidelines and facilitate recycling and disposal of computers.[449] GeSI, the ITU and private sector businesses have undertaken significant work to reduce the financial and environmental costs associated with GHG emissions from ICT networks and devices.[450]

ICTs can also improve the management and efficiency of other economic sectors, with positive impacts on the environment. GeSI believes that smart systems in energy, transport and logistics (see Chapter 4) should lead to energy and carbon savings that could greatly exceed the ICT sector's contribution to GHGs. However, it concedes that 'these are not easy wins.'[451] The investments required are substantial, will be determined by managements in businesses outside the ICT sector, and require considerable organizational change. The virtualization of some goods and services, changes in work and leisure patterns and other developments in social and economic behaviour

Figure 34: Global ICT emissions (gigatonnes of CO2 equivalent)



Source: UNCTAD, derived from GeSI, SMARTer 2020 report, p. 21.

resulting from the Information Society are also expected to affect the environment. Their overall outcome is difficult to predict,[452] and more research is needed in this area.

The role of ICTs in facilitating environmental monitoring and early warning systems are discussed in the section of this chapter concerned with Action Line C2.

7. E-agriculture

The remit for the Action Line on e-agriculture in the *Geneva Plan of Action* included just two issues: the dissemination of agricultural information and the value of public-private partnerships.[453] In 2006, the UN Food and Agriculture Organization (FAO) established a multi-stakeholder e-Agriculture Working Group to support implementation of this Action Line.[454] The following year, it launched the e-Agriculture Community of Practice 'a global initiative to enhance sustainable agricultural development and food security by enhancing the use of ICT in the sector.' This Community, which had more than 12,000 members by 2014,[455] provides '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 supports the international development, validation and dissemination of conceptual models and methodologies in e-agriculture.

The mandate for the e-agriculture Action Line was extended in the *WSIS+10 Vision*. Building on work to date, it encouraged the development and implementation of national e-agriculture strategies focused on integrating ICTs in rural development to foster food security. It also encouraged the creation and adaptation of content in local languages and for local contexts, support for digital literacy, and the use of ICTs to reinforce the resilience of communities to natural and man-made disasters and environmental change.[456]

Developments since WSIS

Agriculture is a major economic sector and source of employment in many developing countries, at different levels from agri-businesses to micro-enterprise. Most attention has been paid in the ICT4D literature to impacts on small farmers.

Rural areas in most developing countries had limited telecommunications access at the time of WSIS. The growth of mobile telephony since the Summit has enabled small farmers to improve productivity and earnings potential. Advocates believe that access to ICTs has reduced information asymmetries, improving market efficiency by enabling producers to target the best sources of inputs and the best outlets in which to sell their produce, for example by using mobile phones to compare prices in different markets. This has improved farmers' decision-making capacity throughout the production process, from assessing what crops to grow in order to maximize returns to deciding when to harvest and where to sell.[457] Where it has become available, mobile money has been a valuable new resource for farmers who have often had little or no previous access to financial services. Increased network coverage has also provided new openings for agricultural support services by governments, private sector businesses and NGOs. While the voice telephony and SMS functions of 2G mobile phones have enabled farmers to make substantial gains, these opportunities will increase as mobile Internet and smartphone apps become more widely available. Since women play an important part in agricultural production, these benefits also affect gender equity.

However, concerns have been expressed that larger-scale and more established producers are better equipped to exploit the advantages derived from ICTs, which may result in redistribution of income towards those farmers from more marginal producers, for example those who farm primarily for subsistence and sell only a small proportion of their crops. An ECLAC report has emphasized that 'The adoption and success rates of new technologies in agriculture … depend … on the development of internal capacities that allow producers, on one hand, to select, implement and make correct use of such technologies and, on the other hand, to interact and learn with them,'[458] implying the importance of literacy and research skills. Opportunities for small farmers to access competing suppliers are often constrained by non-ICT factors such as lack of competition among intermediaries, indebtedness and relationships with landowners.

Summarizing developments for the CSTD ten-year review of WSIS, FAO identified a number of positive trends, including mobile applications for agricultural information, mobile financial services,

and stronger integration of ICTs into agriculture and e-agriculture strategies, but acknowledged that challenges such as those described above may limit gains. The digital divide in agriculture, it emphasized, 'is not only concerned with technological infrastructure and connectivity, but … is a multi-faceted problem of ineffective knowledge exchange and management of information content, as well as human resources, institutional capacity, and sensitivity to gender and the diverse needs of different groups.' As a result, development actors need to address the affordability of access, adapt content to local requirements, build the capacity of farmers to make use of the information to which they now have access, and ensure that ICT4D initiatives include women, older farmers and those lacking literacy and educational skills.[459]

8. E-science

The remit for Action Line C7 on e-science concentrated on coordination of research and the potential for improving data collection and analysis through ICTs. Particular importance was attached to reliable high-speed Internet access for universities and research institutes, sharing of scientific knowledge, and the development of principles and standards to improve the quality of scientific data.[460]

Action Line discussions have prioritized access to scientific knowledge in sectors such as agriculture, health and the environment. Work was undertaken in the years following WSIS on the systematization and standardization of scientific data gathering in areas including meteorology. The Action Line has focused more recently on the potential of broadband networks to extend scientific knowledge-sharing through e-publishing, peer-to-peer networking and other means. It has worked with Action Line C3 to stimulate research and scientific exchange through NRENs.[461]

The *WSIS+10 Vision* recognized the impact of e-science on scientific practice, including participation, research, and the dissemination of findings and exploitation of research outcomes. It called for the promotion of e-science 'to enhance the interface between policy, science and society by facilitating more evidence-based and better harmonized policy-making and greater involvement of citizens in scientific and policy processes, thus improving sustainability of outcomes.' Critical areas that it identified as potential beneficiaries from improved access to scientific assessments include climate change, biodiversity and ecosystem management, health, food security and disaster risk reduction. Attention was also paid in the *Vision* to citizen science (see below), the need to build information networks within and extending beyond the scientific community, and the engagement of the wider community in participatory decision-making.[462]

Developments since WSIS

UNESCO has described ICTs as 'critical to scientific development in many ways' and summarized developments since WSIS as follows:

> *They are themselves the products of highly sophisticated applied science, in areas such as radio transmission and fibre optics as well as in computing, which have advanced very rapidly over the past thirty years.* [They] *are now essential for data gathering and analysis, for modelling and validation of findings, for real-time scientific applications and for the reporting and dissemination of scientific findings. They are used to enhance resource utilisation and the quality of learning processes and research activities. Communications networks also enable scientists to work much more collaboratively, across international borders, than they could do before. Recent developments in ICTs, including collaborative data analysis, cloud computing and linked open data have enabled much more sophisticated analysis of scientific data than was possible in the past, including analysis of much larger data sets, with consequential added value for policymakers and communities. This is particularly important in areas such as the environment and climate change, and agricultural production.*[463]

The scope for ICTs to enable data-gathering and scientific research has been greatly extended by the technological developments described in Chapter 4, particularly datafication and big data analysis. In reviewing the Action Line in 2014, UNESCO observed that the Internet has enabled much greater scientific collaboration, while 'the ever-growing capacity of computing equipment has allowed scientists to address increasingly complex problems, using analytical methods and

computations' that were unfeasible at the time of WSIS. This has made it increasingly important to develop the interface between science, public policy and public understanding. Since 2010, UNESCO and other stakeholders have paid increased attention to this interface, including the emergence of ICT-enabled and crowd-sourced citizen science, which enables and encourages members of the public to join in scientific data collection and analysis. UNESCO sees citizen science, facilitated by mobile and Web technologies, as enabling 'a more open and more responsive scientific process,' to the benefit of all stakeholders.[464]

Several United Nations agencies have worked with private sector, academic and research institutions to develop more inclusive approaches to scientific knowledge sharing. Significant initiatives in this area include the HINARI Access to Research in Health Programme, which now provides access to some 13,000 journals and 29,000 books to developing countries on free or concessionary terms,[465] the FAO-led AGORA Access to Global Online Research in Agriculture programme[466] and the UNEP-led OARE Research in the Environment programme.[467] These are coordinated in the multi-agency Research4Life partnership.[468] Open data policies in some countries have also improved access to findings derived from publicly-funded research.

H. 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 civilisations.'[469] Its mandate draws on the *Universal Declaration on Cultural Diversity*, agreed by UNESCO in 2001,[470] and includes:

- the maintenance of cultural diversity and preservation of cultural heritage;
- multilingualism and linguistic diversity, as advocated in the 2003 UNESCO Recommendation concerning the promotion and use of multilingualism and universal access to cyberspace;[471]
- the development of local and locally-relevant content, curriculum and software;
- the role of libraries and other public facilities in enabling access to content;
- the promotion of media literacy among women and girls; and
- support for indigenous peoples, including indigenous knowledge and expression.[472]

Action Line C8 has enabled multi-stakeholder exploration of these issues. Multilingualism, including the establishment of internationalized domain names (IDNs), and the monitoring of online linguistic diversity were priorities in the five years following the Summit. More recently, the Action Line has focused on the needs and interests of indigenous peoples. Participants in the Action Line have emphasized the importance of balancing access and economic opportunity with the protection of cultural values and identity. UNESCO has worked to promote the development of local content through this Action Line, publishing a joint report on *The Relationship between Local Content, Internet Development and Access Prices* with the Internet Society and the OECD in 2011.[473]

The *WSIS+10 Vision* reinforced the mandate of the Action Line, 'working towards a more culturally and linguistically diverse digital world,' in which 'development takes into account local, national and regional contexts,' there is greater linguistic diversity online, traditional knowledge is promoted and protected, and 'culture is integrated in all development policies and programmes, for poverty reduction and inclusive sustainable development.' The *Vision* also drew attention to the importance of promoting local content, the development and use of internationalized domain names, and the strengthening of policies concerned with cultural and linguistic diversity and heritage including indigenous knowledge and traditions, digitization and archiving.[474]

Developments since WSIS

Major developments have occurred in the range of content and the availability of different languages online since WSIS. They include rapid growth in the number of websites available online, the emergence of social networks and other user-generated media, and increased linguistic diversity. However, the online presence of many minority languages

and some world languages remains relatively poor. These developments are summarized in the section of Chapter 3 concerned with Target 9.

A number of stakeholders contributing to the open consultation for the CSTD ten-year review of WSIS stressed the importance of local content in facilitating ICT4D. The *Final WSIS Targets Review* notes that 'there is no generally agreed definition of local content, which has both geographic and linguistic resonance. Some use the term narrowly,' it says, 'to refer to information that is specifically and directly relevant to local communities,' while others have defined it, more widely, to include 'all digital content created for an end user who speaks the same language as the author.'[475] UNESCO, the OECD and ISOC have established that there is a symbiotic relationship between infrastructure deployment, affordability and local content generation, and stressed the importance of considering different stages in the process of content creation, dissemination and use.[476] UNCTAD and UNESCO have emphasized the importance of the cultural and creative industries within the Information Society and the wider economy, in their reports on the *Creative Economy.*[477]

There have also been important developments in linguistic diversity since WSIS. Computer code and programming, which were once dominated by the English language, have diversified. Internet browsers have become more multilingual. Wikipedia now has articles online in more than 200 languages, though the amount of content in many remains small. Internationalized domain names have been introduced since WSIS, though there have been some problems in ensuring their recognition by some popular global websites. Automated translation programmes of increasing quality are now available, at least for major languages, increasing access to a wider range of content.[478]

The report of the *Final WSIS Targets Review* summarized progress overall in this Action Line area as follows:

> *The growth in content, including local content, over the past decade … and the related spread of language diversity online have resulted primarily from developments in … communications markets…. Increased access to the Internet, the increased capacity of networks to carry high content volumes, and the low cost of publication online have accelerated the growth in web content, while new platforms such as social media and microblogs have enabled all Internet users to contribute their own content at minimal cost and inconvenience. Internet businesses have responded to this growth in content by providing new platforms for content distribution and extending the range of languages in which content can readily be published. Governments have supported content growth by facilitating the enabling environment for Internet investment and services, while, in most countries, imposing few restrictions on content access.*[479]

I. ACTION LINE C9 – MEDIA

The *Geneva Declaration*'s ninth principle recognized that 'traditional media' – print media and broadcasting –would continue to play an important part in the Information Society. The associated Action Line mandate sought to promote legislation concerning the independence and plurality of media, to support freedom of expression but also to combat 'illegal and harmful content,' and to reduce international imbalances in media infrastructure, technical resources and human capabilities.[480] Some of these issues overlap with Action Line C10.

Action Line C9 has been facilitated by UNESCO. After WSIS, subgroups were established to consider 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. The World Association of Community Radio Broadcasters (AMARC) led work on the evolving role of community media. Recent Action Line meetings have focused on the regulation of social media, online freedom of expression, the continuing significance of public sector broadcasting, and the concept of 'Internet universality' (see Chapter 7).[481]

The *WSIS+10 Vision* reaffirmed the expectation that media will benefit from interaction with new ICTs. It recognized that freedom of expression is 'essential for media's role in information and knowledge societies,' and affirmed that 'the

same rights that people have offline must also be protected online,' including media on all platforms. The *Vision* encouraged equal opportunities for men and women in media and commended the United Nations plan of action on the safety of journalists.[482]

Developments since WSIS

There have been major developments in the relationship between ICTs and traditional media since WSIS, as increasing numbers of people have made more extensive use of online information sources. However, although many people now access news online, through social media posts, blogs and other sources as well as broadcast and print media, UNESCO believes that traditional media institutions and platforms remain predominant in most regions, with television and radio remaining the media by which most people access news. It has summarized the principal changes underway as follows:

> *Changing business models and citizen behaviour have adversely affected some media. Newspapers have lost readers in many countries. Radio and television compete for audiences with online content, including new types of audio and video. Traditional book publishers are threatened by e-books in much the same way as traditional booksellers were threatened and lost markets to online retailers. All traditional media have lost advertising revenue to digital competitors.*
>
> *However, ICTs have also allowed traditional media to develop in new ways. Newspapers and broadcasters now publish content online, often including material that is not available on their traditional platforms, and have extended their readerships beyond national borders. Many publications are now only available online. Traditional newsgathering has been supplemented by user-generated content, including images and video material, and by citizen journalism. Content has become more interactive, as traditional titles offer digital comment space as well as letters pages.*[483]

As a result of these developments, news content is now provided by a wider range of non-professionals as well as professional journalists, raising questions concerning the status of journalists and the security of those contributing to news media. Significant changes have also taken place in media ownership, including the concentration of print media, the privatization of state media, convergence between media platforms and businesses, and the diversification of broadcasting including the emergence of global markets for satellite news and entertainment channels. In some countries, media licensing regimes have been extended to include online media. 'New issues of media ethics [have arisen] at the boundaries of journalism, security and privacy …, particularly with the rising popularity of user-generated content, which … has tested both media and intermediaries in their ethical decision-making about the legitimate limits on free expression.'[484]

J. ACTION LINE C10 – ETHICAL DIMENSIONS OF THE INFORMATION SOCIETY

Ethical dimensions of the Information Society are concerned with the relationships between governments, businesses and citizens, rights and responsibilities, and the ways in which ICTs interact with legal and regulatory frameworks and social norms. The *Geneva Declaration of Principles* premised the development of a 'people-centred, inclusive and development-oriented Information Society' on 'the purposes and principles of the Charter of the United Nations and respecting fully and upholding the Universal Declaration of Human Rights' (UDHR). Subsequent paragraphs in the *Declaration* reaffirmed 'the universality, indivisibility, interdependence and interrelation of all human rights and fundamental freedoms, including the right to development,' and drew particular attention to the rights and responsibilities set out in Articles 19 and 29 of the UDHR.[485]

The tenth principle of the *Geneva Declaration* proposed that the Information Society 'should foster justice, and the dignity and worth of the human person.'[486] The associated mandate for Action Line C10 states that stakeholders should 'promote respect for peace and … uphold the fundamental values of freedom, equality, solidarity, tolerance, shared responsibility, and respect for nature.' They should 'promote the common good, protect privacy and personal data and take appropriate actions and preventive measures, as determined by law, against abusive uses of ICTs such as 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.'[487]

This Action Line has been facilitated by UNESCO. Discussions in the period following WSIS were primarily concerned with means of promoting universal values and principles for the Information Society and preventing abuses of ICTs. UNESCO has organized a series of Info-Ethics Conferences in different world regions and, in 2013, a meeting of experts adopted the *Riga Guidelines on Ethics in the Information Society*.[488] Action Line meetings since 2010 have considered the equivalence of rights online and offline, concerns about the surveillance of communications, and related issues of privacy and data protection.[489]

The *WSIS+10 Vision* reaffirmed that Information and Knowledge Societies should be 'subject to universally recognized values, [should] promote the common good and [should] prevent abusive uses of ICTs.' Particular attention was drawn to the need to enhance the protection of privacy and personal data. The document urged all stakeholders to raise awareness and promote debate concerning ethical opportunities and challenges related to ICTs, and encouraged further research in this area.[490]

Developments since WSIS

The increased pervasiveness and capabilities of ICTs have intensified concerns about a number of issues relating to rights and other ethical dimensions of the Information Society since WSIS. These have included:

- issues related to freedom of expression and freedom of association;
- issues related to privacy and data protection, including surveillance of online communications by governments at both national and international levels and the retention and exploitation of data derived from online activity by communications businesses and online service providers; and
- adoption of the principle of equivalence of rights online and offline by the United Nations Human Rights Council and the General Assembly.

These issues are discussed in Chapter 2.

In its review of this Action Line area, UNESCO concluded that:

> *The ethical challenges of the Information Society will continue to grow and become more complex as ICTs continue to become more pervasive and have increased impact on human society, and as technological innovation presents people with opportunities to do things which were previously not possible or which threaten others' security or privacy, many of which were not envisaged at the time that international rights instruments were developed. Concepts of security and privacy are evolving rapidly alongside the evolution of ICTs themselves, particularly as data gathering becomes more pervasive and extensive and as data management and analysis become more crucial to policy development, public service and business activity. Technological innovation and market evolution are changing the relationships between governments, businesses and citizens. The blurring of boundaries between issues, and the emergence of new opportunities and threats to rights, point to the need for more public discourse around these challenges and better understanding of their implications.* [491]

K. ACTION LINE C11 – INTERNATIONAL AND REGIONAL COOPERATION

The final principle adopted in the *Geneva Declaration* related the Information Society to wider global policy objectives, including the MDGs and other internationally agreed development goals. It affirmed the need for 'effective international and regional cooperation among Governments, the private sector, civil society and other stakeholders, including the international financial institutions.' It drew specific attention to the role of the ITU in technical areas of the Information Society, and to financial and other support for economies in transition. The associated mandate commends 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 organizations.[492]

The *WSIS+10 Vision* reinforced the approach set out in this mandate, drawing attention in particular to the roles of Official Development Assistance, public-private partnerships, and multisectoral

cooperation. It called on the international community 'to assist developing countries in the preparation and implementation of national action plans to support the fulfillment of the post 2015 development agenda and the results of the overall review of WSIS outcomes in 2015,' taking into account 'the importance of regional initiatives.'[493]

Developments since WSIS

Action Line C11 has been implemented by DESA alongside Action Line C1, and relevant aspects of its mandate are therefore discussed above. Aspects concerned with the post-2015 development agenda are also discussed in Chapter 2, developments concerning multilateral and multi-stakeholder cooperation in implementation of WSIS outcomes in Chapter 8, and those concerning financial mechanisms in Chapter 6.

L. SUMMARY

The eighteen Action Lines established following WSIS provide a framework for international cooperation to address particular areas of WSIS implementation within the context of the vision discussed in Chapter 2. Significant achievements have been reported in each Action Line area, along with continued challenges, particularly relating to inclusiveness. The rapid growth in ICT networks and adoption since WSIS, together with changes in available technologies and services, has substantially affected the parameters for implementation in each Action Line. Mass market adoption of mobile phones, broadband networks and social media have enabled new ways for governments and other stakeholders to deliver services with developmental value, while individuals and communities have also developed their own ways of maximizing the value that they can derive from ICT resources.

At the same time, there have been persistent challenges in achieving universal access to ICT resources and services, and in leveraging their developmental value throughout society. The rapid development of technology and services has also raised new challenges in areas such as cybersecurity, privacy and surveillance. More research is needed to build understanding of the overall impact of the Information Society in areas such as education, employment and the environment. A number of contributions to the CSTD ten-year review of WSIS expressed the view that future implementation of WSIS outcomes should be forward-looking, addressing the challenges posed by developments such as big data, the Internet of Things and cloud computing.

In its midterm review of WSIS implementation in 2010, the CSTD noted a number of limitations of the Action Line framework. In particular, the Action Line process recorded only 'a fraction of the activities which are implemented by ICT and development agencies.' Attendance at Action Line meetings varies but does not comprehensively include either governments or the full range of specialist agencies involved in each Action Line area. Participants have commented that the high costs of attendance make it difficult for those from specialist development agencies and from some developing countries to attend. Some contributors to the open consultation for the CSTD ten-year review of WSIS commented that some Action Line remits, particularly those in Action Line C7, are limited in scope, that important new issues have arisen within most Action Line areas since WSIS, and that new technologies and services have affected the implementation of WSIS outcomes in the areas covered by them. UN Women and others have pointed out that there is no specific Action Line related to gender.[494] Some contributors to the consultation process also expressed concern that the Action Line format pays insufficient attention to the synergies between Action Line areas and that Action Lines are 'not well integrated into the much more substantial interactions which take place in other fora that are concerned with the issues that they cover.'[495]

The *Statement on the Implementation of WSIS Outcomes*, agreed at the WSIS+10 High Level Event organized by the ITU, UNCTAD, UNDP and UNESCO in 2014, asserted that the Action Lines have helped to build a common understanding of 'the desirability to realize a truly global interconnected and inclusive Information Society.' It described the WSIS Forum as 'an efficient global multi-stakeholder platform for coordination of the implementation of the WSIS Outcomes,' and identified 'the participation and rising interest of all stakeholders, at the national, regional and international levels, in jointly building and shaping the inclusive information society and raising awareness and overcoming the challenges that this process

entails' as 'the most notable achievement of the current implementation of the WSIS Action Lines.' The *Statement* recognized, however, that 'several challenges … identified in the implementation of the WSIS Action Lines … need to be addressed in order to build [an] inclusive Information Society beyond 2015,' listing 30 specific points within this context.[496] The outcome documents of the WSIS+10 High Level Event did not propose changes to the principles and mandates of the Action Lines as these are set out by the *Geneva Declaration* and *Plan of Action*. However, both WSIS+10 *Statement* and *Vision* emphasized 'the potential of ICT as a tool for promoting gender equality and the empowerment of women,' and the *Vision* recommended that gender equality aspects of WSIS Action Line outcomes should in future be 'implemented, reviewed and monitored … by UN Women in cooperation with other Action Line Facilitators.'[497]

NOTES

287 *Geneva Declaration of Principles*, section B; *Geneva Plan of Action*, section C.

288 Reports of implementation meetings can be found through http://www.itu.int/wsis/implementation/.

289 See www.wsis.org/prizes.

290 The 2013 Forum, for example, included more than 150 sessions. It was attended by 1,800 participants from more than 140 countries, including more than 60 ministers and deputy ministers. Just over half of these participants were from governments, with around 40 per cent from Western Europe. There were also over 300 remote participants. See http://www.itu.int/wsis/implementation/2013/forum/.

291 ITU, 2014f, p. 10.

292 Ibid., p. 24.

293 *Geneva Declaration of Principles*, para. 20.

294 *Geneva Plan of Action*, para. 8.

295 ITU, 2014f, pp. 35-36, section C II, C.1.

296 *Tunis Agenda*, paras. 20, 85.

297 ECA, 2013, Implementing the WSIS outcomes in Africa - Tunis + 7, December, available at http://unctad.org/en/PublicationsLibrary/a69d65_bn_ECA.pdf (accessed 21 November 2014).

298 Connect Africa Summit Outcomes Report, http://www.itu.int/ITU-D/connect/africa/2007/summit/pdf/finalreport.pdf.

299 Cited in APC, *The APC ICT Policy Handbook*, 2nd edn., 2009, p. 3.

300 For example, the submissions by Pakistan, the Russian Federation and Trinidad and Tobago.

301 Broadband Commission, 'Broadband Targets for 2015', http://www.broadbandcommission.org/Documents/Broadband_Targets.pdf.

302 The World Bank, 2012a, *Broadband Strategies Handbook*, (Washington D.C., The International Bank for Reconstruction and Development and The World Bank).

303 ECOSOC, 2013b, *Internet broadband for an inclusive digital society* (Report of the Secretary-General E/CN.16/2013/3).

304 World Economic Forum and INSEAD, *Global Information Technology Report*, 2013 p. 56.

305 Rwanda, for example, has deployed three successive NICI plans, focusing in turn on institutional and policy frameworks including infrastructure, the application of ICTs in thematic areas and key development sectors, and ICT service delivery. The fourth plan, which is intended to consolidate development to date after 2015, will seek to transform Rwanda into 'an information-rich knowledge-based society and economy.' The latest plan is available at http://www.rdb.rw/uploads/tx_sbdownloader/NICI_III.pdf.

306 UNCTAD, contribution to CSTD five-year review of WSIS implementation, available at http://www.unctad.info/upload/WSIS5/Contributions/UNGIS/UNCTAD.pdf.

307 See *e.g.* R Heeks, 'Causes of eGovernment Success and Failure: Design-Reality Gap Model', available at http://www.egov4dev.org/success/evaluation/.

308 ESCWA, 2013b, *Regional Profile of the Information Society in the Arab Region* (New York, United Nations publication), p. 9.

309 *Geneva Declaration of Principles*, section B2; *Geneva Plan of Action*, para. 9.

310 That is, the transition of television broadcasting from analogue to digital technologies, which releases spectrum for other purposes including mobile telephony.

311 pp. 35-36.

312 ITU, 2014f, p. 35-36, section C II, C.2.

313 See e.g. contribution by the APC. to the open consultation for the CSTD review, http://www.unctad.org/Sections/un_cstd/docs/cstd_wsis10_apc_en.pdf

314 See http://www.itu.int/wsis/review/inc/docs/ralfreports/WSIS10_ALF_Reporting-C2.Summary.pdf (accessed 21 November 2014).

315 The ITU's Smart Sustainable Development Model, launched in 2013, seeks to build on these developments by 'creat[ing] ecosystems where investments made for deploying telecom infrastructures for economic development are also used for disaster response,' optimizing the use of 'scarce and high cost resources such as satellite systems,' and 'ensur[ing] deployment of robust and resilient communications networks that continue to provide services in the immediate aftermath of disasters.' See ITU, *Smart Sustainable Development* Model, http://www.itu.int/ITU-D/emergencytelecoms/initiatives/SSDM.pdf.

316 The World Bank, 2014, *World Development Report 2014: Risk and Opportunity* (Washington, The International Bank for Reconstruction and Development and The World Bank).

317 *Geneva Declaration of Principles*, para. 24.

318 *Geneva Plan of Action*, para. 10.

319 UNESCO, *Building Inclusive Knowledge Societies*, 2014, p. 47, http://unesdoc.unesco.org/images/0022/002264/226425e.pdf.

320 ITU, 2014f, p. 36-37, section C II, C.3.

321 See *e.g.* the contribution by IFLA to the open consultation for the CSTD review, http://www.unctad.org/Sections/un_cstd/docs/cstd_wsis10_ifla_en.pdf.

322 See UNESCO report on Action Line C3 to the Multi-stakeholder Preparatory Platform for the WSIS+10 High Level Event, available at http://www.itu.int/wsis/review/inc/docs/ralfreports/WSIS10_ALF_Reporting-C3.Summary.pdf (accessed 21 November 2014).

323 *Geneva Declaration*, para. 29.

324 *Geneva Plan of Action*, para. 11.

325 See ITU webpage available at http://www.itu.int/wsis/c4/index.html (accessed 21 November 2014).

326 ITU, 2014c, p. 37, section C II, C.4.

327 ECOSOC, 2012, Innovation, research, technology transfer for mutual advantage, entrepreneurship and collaborative development in the information society (Report of the Secretary-General E/CN.16/2012/2).

328 Ibid.

329 ITU, 2011a, *Measuring the Information Society* (Geneva, United Nations publication) p. 111.

330 Contribution by the Government of Sri Lanka to the open consultation for the CSTD review, http://www.unctad.org/Sections/un_cstd/docs/cstd_wsis10_sri_lanka_en.pdf.

331 In 2008-2012, for example, the ITU implemented programmes of policy and regulatory harmonisation and capacity-building for countries in the African, Caribbean and Pacific regions, with funding from the European Commission: see http://www.itu.int/en/ITU-D/Projects/ITU-EC-ACP/Pages/default.aspx.

332 ECOSOC, 2010, Improvements and innovations in existing financing mechanisms: information and communication technology for development (Report of the Secretary-General E/CN.16/2010/3),p.13, http://unctad.org/en/Docs/ecn162010d3_en.pdf.

333 ITU report on Action Line C4 to the Multi-stakeholder Preparatory Platform for the WSIS+10 High Level Event, available at http://www.itu.int/wsis/review/inc/docs/ralfreports/WSIS10_ALF_Reporting-C4.Summary.pdf (accessed 21 November 2014).

334 *Geneva Declaration*, para. 35.

335 *Geneva Plan of Action*, para. 12.

336 See ITU website at http://www.itu.int/wsis/c5/index.html (accessed 21 November 2014).

337 ITU, 2010d, *WSIS Action Line Roadmaps* (Geneva, United Nations publication).

338 As well as meetings within the WSIS and IGF frameworks, these have included fora implemented by UNESCO, multilateral agencies such as the OECD and ASEAN, and international standards bodies.

339 ITU, 2014f, p. 38, section C II, C.5.

340 ITU Recommendation ITU-T X.1205, https://www.itu.int/rec/dologin_pub.asp?lang=e&id=T-REC-X.1205-200804-I!!PDF-E&type=items, as endorsed in Resolution 181 of the ITU Plenipotentiary Conference, 2010, http://www.itu.int/osg/csd/intgov/resoultions_2010/PP-10/RESOLUTION_181.pdf.

341 That is, attempts to prevent users from accessing an Internet resource by overloading it with demand for access.

342 See ITU website, available at http://www.itu.int/en/action/cybersecurity/Pages/gca.aspx (accessed 21 November 2014).

343 See Impact website, available at http://www.impact-alliance.org/home/index.html (accessed 21 November 2014).

344 Its Global Response Centre provides a real-time aggregated early warning system for governments and ICT professionals.

345 At the end of 2014, the ITU reported that there were 101 national CIRTs established worldwide: see http://www.itu.int/en/ITU-D/Cybersecurity/Pages/Organizational-Structures.aspx.

346 This Council of Europe convention is also open to signature by other countries; available at http://conventions.coe.int/Treaty/Commun/QueVoulezVous.asp?NT=185&CL=ENG (accessed 21 November 2014).

347 Current signatories available at http://conventions.coe.int/Treaty/Commun/print/ChercheSig.asp?NT=185&CL=ENG (accessed 21 November 2014). 44 countries have ratified the Convention.

348 The African Union Convention on Cybersecurity and Personal Data Protection is available at https://www.ccdcoe.org/sites/default/files/documents/AU-270614-CSConvention.pdf (accessed 24 November 2014).

349 See Action-Line C5, available at http://www.itu.int/wsis/review/inc/docs/ralfreports/WSIS10_ALF_Reporting-C5.Summary.pdf (accessed 24 November 2014).

350 *Geneva Declaration*, paras. 38-39.

351 *Geneva Plan of Action*, para. 13.

352 *Tunis Agenda*, para. 96.

353 See Chapter 7.

354 *Geneva Plan of Action*, para. 13.

355 See ITU website, available at http://www.itu.int/wsis/c6/index.html (accessed 24 November 2014).

356 ITU, 2014f, p. 38-39, section C II, C.6.

357 World Economic Forum and INSEAD, 2013, *The Global Information Technology Report 2013: Growth and Jobs in a Hyperconnected World* (Geneva, World Economic Forum).

358 For an overview of regulatory policy and practice, see The World Bank *info*Dev and ITU, 2011, *Telecommunications Regulation Handbook: 10th anniversary edition*.

359 The ITU estimates that 35 times as much traffic was handled by IP-based networks in 2011 as in 2003: see http://www.itu.int/wsis/review/inc/docs/ralfreports/WSIS10_ALF_Reporting-C2.Summary.pdf (accessed 24 November 2014).

360 Spectrum challenges include the digital switchover, spectrum trading and the reuse of TV white space.

361 For information on the 2014 event, see http://www.itu.int/en/ITU-D/Conferences/GSR/Pages/gsr2014/default.aspx (accessed 24 November 2014).

362 Since 2010, Trends reports have focused on *Smart Regulation for a Broadband World* in 2014and *Transnational Aspects of Regulation in a Networked Society* in 2013. They are available at http://www.itu.int/pub/D-REG-TTR (accessed 24 November 2014).

363 ITU, 2014e, *Trends in Telecommunication Reform Special Edition - Fourth-generation regulation: Driving digital communications ahead* (Geneva, United Nations publication).

364 DESA, *Global E-Government Survey*, 2014, p. 169.

365 The challenges arising from this and their implications for balancing the interests of rights holders and users were recognized in the *Geneva Declaration*, para. 42 and have been addressed in discussions at the World Intellectual Property Organisation (WIPO), including the WIPO Development Agenda.

366 For example, the transition from physical products to downloads in music retail.

367 *Geneva Declaration*, para. 44.

368 ITU, report on Action Line C6 to the Multi-stakeholder Preparatory Platform for the WSIS+10 High Level Event, available at http://www.itu.int/wsis/review/inc/docs/ralfreports/WSIS10_ALF_Reporting-C6.Summary.pdf (accessed 24 November 2014).

369 *Geneva Declaration*, para. 51.

370 ITU, *Geneva Plan of Action*, paras. 14-22.

371 DESA, *UN E-Government Survey*, 2014, p. 2.

372 *Geneva Plan of Action*, para. 15.

373 These are available at http://www.unpan.org/egovkb/global_reports/08report.htm (accessed 24 November 2014).

374 This can be accessed through http://www.unpan.org/DPADM/EGovernment/KnowledgeBaseofEGovernmentPractices/tabid/828/language/en-US/Default.aspx (accessed 24 November 2014).

375 ITU, 2011c, *National e-Strategies for Development: Global Status and Perspectives 2010* (Geneva, United Nations publication).

376 See also http://www.unpan.org/DPADM/Themes/EParticipation/tabid/1772/language/en-US/Default.aspx (accessed 24 November 2014).

377 ITU, 2014f, p. 39-45, section C II C.7.

378 DESA, 2008, *United Nations E-Government Survey 2008* (New York, United Nations Publication).

379 See contribution by DESA to the open consultation for the CSTD review, http://www.unctad.org/Sections/un_cstd/docs/cstd_wsis10_undesa_en.pdf.

380 DESA, UN E-Government Survey, 2014, pp. 6, 14.

381 Some governments have, as a result, required government data to be stored in-country and/or to support the development of national data centre capacity: see UNCTAD, *Information Economy Report*, 2013.

382 See *e.g.* R Heeks, *Implementing and Managing eGovernment: an international text* (Sage Publications, 2005).

383 Contribution by APC, to the open consultation for the CSTD review, http://www.unctad.org/Sections/un_cstd/docs/cstd_wsis10_apc_en.pdf.

384 DESA, 2014, p. 106.

385 DESA, 2014, p. 74.

386 Ibid. It also suggests that 'these opportunities and challenges call for effective strategies to create an enabling environment for e-participation, including appropriate legal and institutional frameworks, capacity development for digital media literacy for citizens and a seamless integration of online and offline features for public participation.'

387 Contribution by DESA, http://www.unctad.org/Sections/un_cstd/docs/cstd_wsis10_undesa_en.pdf.

388 *Geneva Plan of Action*, para. 16.

389 The series is available at http://unctad.org/en/Pages/Publications/InformationEconomyReportSeries.aspx.

390 These can be found at http://www.itu.int/wsis/c7/e-business/index.html (accessed 24 November 2014).

391 ITU, 2014d, p. 39-45, section C II C.7.

392 UNCTAD, 2009, p. 7.

393 http://www.emarketer.com/Article/Global-B2C-Ecommerce-Sales-Hit-15-Trillion-This-Year-Driven-by-Growth-Emerging-Markets/1010575.

394 The *info*Dev website is at http://www.infodev.org/idisc (accessed 24 November 2014).

395 An example is the iHub in Nairobi, Kenya, see http://www.ihub.co.ke/ (accessed 24 November 2014).

396 'Other things being equal,' UNCTAD concluded in its *Information Economy Report* 2012, *The Software Industry and Developing Countries*, 'locally based software expertise is better positioned to understand domestic needs and therefore to develop relevant and innovative applications and content. Countries with well-developed software industries are better placed to implement their own tailored solutions,' including procurement from local suppliers, and to generate employment for ICT-skilled young people. UNCTAD, 2012, p. xiii.

397 UNCTAD, *Information Economy Report*, 2013.

398 It has been estimated that as many as 150,000 Internet-related start-ups are emerging each year in developing countries. United Nations General Assembly and ECOSOC, 2014, p. 24.

399 Aker J C and Mbiti I M, 2010, Mobile phones and economic development in Africa, *The Journal of Economic Perspectives*, p. 207-232.

400 UNCTAD, 2014a, *Empowering Women Entrepreneurs Through Information And Communications Technologies*.

401 *Geneva Declaration*, para. 29.

402 These goals can be found at http://www.unesco.org/new/en/education/themes/leading-the-international-agenda/education-for-all/efa-goals/ (accessed 24 November 2014).

403 *Geneva Plan of Action*, para. 11.

404 http://www.unesco.org/new/en/unesco/themes/icts/e-learning/.

405 See http://www.itu.int/wsis/c7/e-learning/index.html (accessed 24 November 2014).

406 ITU, 2014f, p. 39-45, section C II C.7.

407 ESCWA, 2013, p. 61.

408 Examples include Uruguay and Rwanda: see ITU, 2014a, Target 2.

409 Continued education for those who have left the formal education system.

410 GeSCI is an international NGO based in Kenya: see http://www.gesci.org/.

411 GeSCI has also expressed concern about 'policies that are visionary but not realistic and do not take account of parallel challenges and opportunities in other sectors that will impact policy implementation:' GeSCI contribution to the Multi-stakeholder Preparatory Platform for the WSIS+10 High Level Event, accessible through http://www.itu.int/wsis/review/inc/docs/submissions/Form1_WSIS10-HLE-OC_OfficialSubmissions-GESCI_web.pdf l.

412 See *e.g.* The World Bank, The African Development Bank and African Union, 2011, *The Transformational Use of Information and Communication Technologies in Africa* (eTransform Africa).

413 GeSCI, *op. cit.*

414 OECD, 2011, *PISA 2009 Results: Students Online: Digital Technologies and Performance (Volume VI)* (Paris, OECD publication).

415 F. Pedro, 'Trusting the Unknown: The Effects of Technology Use in Education,' in World Economic Forum and INSEAD, 2012.

416 See http://one.laptop.org/ (accessed 24 November 2014); and Cristia J, Ibarrarán P, Cueto S, Santiago A and Severín E, 2012, Technology and child development: Evidence from the one laptop per child program, *IDB Working Paper No. IDB-WP-304*, 1 April.

417 African Development Bank and World Bank, *op. cit.*

418 One example is the BBC Janala project in Bangladesh: see http://www.bbc.co.uk/mediaaction/where_we_work/asia/bangladesh/bbcjanala.html.

419 See http://www.unesco.org/new/en/unesco/themes/icts/teacher-education/unesco-ict-competency-framework-for-teachers/ (accessed 24 November 2014).

420 See http://www.unesco.org/new/en/communication-and-information/access-to-knowledge/open-educational-resources/ (accessed 24 November 2014).

421 See Haber J, 2014, MOOCs (Massachusetts, The MIT Press Essential Knowledge Series).

422 A number of different platforms have been developed to support teachers and administrators, including UNESCO's OpenMIS platform: see http://www.unesco.org/new/en/education/themes/planning-and-managing-education/policy-and-planning/emis/ (accessed 24 November 2014).

423 UNESCO, 2014, *Building Inclusive Knowledge Societies: A review of UNESCO's action in implementing the WSIS outcomes*.

424 *Geneva Plan of Action*, p. 41-43, para. 18.

425 See http://www.who.int/goe/en/ (accessed 24 November 2014).

426 See http://www.itu.int/wsis/c7/e-health/index.html (accessed 24 November 2014).

427 ITU, 2014f, p. 39-45, section C II C.7.

428 See http://www.un.org/millenniumgoals/ (accessed 24 November 2014).

429 World Health Organization. 2007. Building Foundations for e-Health: Progress of Member States. Geneva: Global Observatory for eHealth., cited in J-Y Hamel, 'ICT4D and the Human Development and Capability Approach: The Potentials of Information and Communication Technology ', UNDP Human Development Research Paper 2010/37, p. 27.

430 Contribution by the WHO to the open consultation for the CSTD review, available at http://www.unctad.org/Sections/un_cstd/docs/cstd_wsis10_who_en.pdf (accessed 18 November 2014).

431 ITU, 2014a, Target 5.

432 See http://www.who.int/goe/publications/ehealth_ex_summary_en.pdf (accessed 24 November 2014).

433 WHO, *eHealth and Innovation in Women's and Children's Health: a baseline review*, 2014, http://www.who.int/goe/publications/ehealth_ex_summary_en.pdf. See also WHO report on Action Line C7 e-health to the Multi-stakeholder Preparatory Process for the WSIS+10 High Level Event, http://www.itu.int/wsis/review/inc/docs/ralfreports/WSIS10_ALF_Reporting-C7_E-Health.Summary.pdf.

434 *Geneva Plan of Action*, p. 43, para. 19.

435 See Forum agendas at http://www.itu.int/wsis/implementation/.

436 ITU, 2014f, p. 39-45, section C II C.7.

437 Assessment by Booz & Co. in World Economic Forum and INSEAD, *Global Information Tecnology Report*, 2013, , Chapter 1.2.

438 World Bank, *Kenya Economic* Update, December 2010, available at http://siteresources.worldbank.org/KENYAEXTN/Resources/KEU-Dec_2010_with_cover_e-version.pdf (accessed 25 November 2014).

439 Experience with BPO shows that success in this requires a number of factors, such as the combination of relatively high educational attainment levels and world language capabilities with relatively low labour costs, as well as high-quality international connectivity.

440 World Economic Forum and INSEAD, 2013, p35.

441 *Geneva Plan of Action*, para. 20.

442 ITU, 2014f, p. 39-45, section C II C.7.

443 By the end of 2012, it was estimated that the number of information technology devices on the planet would exceed the number of people: ESCAP, 2012, Measuring progress - review of the targets and information and communications technology indicators of the World Summit on the Information Society (Note by the secretariat E/ESCAP/CICT/(3)/3).

444 See http://www.unep.org/ietc/Portals/136/Other%20documents/PolicyBriefs/13052013_E-Waste%20Policy%20brief.pdf (accessed 25 November 2014).

445 UNEP, *Policy Brief on E-waste*, 2013, http://www.unep.org/ietc/Portals/136/Other%20documents/PolicyBriefs/13052013_E-Waste%20Policy%20brief.pdf.

446 Contribution to the Multi-stakeholder Preparatory Platform for the WSIS+10 High Level Event, available at https://www.itu.int/wsis/review/inc/docs/submissions/Form1_WSIS10-HLE-OC_OfficialSubmissions-UNEP-SBC_web.pdf (accessed 25 November 2014).

447 GeSI, 2012, *SMARTer 2020: The Role of ICT in Driving a Sustainable Future* (GeSI aisbi and The Boston Consulting Group, Inc), pp. 21-27.

448 See http://archive.basel.int/industry/mppi.html (accessed 25 November 2014).

449 See http://archive.basel.int/industry/compartnership/ (accessed 25 November 2014).

450 ITU work in this area is summarized at http://unfccc.int/resource/docs/2014/smsn/un/158.pdf

451 GeSI, *SMART 2020*, 2008. GeSI suggests that ICT-enabled solutions offer the potential to reduce GHG emissions by 16.5 per cent if they are exploited to their fullest potential, making potential carbon savings equivalent to seven times the ICT sector's emissions.

452 Not least because of rebound effects – the possibility, for example, that changes in working patterns such as telecommuting will lead to higher, rather than lower, levels of energy consumption as people engage in more leisure travel and make more use of home entertainment systems.

453 *Geneva Plan of Action*, para. 21.

454 See http://www.slideshare.net/eagriculture (accessed 25 November 2014).

455 Community members come from more than 170 countries. See contribution by FAO to the open consultation for the CSTD review, available at http://www.unctad.org/Sections/un_cstd/docs/cstd_wsis10_fao_en.pdf (accessed 18 November 2018).

456 ITU, 2014f, p. 39-45, section C II C.7.

457 See *e.g.* Aker J C and Mbiti I M, 2010.

458 ECLAC, 2013c, *Information and Communication Technologies for Agricultural Development in Latin America* (Santiago, United Nations publication).

459 Contribution by FAO to the open consultation for the CSTD review, http://unctad.org/Sections/un_cstd/docs/cstd_wsis10_fao_en.pdf.

460 *Geneva Plan of Action*, p. 44, para. 22.

461 See http://www.itu.int/wsis/c7/e-science/index.html (accessed 25 November 2014).

462 ITU, 2014f, p. 39-45, section C II C.7.

463 UNESCO, 2014, *Building Inclusive Knowledge Societies: A review of UNESCO's action in implementing the WSIS outcomes*.

464 Ibid.

465 See http://www.who.int/hinari/en/ (accessed 25 November 2014).

466 See http://www.aginternetwork.org/en/ (accessed 25 November 2014).

467 See http://unep.org/oare (accessed 25 November 2014).

468 See http://www.research4life.org/ (accessed 25 November 2014).

469 *Geneva Declaration*, para. 52.

470 UNESCO, 2002, *UNESCO Universal Declaration on Cultural Diversity* (Paris, UNESCO publication).

471 See http://portal.unesco.org/en/ev.php-URL_ID=17717&URL_DO=DO_TOPIC&URL_SECTION=201.html (accessed 24 November 2014).

472 *Geneva Plan of Action*, para. 23.

473 OECD, ISOC and UNESCO, 2013, The Relationship between Local Content, Internet Development and Access Prices. *OECD Digital Economy Papers*.

474 ITU, 2014f, pp. 31, 45-46, sections B.15 and C II C8.

475 This is the phrase used by OECD, ISOC and UNESCO, *op, cit.* ITU, 2014a, p 277.

476 OECD, ISOC and UNESCO, 2013, *op. cit*.

477 See *e.g.* UNCTAD, *Creative Economy Report 2010*, http://unctad.org/en/pages/PublicationArchive.aspx?publicationid=946, and UNESCO, *Creative Economy Report 2013*, http://www.unesco.org/culture/pdf/creative-economy-report-2013.pdf.

478 On these issues, see ITU, 2014a, Target 9.

479 Ibid.

480 *Geneva Declaration*, para. 55; *Geneva Plan of Action*, para. 24.

481 See http://www.itu.int/wsis/c9/index.html (accessed 25 November 2014).

482 ITU, 2014f, p. 46, section C II C9.

483 UNESCO, 2014a, p. 55.

484 UNESCO, 2014b, *World Trends in Freedom of Expression and Media Development* (Paris, UNESCO publication).

485 *Geneva Declaration*, paras. 1, 3-5.

486 Ibid., para. 57.

487 *Geneva Plan of Action*, para. 25.

488 These can be found at http://www.unesco.org/new/fileadmin/MULTIMEDIA/HQ/CI/CI/pdf/ifap/ifap_riga_guidelines_ethics_in_information_society_en.pdf (accessed 25 November 2015).

489 See http://www.itu.int/wsis/c10/index.html (accessed 25 November 2014).

490 ITU, 2014f, pp. 46-47, section C II C.10.

491 UNESCO, 2014a, p. 59.

492 *Geneva Declaration*, paras. 60-64; *Geneva Plan of Action*, p. 48-49, para. 26.

493 ITU, 2014f, p. 47-48, section C II C.11.

494 Contribution by UN-WOMEN to the open consultation for the CSTD review, http://www.unctad.org/Sections/un_cstd/docs/cstd_wsis10_unwomen_en.pdf.

495 Contribution by APC to the open consultation for the CSTD review, http://unctad.org/Sections/un_cstd/docs/cstd_wsis10_apc_en.pdf.

496 ITU, 2014f, p. 29-33, section B.

497 ITU, 2014f, pp. 11, 26, 48.

CHAPTER 6

FINANCIAL MECHANISMS FOR THE INFORMATION SOCIETY

CHAPTER 6 – FINANCIAL MECHANISMS FOR THE INFORMATION SOCIETY

The *Geneva Plan of Action* recognized the importance of financial mechanisms for implementing the Information Society. It urged the governments of developed countries, international development agencies and IFIs 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 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.' The *Plan of Action* requested the United Nations Secretary-General to initiate a Task Force to review the adequacy of existing financing mechanisms (see Box 7).[498]

A. DEVELOPMENTS IN FINANCIAL MECHANISMS FOR THE INFORMATION SOCIETY

Major changes had taken place in the financing of communications networks in the period leading up to WSIS. The liberalization and privatization of telecommunications markets, which began in developed countries in the 1980s, spread to many developing countries in the 1990s, with the result that the primary source of investment for communications networks shifted from the public to the private sector. By 2003, many countries, including developing countries, had liberalized their fixed telecommunications networks, allowing market entry by private sector alternatives to public sector incumbents, and had wholly or partly privatized those incumbent operators, opening markets to foreign direct investment (FDI), a process facilitated by the WTO's Basic Telecommunications Agreement.[499] Most mobile telecoms markets, including those in developing countries, have been introduced on a competitive basis, with the majority of investment coming from international private sector operators. Very high levels of FDI were made in telecommunications in developing countries in the late 1990s and 2000s, mostly in response to privatizations and the opportunity to develop wireless networks. An increasing amount of this has been South-South investment, with major international investors emerging in China, India and other parts of Asia, South Africa, the Arab region and Latin America.[500]

Responding to this growth in FDI, multilateral and bilateral donors, including the World Bank and other IFIs, reoriented their ICT sector investments, reducing commitments to the direct financing of infrastructure and increasing support for policy reforms and other mechanisms that were expected to encourage private investment, including liberalization, privatization and the introduction of independent regulation. Changes also occurred around this time in the international framework for development investment and Official Development Assistance (ODA). The World Bank and other multilateral agencies focused their attention from 2000 on the Millennium Development Goals and Poverty Reduction Strategies. The United Nations International Conference on Financing for Development in 2002 adopted a new framework for development finance, the Monterrey Consensus, which emphasized the role of private sector FDI, domestic financial resources and international trade as catalysts for development.[501] In 2005, the Paris Declaration on Aid Effectiveness established a complementary new framework for the management of ODA, based on developing country ownership of poverty reduction strategies, harmonization of donor interventions, and measurable developmental outcomes.[502]

Although the run-up to WSIS saw a high level of private sector investment in telecommunications in developing countries, this naturally focused on those geographical areas and market segments that were likely to generate a rapid return. Network coverage occurred more quickly in urban areas and in those rural areas which had relatively large or prosperous populations. Many governments

sought to stimulate the deployment of infrastructure in less economically viable areas through a variety of regulatory instruments, including licence obligations, fiscal incentives and government subsidies. These are considered further below.

The report of the Task Force on Financial Mechanisms (TFFM) is summarized in Box 7.

Box 7: The Task Force on Financing Mechanisms for ICT for Development

The Task Force on Financing Mechanisms was established following the Geneva phase of WSIS, and was managed by UNDP. It published its report in December 2004.[503] This noted the developments described above, including the increased importance of FDI, the availability of multilateral and bilateral ODA, and the increased attention paid by development agencies to the enabling environment for private sector investment. It identified a number of gaps in investment patterns, concluding that 'Regional cooperation, multi-stakeholder partnerships, and seed financing appear to be critical elements for addressing critical infrastructure gaps and can in turn help promote further development of national backbones and last mile solutions in countries where gaps persist.' It also noted the importance of investment reaching beyond infrastructure to include content, applications and human capabilities. 'Without … commitment to fundamental human resource capacity,' it concluded, 'the return on investment in hardware and software risks could be limited and the pace at which the digital divide is narrowed could be decelerated.'

The analysis in its report was broadly adopted at the Tunis phase of WSIS and incorporated in the *Tunis Agenda.* This identified a number of areas that were felt to require further attention from national and international actors, including:

- regional backbone infrastructure, especially in economically disadvantaged regions;
- broadband capacity;
- international access and connectivity in LDCs, landlocked developing countries (LLDCs) and Small Island Developing States (SIDS);
- capacity-building for regulators and policy-makers; and
- the development of poverty-related ICT applications and content.[504]

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 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 that could provide resources for specific project activities.[505]

In October 2009, at the request of the ECOSOC, UNGIS hosted an open consultation forum on 'Financial mechanisms – meeting the challenges of ICT for Development,' to review initial experience since WSIS, share views and discuss new approaches to financial arrangements at national, regional and global levels.[506] Sessions within the consultation focused on backbone infrastructure, universal access, content and applications, and capacity-building. There was wide agreement that the financing of ICT for development remained 'a significant challenge.' It recognized that liberalization and privatization had been important in generating private sector investment, but noted that it was 'not always possible to find sustainable business models for the investments needed' in rural and remote areas, especially for broadband and Internet provision. Participants regretted that 'capacity development and relevant content' were often 'afterthoughts after heavy infrastructure and hardware investments. Financing these soft and less visible components' was thought to be particularly challenging. These were 'areas where it has been more difficult to generate funds from the private sector, … highlighting the importance of continuous support [from] governments, [and] from bilateral and multilateral donor organizations.'[507] Discussions considered ways

of reducing infrastructure costs in remote and rural areas, including infrastructure sharing, and emphasized the need to continue exploring new financing mechanisms including multi-stakeholder partnerships, large scale financing institutions such as IFIs, and microfinance.

A report on *Improvements and innovations in existing financial mechanisms for ICT* was issued by the United Nations Secretary-General in 2010. This concluded that financing ICT4D remained a significant challenge for the international community, particularly in ensuring that affordable ICT access becomes available in areas of low population density, in developing local content and applications, and in building capacity. It suggested that particular attention needs to be paid to these latter "soft' and 'less visible' components', because they are less attractive to the private sector and 'often lag behind heavy infrastructure and hardware investments.' The report identified a number of ways in which international agencies and national governments could complement private sector investment in order to address the challenges identified. 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 users in the development of ICT projects, to enhance sustainability. The United Nations Secretary-General also urged governments and development agencies to review the objectives and experience of universal access/service funds and to consider the potential of social networking and user-generated platforms for information-sharing. [508]

B. EXPERIENCE SINCE WSIS

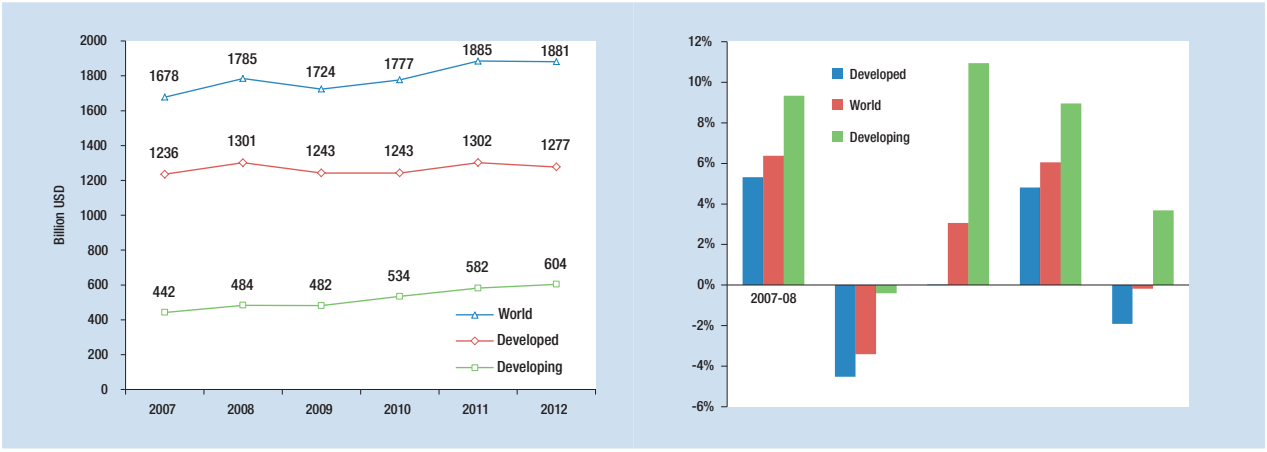
Private investment has continued to be the main source of ICT sector financing in developing countries since WSIS. Investment in developing country networks increased in the period immediately following the Summit, continued at a substantial level even during the economic downturn of 2008-2010, and has since recovered towards earlier levels. South-South investment has continued to grow within the sector. Much of the drive for new investment has come from technological innovation, in particular the need to deploy broadband fixed and wireless networks capable of providing the capacity required for growth in the reach of ICTs and for the new services that are continually becoming available. The following paragraphs consider, in turn, the roles of private investment, which has focused primarily on investment in infrastructure and services; of IFIs, which have focused on infrastructure and the policy and regulatory environment; and of ODA, which has been more concerned with the "soft' and 'less visible' components' such as content and capacity-building.

1. The ICT sector and infrastructure investment

The ICT market has continued to grow since WSIS. The value of the global ICT sector in 2011 was estimated to be US$4 trillion, a figure forecast to rise to US$4.5 trillion by 2014.[509] Sales of IT products represented approximately 9.5 per cent of global merchandise exports in 2010.[510] There have, however, been major changes in the composition of the sector since WSIS, including convergence between different market segments. International telecoms operating businesses now predominate in most national telecoms markets, and are often also countries' leading Internet Service Providers (ISPs). Online service providers such as Google, Amazon, Facebook and Alibaba, which were relatively small at the time of WSIS, have become major global businesses with very high levels of market capitalization. Substantial subsidiary markets have developed in areas such as gaming and entertainment services. Continued convergence between telecommunications, computing, broadcasting and content sectors means that it is becoming increasingly difficult to differentiate between ICT sector and other types of investment.

Total telecommunications revenue worldwide rose overall by 12 per cent in the period from 2007 to 2012, reaching 2.7 per cent of world GDP, as illustrated in Figures 35 and 36, but proved vulnerable to global economic conditions, falling in the economic crisis of 2008-2009 and stagnating in 2011-2012. These negative impacts were much less apparent in developing than in developed countries. The share of telecommunications revenue accounted for by developing countries rose between 2007 and 2012 from 26 per cent to 32 per cent, though this is still below the 36 per cent share of global GDP attributed to developing countries.[511]

Figures 35 and 36: Worldwide telecommunications revenue, 2007-2012

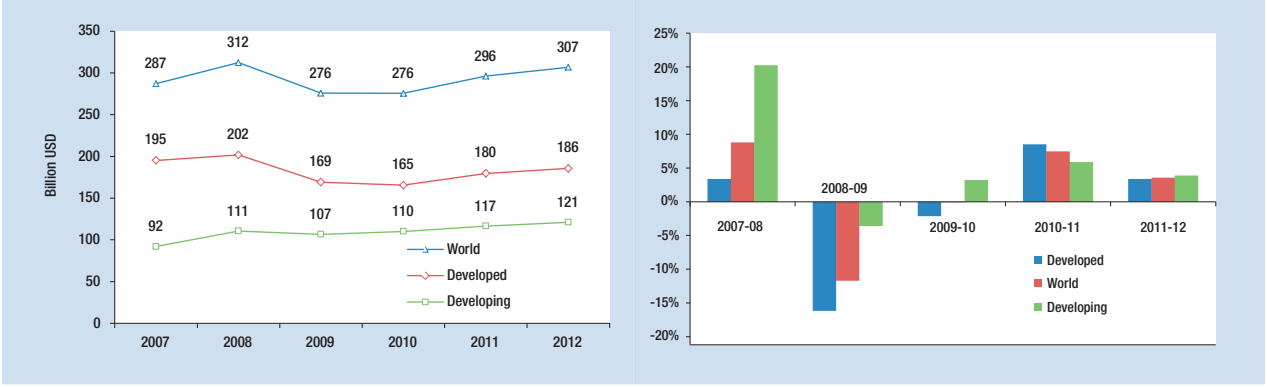


Source: ITU, Measuring the Information Society 2014, p. 13.

Infrastructure investment worldwide, including investment in ICTs, was also negatively affected by the financial crisis that began in 2008. Capital investment by telecommunications operators fell dramatically in 2008-2009, as private sector investors responded to falling revenues and constrained capital markets, even though the number of subscriptions to communications networks continued to grow due to the global spread of mobile telephony and Internet. However, as Figures 37 and 38 show, investment in developing countries proved more resilient to the impact of the recession than that in developed countries. Unlike revenues, investment by telecommunications operators in both developing and developed countries was positive during 2012, the latest year for which figures are available.[512]

The trend towards increased South-South investment in telecommunications has continued. Chinese equipment manufacturers and other Asian investors, for example, have played an important part in the deployment of broadband infrastructure in African and other developing country markets. The Indian telecoms operating company Bharti Airtel has become the fourth largest mobile telecoms company worldwide in subscriber numbers, with businesses in twenty countries, many of them in Africa.[513] The South African telecoms and broadcasting firm MTN likewise runs communications networks in more than twenty countries, in Asia as well as Africa,[514] while the Mexican business Telmex provides telecoms products and services in many countries in Latin America.[515]

Figures 37 and 38: Investment by telecommunications operators, 2007-2012



Source: ITU, Measuring the Information Society 2014, p. 14.

The United Nations Secretary-General summarized the financial and other challenges associated with large-scale infrastructure in his 2010 report as follows:[516]

> *Backbone networks invariably require the highest upfront investment in major infrastructure, thus imposing the greatest burdens and potential risks upon investors. They typically involve a combination of transmission technologies, from fibre optic cables (terrestrial and undersea) to microwave towers and satellite systems, and they must be fully linked across often harsh terrain in remote areas: mountains, jungles, oceans and deserts. For these reasons, the financing of backbone networks depends upon large-scale investments, often by a combination of governments, major network operators, international investors and partners, as well as donors and financial institutions.*

Considerable attention was paid in the years following WSIS to investments in submarine cable connectivity, which offers higher bandwidth and greater flexibility than satellite connections. East Africa, the last major region not connected to international cable networks, was connected through a series of new cables from 2009, leading to very substantial increases in bandwidth and reductions in Internet prices. The emergence of competition in the market for submarine access had a similar effect on Internet prices in West Africa.[517] Submarine cable connectivity is now available in all but two coastal countries in Africa and a number of small island states in the Pacific.

The near-completion of global submarine cable networks around the world has required large-scale investments by a variety of stakeholders including private sector consortia – in which established telecommunications operators have generally played a leading part – and IFIs. The principal focus of attention has now shifted to terrestrial backbone and backhaul infrastructure. Increased international connectivity, lower bandwidth prices and rapidly growing demand for data traffic resulting from increased usage and the development of cloud computing have all intensified the need to improve the capacity of terrestrial networks since WSIS. At higher traffic volumes, fixed networks become more competitive with wireless networks, leading to more investment in fixed infrastructure in areas, like sub-Saharan Africa, where wireless backbone networks had been deployed.[518]

A series of regional conferences, organized by the ITU in conjunction with regional organizations, has focused attention on investment priorities and illustrated the scale of investment being undertaken by private companies. The Connect Africa conference held in Rwanda in 2007, for example, agreed a five-point set of investment priorities for Africa, which echoed the conclusions of the Task Force on Financing Mechanisms:

- to interconnect all African capitals and major cities with broadband infrastructure (by 2012) and strengthen connectivity to the rest of the world;
- to connect African villages to broadband (by 2015) and implement shared access initiatives such as community telecentres and village phones;
- to adopt regulatory measures to promote affordable broadband access, including technology neutral licensing, appropriate spectrum allocation and the implementation of IXPs;
- to support the development of 'a critical mass of ICT skills required by the knowledge economy'; and
- to adopt national e-strategies incorporating strategies for cybersecurity and digital government services.

Private companies present at that summit announced plans to invest a total of US$55 billion in communications infrastructure, the vast majority of it in wireless networks, while a number of partnerships were agreed between IFIs and other international organizations to co-finance large-scale investment projects involving a number of countries.[519] Similarly large levels of planned investment were revealed at other events in the ITU's Connect the World series, which have addressed the CIS region (2009), the Arab States (2012), the Americas (2012) and the Asia-Pacific region (2013).[520]

Public sector bodies have significantly re-engaged with infrastructure investment since WSIS. IFIs and regional organizations have reasserted their role, alongside private investment, in broadband networks, particularly at a regional level.[521] Governments, too, have begun to play a part in

financing infrastructure, using their own resources, in public-private partnerships and in conjunction with IFIs.[522] While generally welcomed as expediting broadband investment and enabling it to reach into less commercially attractive districts, this has also raised concerns. In the words of one contribution to the CSTD ten-year review of WSIS:

> *… care must be taken to ensure that* [this] *does not reinstate government-controlled monopolies over critical infrastructure which could jeopardise both future network deployment and freedom of expression. Care also needs to be taken to avoid negative outcomes for future infrastructure deployment and for consumer prices arising from consolidation of network operators and service providers in national markets.*[523]

While backbone networks require the highest volumes of investment, local access networks are the most costly part of infrastructure per user. Although the costs of wireless access networks are generally lower than those for fixed networks, it has still proved necessary for governments to stimulate network deployment in some, particularly remoter rural, areas through universal access mechanisms. The *Tunis Agenda* urged governments and other stakeholders to introduce 'policy and regulatory incentives aimed at universal access and the attraction of private-sector investment,' develop 'institutional and implementation capacity to support the use of national universal service/access funds,' and initiate 'further study of these mechanisms and those aiming to mobilize domestic resources' for infrastructure investment.[524]

Approaches to universal access have evolved with technology and markets during the years since WSIS. Many strategies have been based on governments providing subsidies to network operators to invest in economically unviable or unattractive areas, often offering these on a competitive basis through reverse auctions[525] and drawing resources for them from levies on operating companies' turnover or profits. Basic mobile networks have reached much more extensively into rural areas than was expected at the time of WSIS, with the result that fewer geographical areas than anticipated have required subsidy. The widespread adoption of personal mobile phones has also meant less demand for public payphones and basic telecentres than had been anticipated. As a result, some universal access agencies have been criticized for failing to deploy resources that they have accumulated. However, while access to basic services has become more universally available, the same cannot be said for broadband services, and universal access strategies have therefore increasingly focused on broadband access. In some cases, they have also supported the development of digital government services, local content and capacity-building initiatives. The United Nations Secretary-General concluded in 2010 that 'The model of some form of public Fund to support equitable ICT access will remain a key financial mechanism and a cornerstone of many countries' development policies for some time to come.'[526]

Data centres and cloud computing have been another area of rapidly growing private sector investment since WSIS, led not by telecommunications operating companies but by software companies and online service providers, including Microsoft, Apple, Google and Amazon.[527] It is estimated that sales of worldwide public cloud services reached US$111 billion in 2012, about half accounted for by advertising and half by fee-based services.[528] Forecasts for growth in cloud computing vary substantially, reflecting the many technological and other factors influencing adoption. One leading consultancy estimated in 2012 that the market for public fee-based cloud services would grow from US$14 billion to US$43 billion between 2010 and 2015.[529] Most forecasts expect cloud adoption to expand rapidly over the next few years, accounting for a growing share of overall ICT sector revenues. These and other innovations described in Chapter 4 have enabled the emergence of a highly diverse new range of services and applications, including platforms for user-generated content. Synergies have emerged between the markets for information content, underlying networks and facilities and, in some cases, terminal equipment.[530] While these innovations have been driven primarily by the private sector, their introduction also provides new opportunities for public services and developmental applications.

2. International Financial Institutions (IFIs)

IFIs provide investment resources on commercial or concessionary terms and have traditionally been the principal source of funding for large-scale infrastructure projects in developing countries.

However, their role in the ICT sector changed significantly as a result of the growing private sector predominance in investment in communications infrastructure and services towards the end of the last century. In consequence of this, IFIs have concentrated their financial commitments on areas and aspects of communications that are less attractive to private sector investors, or that have higher levels of risk, while also encouraging policy and regulatory changes which aim to leverage private investment into regional and national markets.

The largest IFI is the World Bank Group (WBG), which has invested substantially in communications projects over many decades. Its portfolio of active projects with ICT components has grown from about $500 million in 2006 to about $1.7 billion in 2014.[531] The International Finance Corporation (IFC), part of the Bank Group, has invested about US$4.5 billion in private sector ICT projects since 2001, while the Group's Multilateral Investment Guarantee Agency provides financial guarantees to support private investment in high risk environments. Recent Bank-supported projects to address infrastructure needs include financial assistance for a fibre optic cable connecting the Pacific countries of Tonga and Fiji, policy reforms and infrastructure deployment to bring Internet access to underserved communities in landlocked Afghanistan and South Sudan, and support for the establishment of an ICT regulator in Somalia. The Bank has supported sector reforms in many countries worldwide, research into the potential of ICTs, and guidance in policy and regulatory areas, notably, since WSIS, concerning broadband policy. ICT components are now present in a large proportion of all projects in the Bank's portfolio, including many which are not directly concerned with ICTs, such as in health, agriculture and education.

The World Bank's strategy for the ICT sector at the time of WSIS focused on four pillars: broadening and deepening sector and institutional reform; increasing access to information infrastructure; building human capacity in the use of ICTs at various levels; and supporting the development of ICT applications in various development domains.[532] An independent review of ICT activities in 2011 concluded that 'the Bank Group's most notable contributions have been in support to sector reforms and in private investments for mobile telephony in difficult environments and in the poorest countries.'[533] Those countries with Bank Group support for policy reform and investments, it continued, 'have increased competition and access faster than countries without such support.' In other areas, however, Bank interventions were found to have been less successful. While there were many positive examples of targeted approaches to extend access beyond commercially viable areas, for example in Chile and Pakistan, the evaluation concluded that 'access for the poor has been more effectively supported through general, non-targeted interventions focused on the enabling environment and direct support to private investments.' More also needed to be done to achieve the Bank's goals for human capacity and applications.

This review informed a revised ICT sector strategy that the Bank adopted in 2012.[534] In the period 2012-2015, the Bank has directed its activity towards three priority areas:

- Transformation: Making development more open and accountable, and improving service delivery – for instance by facilitating citizen feedback to governments and service providers.
- Connectivity: Scaling up affordable access to broadband – including for women, disabled citizens, disadvantaged communities, and people living in remote and rural areas.
- Innovation: Developing competitive IT-based service industries and fostering ICT innovation across the economy – with a focus on job creation, especially for women and youth.

The Bank will focus on *Internet for Development* in the 2016 edition of the *World Development Report*, aiming to 'assemble the best available evidence on the Internet's potential impact on economic growth, on equity, and on the efficiency of public service provision,' and thereby 'position the World Bank Group … as a leader in the application of the Internet to solve the world's most pressing development challenges.'[535]

Most IFIs operate at regional rather than global level, and have followed similar strategies to the World Bank in terms both of infrastructure investment and support for an enabling policy environment within their regions. The African Development Bank (AfDB) illustrates the work of regional IFIs. It recognized

in 2008 that past investments in the sector had been fragmented and sought to introduce a more cohesive and sustained approach through a new ICT Operations Strategy. During this strategy's first phase, to 2010, the Bank concentrated on financing regional and national infrastructure, investing over US$200 million,[536] and on improvements in the enabling policy and regulatory environment. After 2010, it gave more attention to services and applications that make use of infrastructure, including e-government, health and education.[537] Looking ahead in 2012, the AfDB concluded that:

> *the Bank needs to focus on: (i) extending ICT infrastructure to underserved areas and expanding regional/national ICT broadband infrastructure; (ii) creating enabling policy/ regulatory environment to leverage private investment and forging PPPs for improved and affordable connectivity; and (iii) providing support for [member-countries] to scale up their ICT applications in all sectors to transform public service delivery and regional integration.*[538]

3. Official development assistance (ODA) and other financial flows

The *Tunis Agenda* recognized that, 'as a result of the growing impact of sustainable private-sector investment in infrastructure, multilateral and bilateral public donors are redirecting public resources to other development objectives, including Poverty Reduction Strategy Papers and related programmes, policy reforms and mainstreaming of ICTs and capacity development.' It encouraged multilateral and bilateral development agencies to provide more financial support for regional and large-scale infrastructure projects and capacity development, and identified a particular need for public finance 'in providing ICT access and services to rural areas and disadvantaged populations' including those in SIDS and landlocked developing countries.[539] In addition, the *Tunis Agenda* recommended that 'ICTs should be fully mainstreamed into strategies for Official Development Assistance (ODA) through more effective information-sharing and coordination among development partners, and through analysis and sharing of best practices and lessons learned from experience with ICT for development programmes.'[540] While IFIs have concentrated on infrastructure investment and policy reform, international financial commitments to other areas of Information Society development identified by the Task Force on Financial Mechanisms, such as content, capacity-building and applications development, have been addressed by ODA donors and non-governmental actors.

A Digital Solidarity Fund, initially proposed during the Geneva phase of WSIS, was established in Geneva in March 2005. Its establishment was welcomed in the *Tunis Agenda* as 'an innovative financial mechanism of a voluntary nature open to interested stakeholders' that could focus on 'specific and urgent needs at the local level' and seek 'new voluntary sources of 'solidarity' finance', complementing other mechanisms for funding the Information Society.[541] The Fund's secretariat subsequently suggested that a levy on public procurement contracts should be paid to it by ICT vendors in order to support community-based projects concerned with ICTs.[542] However, this initiative did not fulfil expectations and the Fund's Foundation Board decided to dissolve the Foundation under Swiss law in 2009.

Data from a review of *Financing ICTs for Development Efforts*, published by the OECD in 2005 suggest that the total volume of ODA commitments to ICT infrastructure recorded by the OECD had fallen dramatically, as private sector investment grew, from US$1.2 billion in 1990 to US$194 million in 2002. However, the review concluded, public sector funding and ODA would continue 'to play an important role in creating an enabling policy environment, channelling resources towards less commercially attractive regions as well as towards the poor, and supporting innovate financing mechanisms for ICTs for development.'[543] Their role in this context was reflected in a *Donor ICT Strategies Matrix*, published in 2003, which listed the activities at that time of both bilateral and multilateral donors.[544]

Bilateral donors have played varying roles in supporting ICT4D activities in developing countries since WSIS, focusing on geographical regions which are prioritized in their overall development strategies and on particular aspects of ICTs that build on their national expertise or preferences. The Canadian International Development Research Centre (IDRC), which played a prominent role in the development of ICT4D from 1995 and throughout the WSIS period, published a review of its achievements and of changing priorities in ICT4D

in 2013.[545] It now emphasizes the importance of 'open development' in leveraging opportunities. This includes 'open government' (transparency, accountability and responsiveness), 'open learning' (including open educational resources), 'open business models' (for example, new ways of licensing intellectual property) and 'open science' (including open data and scientific collaboration), and stresses the potential value of mobile platforms in areas such as health and personal finance. Some ODA donors, like those in Japan and the Republic of Korea, have focused on issues concerned with equipment, networks and related policy issues. Others, such as those in the UK, Finland, Germany and Sweden, have focused more on applications development, the use of ICTs in development sectors such as education, and the role of ICTs in governance. In addition to funding large-scale activities through government bodies in developing countries, bilateral donors also finance non-governmental agencies based in both developed and developing countries. The role of these non-governmental agencies and of business and charitable foundations is outlined in Chapter 8.

It is difficult to establish the level and scope of financial commitments to the ICT sector and ICT-enabled projects from multilateral and bilateral ODA, as these data are not systematically collated and analysed. Some commentators have suggested that there was a reduction in ODA allocations to ICT4D in the aftermath of WSIS as donors concentrated resources on the MDGs and on other specific priorities such as HIV/AIDS and climate change.[546] In particular, it is challenging to identify and so to count ICT and WSIS-related programmes and projects, since these are not necessarily explicitly distinguished from other programmes, not least because the mainstreaming of ICTs in other development sectors means that substantial funding for ICT resources is now integrated, and accounted for, within those other sectors. In 2011, for example, UNESCO found ICT deployments in more than 600 of its development programmes and projects, which would not normally have been defined as ICT or ICT4D activities.[547]

C. SUMMARY

The development of communications networks and services has attracted high levels of private sector investment over the past twenty years. As a result, international financial institutions have focused their investment contributions to ICTs on those aspects of infrastructure which are less commercially attractive, and on policy and regulatory reforms designed to encourage investment and infrastructure by the private sector. There has been a significant revival of public involvement in infrastructure in support of broadband investment, including both government and IFI finance, often undertaken in partnership with private sector telecommunications operators or equipment vendors.

As the *Tunis Agenda* made clear, investment in content, applications and capacity-building is as important as investment in infrastructure in enabling communities to take full advantage of the Information Society. While many new developments have resulted from businesses, organizations and citizens taking advantage of the new opportunities afforded by ICTs on their own initiative, multilateral and bilateral donors have also played a significant part in fostering the development of content, supporting small enterprise and building capacity, particularly in less developed countries. It is difficult to determine the trajectory of ODA funding for WSIS implementation, however, because of the increasing extent to which ICTs are mainstreamed in all development activity.

NOTES

498 *Geneva Plan of Action*, section D.

499 http://www.tiaonline.org/trade/world-trade-organization/wto-agreement-basic-telecommunications-services.

500 These issues are summarized in the report of the Task Force on Financial Mechanisms for ICT for Development, 2004.

501 United Nations, 2003, *Monterrey Consensus of the International Conference on Financing for Development* (Monterrey, United Nations publication).

502 See OECD Paris Declaration and Accra Agenda for Action, at http://www.oecd.org/dac/effectiveness/34428351.pdf (accessed 25 November 2014).

503 The report can be found at http://www.itu.int/wsis/tffm/final-report.pdf (accessed 25 November 2014).

504 *Tunis Agenda*, para. 23.

505 Ibid., para. 28.

506 See http://www.ungis.org/?tabid=621 (accessed 25 November 2014).

507 Discussions considered ways of reducing infrastructure costs in remote and rural areas, including infrastructure sharing, and emphasised the need to continue exploring new financing mechanisms, including multistakeholder partnerships, large scale financing institutions such as IFIs and microfinance. The Draft Chairmen's Report from the Open Consultation is available at http://www.ungis.org/LinkClick.aspx?fileticket=yYEEMJ5rClo%3d&tabid=719.

508 ECOSOC,2010, *Improvements and innovations in existing financing mechanisms: information and communication technology for development*, (Report of the Secretary-General E/CN.16/2010/3), http://unctad.org/en/Docs/ecn162010d3_en.pdf.

509 UNCTAD, *Information Economy Report*, 2013.

510 WTO, 2012, 5 Years of the Information Technology Agreement, http://www.wto.org/english/res_e/publications_e/ita15years_2012full_e.pdf.

511 ITU, *Measuring the Information Society 2014*, pp. 13-14.

512 Ibid., p. 14-15.

513 See http://www.airtel.in/about-bharti/about-bharti-airtel (accessed 25 November 2014 link not work).

514 See https://www.mtn.com/Pages/Home.aspx (accessed 25 November 2014).

515 Information about Telmex can be accessed through http://www.telmex.com/ (accessed 25 November 2014).

516 ECOSOC, 2010 (E/CN.16/2010/3), p.4, para.13.

517 See *e.g.* Schumann and Kende, 2013.

518 The total terrestrial transmission network in Africa doubled in the five years from 2009 to 2014, from a little over 450,000 to a little over 900,000 kilometres, bringing more than 40 per cent of sub-Saharan Africa's population within 25 kilometres of a fibre network. See http://www.africabandwidthmaps.com/?p=1701 (accessed 25 November 2014).

519 Connect Africa Summit, Outcomes Report, at http://www.itu.int/ITU-D/connect/africa/2007/summit/pdf/finalreport.pdf (accessed 25 November 2014).

520 http://www.itu.int/en/ITU-D/Conferences/connect/Pages/default.aspx.

521 The New Partnership for Africa's Development (NEPAD) and Africa's Regional Economic Communities have sought to stimulate cross-border infrastructure in a variety of regions. ESCAP has promoted the concept of an Asia-Pacific Information Superhighway, 'a continent-wide meshed network of terrestrial optical fiber, which would provide redundancy to the submarine cable networks and provide a key part of the solution to reducing international bandwidth prices in the region.' See http://unctad.org/en/PublicationsLibrary/a69d65_bn_ESCAP.pdf.

522 The Government of Kenya, for example, invested in laying the TEAMS cable between Kenya and Fujairah, to accelerate Kenyan access to international cable networks. Other governments have entered into public-private partnerships with telecommunications operators and sometimes with equipment vendors, using either their own resources or loans from IFIs.

523 Contribution by ACCESS (accessnow.org) to the open consultation for the CSTD review, http://unctad.org/Sections/un_cstd/docs/cstd_wsis10_access_en.pdf.

524 *Tunis Agenda*, para. 26.

525 Reverse auctions are competitive processes in which operators bid to provide universal access for the lowest offered level of subsidy.

526 ECOSOC, 2010.

527 Information in this paragraph is from UNCTAD, *Information Economy Report*, 2013.

528 Almost half could be attributed to private cloud facilities.

529 Other analysts have made higher estimates.

530 For example, between Apple's iPhone and iPad devices and its content business, iStore.

531 Information concerning World Bank funding can be accessed through http://web.worldbank.org/WBSITE/EXTERNAL/TOPICS/EXTINFORMATIONANDCOMMUNICATIONANDTECHNOLOGIES/0,,contentMDK:20687836~menuPK:282840~pagePK:210058~piPK:210062~theSitePK:282823,00.html (accessed 11 March 2015).

532 The World Bank (2002) Information and Communication Technologies: A World Bank Group Sector Strategy, available at: http://siteresources.worldbank.org/EXTINFORMATIONANDCOMMUNICATIONANDTECHNOLOGIES/Resources/SSPwithAnnexes.pdf.

533 Independent Evaluation Group (2011) 'Capturing Technology for Development: A review of the World Bank Group's activities in ICT', available at: http://ieg.worldbankgroup.org/evaluations/capturing-technology-development.

534 The World Bank, 2012b, *ICT for Greater Development Impact*. World Bank Group Strategy.

535 Information about this forthcoming report can be found at http://econ.worldbank.org/WBSITE/EXTERNAL/EXTDEC/EXTRESEARCH/EXTWDRS/EXTNWDR2013/0,,contentMDK:23543920~pagePK:8258258~piPK:8258412~theSitePK:8258025,00.html (accessed 25 November 2014).

536 See African Development Bank, 2012, *Review of the Bank's ICT Operations Strategy & Action Plan for the Medium Term, 2012-2014*, available at http://www.afdb.org/fileadmin/uploads/afdb/Documents/Policy-Documents/Rev%20ICT%20Operations%20Strategy%20Review.pdf (accessed 25 November 2014).

537 In 2011, the example, in partnership with the World Bank, it launched a series of eight strategic studies of different aspects of experience with ICT-enabled development in Africa, under the overall heading *eTransform Africa* – including economic areas such as trade and regional integration, agriculture, financial services, and local ICT sector development, and social development sectors such as health, education, and adaptation to climate change adaptation – in order to align its work with recent experience and priorities. The reports of these studies are summarized in The World Bank, The African Development Bank and African Union, 2011, The Transformational Use of Information and Communication Technologies in Africa. eTransform Africa, http://siteresources.worldbank.org/EXTINFORMATIONANDCOMMUNICATIONANDTECHNOLOGIES/Resources/282822-1346223280837/MainReport.pdf.

538 African Development Bank, 2012, *Review.*

539 *Tunis Agenda*, paras, 20-21.

540 Ibid., para. 100.

541 Ibid., para. 28.

542 See https://www.itu.int/osg/spu/ni/wsisbridges/linked_docs/presentations/Alain_CLERC.pdf and http://www.innovativefinance-oslo.no/pop.cfm?FuseAction=Doc&pAction=View&pDocumentId=11759 (accessed 25 November 2014).

543 The review covered member-countries of the OECD's Development Assistance Committee (DAC) and multilateral agencies. It can be found at http://www.oecd.org/dac/34410597.pdf (accessed 25 November 2014), p. 7.

544 This can be found at http://www.itu.int/wsis/docs/background/themes/development/oecd-donor-matrix.pdf (accessed 25 November 2014).

545 L Elder, H Emdon, R Fuchs and B Petrazzini, 2013, *Connecting ICTs to Development: The IDRC Experience* (London, New York, Delhi, Anthem Press).

546 See *e.g.* A Greenberg, *Sida's Support to Information and Communications Technologies (ICT) for Development*, 2008, available at http://www.oecd.org/derec/sweden/41445473.pdf . See also R Heeks, 'Worldwide Expenditure on ICT4D', 2009, available at https://ict4dblog.wordpress.com/2009/04/06/worldwide-expenditure-on-ict4d/.

547 UNESCO, 2012b, http://unctad.org/en/PublicationsLibrary/a67d66_UNESCO.pdf.

CHAPTER 7

INTERNET GOVERNANCE

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The Internet is an interactive network of interconnected computer networks built around a suite of protocols (TCP/IP) which enable data to be routed between its users as and when required. It differs from broadcasting and telecommunications in having no centralized structure for the management of data traffic, relying instead on its core protocols to route data through whatever channels are available at the time required. As a global facility, the Internet is dependent on internationally accepted norms and standards.

This chapter addresses the implementation of WSIS outcomes concerned with Internet governance. It begins by describing the working definition of Internet governance that was agreed at WSIS and the overall framework for Internet governance that was outlined in the *Tunis Agenda*. It then describes the implementation of two outcomes that were agreed within that framework: mechanisms for '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,' and the establishment of an Internet Governance Forum to facilitate discussion of Internet-related issues. The final section of the chapter summarizes other developments which have taken place in Internet governance in the decade since WSIS.

A. DEFINING INTERNET GOVERNANCE

A variety of arrangements, norms and governance entities – generally described as mechanisms for 'Internet governance' – were developed by the Internet technical community and other interested parties during the Internet's early years to coordinate its core functions and resources, ensure its security and stability, and facilitate the standardization of applications and services. Governments and multilateral agencies were not substantially involved in their design.

The challenges of Internet governance have become increasingly extensive and complex as the Internet has become more widespread and had more impact on public policy issues. It was agreed in the *Geneva Declaration of Principles* that Internet governance 'should constitute a core issue of the Information Society agenda,' that its international management 'should be multilateral, transparent and democratic, with the full involvement of governments, the private sector, civil society and international organizations,' and that it 'should ensure an equitable distribution of resources, facilitate access for all and ensure a stable and secure functioning of the Internet, taking into account multilingualism.'[548]

The *Geneva Declaration* also asked the United Nations Secretary-General to establish a Working Group on Internet Governance (WGIG), with participation from diverse stakeholder communities, to make proposals for action on Internet governance. A multi-stakeholder Working Group was constituted, and its report[549] considered at the Tunis session of the Summit.

There is no universally agreed definition of Internet governance. The *Tunis Agenda* adopted, as 'a working definition of Internet governance,' the following text which had been developed at the WGIG:

> *… the development and application by governments, the private sector and civil society, in their respective roles, of shared principles, norms, rules, decision-making procedures and programmes that shape the evolution and use of the Internet.*[550]

It reiterated the principles agreed in the *Geneva Declaration*, reaffirming that 'the management of the Internet encompasses both technical and public policy issues and should involve all stakeholders and relevant intergovernmental and international organizations,' recognizing that:

a. *Policy authority for Internet-related public policy issues is the sovereign right of States. They have rights and responsibilities for international Internet-related public policy issues.*

b. *The private sector has had, and should continue to have, an important role in the development of the Internet, both in the technical and economic fields.*

c. *Civil society has also played an important role on Internet matters, especially at community level, and should continue to play such a role.*

d. *Intergovernmental organizations have had, and should continue to have, a facilitating role in the coordination of Internet-related public policy issues.*

e. *International organizations have also had and should continue to have an important role in the development of Internet-related technical standards and relevant policies*.[551]

It also recognized 'the valuable contribution by the academic and technical communities within those stakeholder groups … to the evolution, functioning and development of the Internet.'[552] It urged that 'A multi-stakeholder approach should be adopted, as far as possible, at all levels' of Internet governance.

B. THE WSIS FRAMEWORK FOR INTERNET GOVERNANCE

The *Tunis Agenda* recognized that the Internet 'has evolved into a global facility available to the public [whose] governance should constitute a core issue of the Information Society agenda.' It recognized that 'the existing arrangements for Internet governance have worked effectively to make the Internet the highly robust, dynamic and geographically diverse medium that it is today,' and asserted that 'any framework and mechanisms designed to deal with Internet governance should be inclusive and responsive to the exponential growth and fast evolution of the Internet as a common platform for the development of multiple applications.'[553]

The *Tunis Agenda* noted that, as well as issues such as Internet names and addresses, Internet governance includes issues of 'critical Internet resources, the security and safety of the Internet, and developmental aspects and issues pertaining to the use of the Internet,' and issues of 'affordability, reliability and quality of service.' It further recognized that 'there are many cross-cutting international public policy issues that require attention and are not adequately addressed by the current mechanisms.'[554]

Looking to the future, the *Tunis Agenda* envisaged 'the ongoing and active evolution of the current arrangements' for Internet governance through 'a transparent, democratic, and multilateral process, with the participation of governments, private sector, civil society and international organizations, in their respective roles.' The *Agenda* also encouraged 'the development of multi-stakeholder processes at the national, regional and international levels to discuss and collaborate on the expansion and diffusion of the Internet' as a means to support the achievement of internationally agreed development goals. It underlined 'the need to maximize the participation of developing countries in decisions regarding Internet governance, which should reflect their interests, as well as in development and capacity-building.'[555]

As suggested above, Internet governance includes both technical issues and public policy issues. In practice, it is often difficult to separate the two. The growing importance of the Internet since WSIS in social and economic development, in government and business activity, and in the lives of individuals means that there are very few areas of public policy which are not now affected by the development of the Internet and Internet-enabled services. Many topics in Internet governance, such as those concerned with cybersecurity and intellectual property, have both technical and public policy dimensions, and require attention from both technical entities and national and international stakeholders concerned with the public policy environment. One contribution to the open consultation for the CSTD ten-year review of WSIS suggested that 'the challenge is [no] longer simply a case of how to govern the internet' but 'of all other governance and regulatory processes taking the internet and internet-based activities into account.'[556] A number of different organizations, including the Internet Society, have proposed ways of mapping the complex range of issues, stakeholders and decision-making processes that are now engaged, at global and national levels, in different aspects of Internet governance.[557]

The principal entities concerned with technical and operational aspects of the Internet were in place before the Summit.

- Administration of the domain name system and Internet protocol addresses was, and remains, coordinated by the Internet Corporation for Assigned Names and Numbers (ICANN)[558] at global level, while five Regional Internet Registries (RIRs)[559] are responsible

for IP address management and policy development at regional level. Domain names are coordinated by top level domain (TLD) registries, including those responsible for country code TLDs (ccTLDs) at national level.

- ICANN has responsibility for administering the functions of the Internet Assigned Numbers Authority (IANA),[560] which include global IP address allocation, root zone management in the domain name system and other functions (see below).
- The Internet Architecture Board (IAB)[561] oversees the technical and engineering development of the Internet, while the Internet Engineering Task Force (IETF)[562] and the World Wide Web Consortium (W3C)[563] deal with the development of standards concerning the Internet Protocol and the World Wide Web, respectively. The IAB and IETF have their institutional home within the Internet Society (ISOC), an international non-profit association whose declared mission is to 'promote the open development, evolution, and use of the Internet for the benefit of all people throughout the world.'[564]

These entities have a variety of multi-stakeholder participatory structures and consensus-based decision-making processes.

C. ENHANCED COOPERATION ON INTERNATIONAL PUBLIC POLICY ISSUES PERTAINING TO THE INTERNET

The *Tunis Agenda* requested the United Nations Secretary-General to initiate a process towards '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.' In doing so, it recognized '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.' It also recognized 'the need for development of public policy by governments in consultation with all stakeholders.' The *Agenda* did not define specific mechanisms through which 'enhanced cooperation' should be pursued, but included in this remit 'the development of globally-applicable principles on public policy issues associated with the coordination and management of critical Internet resources' – *i.e.* the root zone and domain name systems. It called on 'relevant organizations' to 'commence a process towards enhanced cooperation involving all stakeholders' and to 'contribute to creating an environment that facilitates this development of public policy principles.'[565]

In 2006, the United Nations Secretary-General's Special Advisor for the World Summit on the Information Society carried out informal consultations on enhanced cooperation, but these did not result in the emergence of a common understanding of how to operationalize the process. The United Nations Secretary-General subsequently invited Internet-related organizations to report on steps that they had undertaken to implement enhanced cooperation, and to make suggestions concerning how the process should be implemented.[566] In 2008, the Secretary-General noted that most organizations that responded to this invitation 'interpret enhanced cooperation as a process to facilitate and contribute to multi-stakeholder dialogue, through formal or informal cooperative arrangements.'[567]

In 2010, the ECOSOC invited the United Nations Secretary-General to convene open consultations, including all Member States and other stakeholders, with a view to further assisting the process towards enhanced cooperation. Written consultations were held during the last four months of 2010, together with an open meeting at the United Nations in December of that year. A 'wide range of public policy issues' was identified as relevant to enhanced cooperation in these consultations, 'underscoring the interdisciplinary nature of Internet governance and its broad relevance to development objectives.' Some stakeholders focused on specific issues such as the management of critical Internet resources in their responses, while others felt that the concept had resonance and relevance to a much wider range of public policy issues. The United Nations Secretary-General observed that 'a generalized notion of enhanced cooperation was thought to be of limited utility, given the multidimensional character of Internet governance and the varied interests at stake.'[568]

Diverging views were also expressed in this consultation process on procedural aspects of enhanced cooperation. 'Some [contributors] argued that enhanced cooperation referred to deliberations among Governments, for example, under the auspices of the United Nations. Others suggested that enhanced cooperation assumed many different forms and that it should involve entities from various stakeholder groups,' for example through the IGF. Others again felt that 'the process towards enhanced international cooperation had not yet begun,' and called for 'a new mechanism, such as a discrete intergovernmental platform with a strict mandate to discuss Internet governance.' Some stakeholders 'suggested that enhanced cooperation could itself be seen as a process of facilitating multi-stakeholder dialogue through formal or informal arrangements.' One 'point of widespread agreement' identified by the United Nations Secretary-General was that 'ongoing dialogue with stakeholders should be a defining characteristic of the relevant international cooperation processes, in accordance with the World Summit on the Information Society principles and the common vision of a people-centred, inclusive and development-oriented information society.'[569]

In 2011, the United Nations General Assembly invited the Chair of the CSTD to convene a one-day interactive meeting on enhanced cooperation, involving all stakeholders, with a view to identifying a shared understanding of enhanced cooperation. This meeting was held in May 2012, but the desired common understanding was not reached.[570] In 2012 the General Assembly invited the Chair of the CSTD to convene a Working Group on Enhanced Cooperation on Public Policy Issues Pertaining to the Internet, 'to examine the mandate of the World Summit on the Information Society regarding enhanced cooperation as contained in the Tunis Agenda, through seeking, compiling and reviewing inputs from all Member States and all other stakeholders, and to make recommendations on how to fully implement this mandate.'[571] This Working Group was established in March 2013, with 22 representatives of governments and 20 participants from other stakeholder communities. It held four meetings in Geneva between May 2013 and May 2014. During these, it examined the mandate for enhanced cooperation by seeking, compiling and reviewing inputs from all Member States and other stakeholders, as stipulated in its mandate. Though consensus emerged on some issues, there was significant divergence of views concerning others. The complexity and political sensitivity of the topic did not allow the Group to finalize a set of recommendations for fully operationalizing enhanced cooperation.[572] The work of the Working Group is summarized in Box 8.

Box 8: The Working Group on Enhanced Cooperation (WGEC)

The first meeting of the WGEC was held in May 2013. At this meeting the Group developed a questionnaire on public policy issues pertaining to the Internet, through which it solicited input from Member States and all stakeholders. The questionnaire, comprising 18 questions, received 69 responses.[573] The second meeting of the Working Group was held in November 2013. At this meeting, it reviewed and analysed responses that it had received to its questionnaire. It agreed to start a mapping exercise concerning international public policy issues. A correspondence group was established to continue this work with mandate to:

- review the international public policy issues pertaining to the Internet that had been identified in the consultation;
- establish and list where there are existing international mechanisms relevant to these;
- identify the status of relevant mechanisms, if any, and consider whether they are addressing the issues identified; and
- attempt to identify gaps in order to ascertain what type of recommendations might need to be drafted by the Working Group.

During its third meeting, in February 2014, the WGEC continued its deliberations based on draft recommendations submitted by its members. The correspondence group was requested to continue working in accordance with its terms of reference.

The fourth meeting of the Working Group was held in April/May 2014, at which it continued to discuss draft recommendations. Consensus could be reached on some issues, while the Group noted a number of others where divergent views remained. The WGEC took note of the presentation of the work of the correspondence group.

The Chair of the WGEC gave an account of the Group's work at the seventeenth session of the CSTD in May 2014. The ECOSOC recommended in July 2014 that work that had been initiated by the Group – concerned with the collection of relevant information, the review of international public policy issues pertaining to the Internet, and the identification of gaps – should be continued by the secretariat of the CSTD.

Box 8: The Working Group on Enhanced Cooperation (WGEC) *(cont.)*

Following the request of the ECOSOC, the CSTD secretariat continued the work and reported on its outcomes to the intersessional panel of the Commission which was held in Geneva in November 2014. Its report included an analysis of 643 mechanisms, addressing 40 public policy issues pertaining to the Internet, but also identified some gaps where there could be room for further improvement. These were particularly concerned with intersectoral collaboration and coordination, including ways to address issues holistically, as well as to improve data and research, participation and inclusiveness, capacity-building and information-sharing. The secretariat's findings noted the difficulty encountered in achieving an agreed definition of such gaps and criteria for their assessment. The secretariat concluded that, while mapping of the kind undertaken is useful in increasing information about the Internet governance landscape, it cannot be exhaustive, particularly as new issues and mechanisms are constantly emerging.

D. THE INTERNET GOVERNANCE FORUM (IGF)

The *Tunis Agenda* requested the United Nations Secretary-General to convene an Internet Governance Forum that would 'build on the existing structures of Internet governance, with special emphasis on the complementarity between all stakeholders involved in this process – governments, business entities, civil society and intergovernmental organizations.' This Forum would 'meet periodically' to provide a space in which all of these interested stakeholders could discuss 'public policy issues related to key elements of Internet governance.'[574] Its mandate, which was agreed in Tunis, is set out in Table 4.

Table 4: The IGF mandate

a. 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.
b. 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.
c. Interface with appropriate intergovernmental organizations and other institutions on matters under their purview.
d. Facilitate the exchange of information and best practices, and in this regard make full use of the expertise of the academic, scientific and technical communities.
e. Advise all stakeholders in proposing ways and means to accelerate the availability and affordability of the Internet in the developing world.
f. Strengthen and enhance the engagement of stakeholders in existing and/or future Internet governance mechanisms, particularly those from developing countries.
g. Identify emerging issues, bring them to the attention of the relevant bodies and the general public, and, where appropriate, make recommendations.
h. Contribute to capacity building for Internet governance in developing countries, drawing fully on local sources of knowledge and expertise.
i. Promote and assess, on an ongoing basis, the embodiment of WSIS principles in Internet governance processes.
j. Discuss, inter alia, issues relating to critical Internet resources.
k. Help to find solutions to the issues arising from the use and misuse of the Internet, of particular concern to everyday users.
l. Publish its proceedings.

Source: Tunis Agenda for the Information Society, para. 72.

It was agreed that the Forum 'would have no oversight function and would not replace existing arrangements, mechanisms, institutions or organizations, but would involve them and take advantage of their expertise. It would be constituted as a neutral, non-duplicative and non-binding process.' It would 'have no involvement in day-to-day or technical operations of the Internet.' It would have a 'lightweight and decentralized structure', with a small secretariat financed by voluntary contributions, and its performance would be reviewed by the United Nations Secretary-General within five years.[575]

The first IGF meeting was held in Athens, Greece in October/November 2006. Eight subsequent Fora have been held annually in countries around the world. These are listed in Table 5, along with the overarching theme for each year's event. The tenth meeting is to be held in João Pessoa, Brazil, in November 2015, with the overarching theme 'Evolution of Internet governance: empowering sustainable development.'[576]

Table 5: Meetings of the Internet Governance Forum

Date	Location	Theme
2006	Athens, Greece	Internet governance for development
2007	Rio de Janeiro, Brazil	Internet governance for development
2008	Hyderabad, India	Internet for all
2009	Sharm El Sheikh, Egypt	Internet governance – creating opportunities for all
2010	Vilnius, Lithuania	Developing the future together
2011	Nairobi, Kenya	Internet as a catalyst for change: access, development, freedoms and innovation
2012	Baku, Azerbaijan	Internet governance for sustainable human, economic and social development
2013	Bali, Indonesia	Building bridges – enhancing multi-stakeholder cooperation for growth and sustainable development
2014	Istanbul, Turkey	Connecting continents for enhanced multi-stakeholder Internet governance

Source: Internet Governance Forum.[577]

Meetings of the IGF include plenary sessions, workshops which allow multi-stakeholder discussion of more specific issues and which feed into plenary sessions, open fora that enable organizations to outline their work to participants, and a variety of other events initiated by individual stakeholders or multi-stakeholder partnerships. Plenary discussions have been clustered around broad themes, such as access, diversity, openness, security, critical Internet resources and Internet governance for development, while focus sessions have emerged in recent years to discuss narrower issues. In 2013, for example, focus sessions addressed Internet principles; principles of multi-stakeholder participation; spam, hacking and cybercrime; the Internet as an engine for growth and sustainable development; and human rights, freedom of expression and the free flow of information on the Internet.[578] The 2014 Forum included a main session concerned with net neutrality and a debate on the transition in IANA stewardship (see below).[579] Each IGF has also included a plenary session exploring emerging issues such as cloud computing, social networking and Internet surveillance.

The IGF is served by a small secretariat based in Geneva, for which DESA provides an institutional home within the UN system. The Forum is also supported by a Multi-stakeholder Advisory Group (MAG), whose members are appointed by the United Nations Secretary-General to include representation from the IGF's stakeholder communities – governments, international organizations, the private sector, civil society and the academic and academic communities. MAG meetings take place three times a year alongside open multi-stakeholder consultations, and are themselves now open to wider stakeholder participation.

Since WSIS, at least a dozen regional and more than twenty national IGFs have emerged, complementing the work of the global Forum, including events in both developed and developing regions and countries.[580] These complementary IGFs were applauded in a number of contributions to the consultation processes for the CSTD ten-year review of WSIS for having extended multi-stakeholder participation, improved dialogue and enhanced understanding of Internet governance issues within both ICT and public policy communities. National and regional IGFs have facilitated dialogue between governments, Internet professionals and user groups concerning opportunities and challenges posed at national level, such as access, broadband policy, cybersecurity and data protection, as well as feeding into global IGF discussions. A number of multi-stakeholder 'dynamic coalitions' have also been formed within the global IGF, to focus attention on particular topics.[581]

As required by the *Tunis Agenda*, the role and performance of the Forum were reviewed by the United Nations Secretary-General in 2010. In its contribution to the Secretary-General's annual report on WSIS outcomes that year, DESA commented that, five years after WSIS:

> *… it is generally felt that the IGF has found its place in the constellation of international institutions dealing with Internet related public policy issues. There was some scepticism to begin with, but now there is a broad recognition that there is a complementarity of functions between the IGF and international organizations and institutions dealing with Internet related policy issues. While at first sight there might be some apparent overlap in terms of substance, there is no such overlap in terms of functions, as the IGF is not a decision-making body. It is more like an incubator for ideas and policy initiatives that will be brought to maturity elsewhere. In this way the IGF prepares and helps shape decisions that are taken by other institutions.*[582]

The IGF's mandate was renewed for a second five-year period in 2010 by the United Nations General Assembly, which underlined the need to link it to 'the broader dialogue on global Internet governance,' to increase participation from developing countries, and to improve secretariat and financing arrangements.[583] The ECOSOC invited the Chair of the CSTD to establish a multi-stakeholder Working Group on Improvements to the IGF in response to this request (see Box 9).[584] A number of innovations responding to its recommendations were introduced during the Ninth session of the Forum in 2014 in response to this report, including 'best practice forums' concerned with multi-stakeholder participation, the regulation of spam, Computer Emergency Response Teams (CERTs), the enabling environment for local content, and online child protection.[585]

Box 9: The CSTD Working Group on Improvements to the Internet Governance Forum

- This Working Group undertook a multi-stakeholder consultation and delivered its final report in May 2012. It agreed that the mandate of the IGF remained valid, but recommended that it should:
- develop more tangible outputs and improve the visibility of its outputs to relevant stakeholders;
- make preparatory processes more effective and participatory, improve the structure and working methods of the MAG, and strengthen the secretariat;
- secure a more stable financial footing through increased voluntary financial and in-kind contributions, supported by greater transparency;
- expand and diversify participation, with particular reference to the participation of stakeholders from developing countries, more effective use of remote participation, and capacity-building for participants; and
- reach out more effectively to other Internet governance entities and related initiatives.[586]

A number of contributions to the open consultation for the CSTD ten-year review of WSIS endorsed the role which the IGF has played in international discourse on the Internet since WSIS, placing particular emphasis on its multi-stakeholder character which these contributors felt has contributed to improved understanding among stakeholders of the different perspectives concerned about the Internet's development. DESA commented that it has developed 'a sense of community that allows discussions of challenging issues in an open and frank manner.'[587] Some stakeholders, including contributors to the CSTD ten-year review of WSIS, have called for the mandate of the IGF to be extended to ten years, or to become open-ended, in order to improve continuity and put it on a more stable financial basis.[588]

The scope for the IGF to develop more substantive outcomes has been discussed within and outside the Forum, particularly since the United Nations General Assembly requested the Secretary-General to inform it concerning the progress made in the implementation of the recommendations contained in the report of the CSTD Working Group on Improvements to the IGF.[589] Some participants have emphasized the value of open discussions at the IGF, while others have called for a more results-oriented Forum that can issue consensus opinions on subjects such as spam. The Internet Society and others have emphasized the value of the IGF in allowing informal discussion of issues before they are addressed in more formal decision-making bodies such as ICANN. In 2014, the MAG issued a summary of 'concrete actions and decisions that have been taken by different stakeholders as a result of the engagement and discussions of Internet related issues' at the global, regional and national IGFs, which had been identified by IGF participants.[590]

While many contributions to the CSTD ten-year review of WSIS supported the IGF, some governments and other stakeholders were critical of its performance. One government felt that it has 'proved to be ineffective as an entity ready on its own to bear responsibility for the development and adoption of the global policy in the field of Internet governance,' and called for 'a new efficient international mechanism … which would take into account equitable interests of all countries and organizations concerned.'[591] Another suggested, however, that 'Against the backdrop that the Internet governance objectives set by WSIS have not been achieved, the role of IGF should be further enhanced, with its mandates extended. Granting decision-making power to IGF could also be considered.'[592]

DESA summarized experience of the IGF as follows in its contribution to the WSIS+10 High Level Event concerning Action Line C11:

> *The IGF has embodied the multi-stakeholder model for Internet governance, responding to the Tunis Agenda. The continuing growth of the Internet, across all technology platforms, has reinforced the need for open policy dialogue which brings all stakeholders together on an equal footing. It is this kind of dialogue that gives strength to the IGF and consolidates its relation with the various other Internet governance institutions and processes, not only through bringing their representatives together at the same discussion table, but, more importantly, through picking up from these discussions and*

feeding them into decision making processes that are shaping the future of the Internet. The IGF has also positively contributed to global social and economic development discussions, both in follow-up to the MDGs and in shaping the post-2015 development agenda.[593]

The second phase of the IGF mandate concludes at the end of 2015. The United Nations General Assembly recommended in its resolution A/RES/69/204 of 19 December 2014 that the extension of the mandate of the Forum should be considered in the context of its overall review of WSIS outcomes.[594]

E. OTHER DEVELOPMENTS

The Internet has continued to develop rapidly in technology and services since WSIS. The number of people regularly accessing the Internet has grown markedly, while mobile devices have become the primary mode of Internet access for many people. Broadband networks have greatly increased available bandwidth and enabled new services and applications. The World Wide Web has become more interactive. Major Internet services are now provided by global corporations, with data and applications increasingly located in the cloud. At the same time, new concerns have arisen about the security of the Internet, the privacy of personal data and the surveillance of Internet traffic. These and other topics have been explored and reviewed by diverse stakeholders, including governments, the technical community, academic and other analysts. The following paragraphs summarize a number of developments concerning Internet governance which have implications for WSIS implementation.

1. Internet protocols

The current prevalent version of the Internet Protocol, the underlying communications protocol which enables the Internet, is IP version 4 (IPv4). This provides for approximately 4.3 billion IP addresses, less than one per person worldwide. The depletion of IPv4 addresses resulting from the growth of the Internet has been a matter of concern within the technical community for some years, and three of the five RIRs are now at or close to exhaustion of available address space. The most recent version of the Internet protocol, IPv6, enables an enormous increase in the number of addresses, replacing scarcity with effectively unlimited abundance.[595]

The need to expedite implementation of IPv6 was raised in a number of contributions to the consultation for the CSTD ten-year review of WSIS as a substantial challenge for WSIS implementation going forward. Contributors noted that the introduction of IPv6 will allow for tremendous expansion of the Internet, such as for the Internet of Things with its potential to radically extend the interfaces between human society and technology. It is also expected to enhance mobile applications and provide additional security measures. However, the interface between IPv4 and IPv6 is technically complex, and the transition from IPv4 to IPv6 has been slower than anticipated, with only 4 per cent of Internet traffic carried on the latter by June 2014.[596]

2. Domain Name System Security Extensions (DNSSEC)

Another important technical development since WSIS, identified in a number of contributions to the CSTD ten-year review of WSIS, has been that of the Domain Name System Security Extensions (DNSSEC), a suite of specifications developed by the IETF to address weaknesses in the security of the domain name system (DNS). The deployment of DNSSEC is considered crucial to securing certain information provided by the DNS, but has been hampered by technical complexities associated with its implementation.[597]

3. Internet Exchange Points

The cost of international bandwidth has been a major factor inhibiting Internet usage in developing countries. The *Tunis Agenda* called for action to address Internet costs including the establishment of Internet Exchange Points (IXPs).[598] These are physical infrastructure facilities which enable the exchange of Internet traffic between Internet service providers. IXPs that are located within a country enable traffic that is local to that country to be interconnected without requiring international bandwidth. As well as reducing costs, this also reduces latency, and can thereby improve the quality of Internet connections. There were a total of 376 IXPs globally by January 2013, an increase from 266 in January 2012.[599] However, only 30 countries in Africa were reported to have IXPs by the end of 2014.[600] A number of international agencies have sought to promote the development of IXPs in national and regional contexts since WSIS, including the ITU and a partnership between

the African Union Commission and the Internet Society launched in February 2014.[601]

4. Net neutrality

The period since WSIS has seen increased discussion of issues concerning network management, including the concept of net (or network) neutrality. Although there is no consensus definition of this concept, the central principle underpinning it is that ISPs and other stakeholders should treat all Internet data and services equally, without discriminating by content or charging users differently for different types of data. Supporters of net neutrality consider it a crucial aspect of the openness that they believe has contributed to the Internet's ability to innovate in response to technological developments and market demand. They believe that, without net neutrality, businesses may charge users for access to particular services or discriminate against competitors, while governments may restrict access to certain types of content. Critics of net neutrality argue that discrimination between some types of content is essential to maintain quality of service, particularly where bandwidth is in short supply, and that restricting the business models available can inhibit infrastructure investment.

5. Intermediary liability

Intermediary liability is one of a number of areas at the interface between technical and public policy dimensions of the Internet that have become more prominent since WSIS. It concerns the role of ISPs and online service providers (such as social media platforms) in the enforcement of legal and regulatory frameworks. Online intermediaries provide access to very large volumes of content, uploaded by third parties, which cannot readily be scrutinized in advance to assess whether content infringes copyright or is inconsistent with legal requirements in areas like child protection. The enforcement of legal and regulatory requirements is particularly challenging because intermediaries (and the data centres in which content is held) are commonly located in different jurisdictions from those in which content is created and accessed. A number of legal frameworks have been developed since WSIS to address these challenges, including 'notice and take-down' procedures whereby intermediaries are considered responsible for removing content that violates legal or regulatory requirements when they have been notified about it. UNESCO published a report, *Fostering Freedom Online*, concerning the role of Internet intermediaries in 2014.[602]

6. Developments concerning ICANN

Significant changes have taken place in the Internet Corporation for Assigned Names and Numbers (ICANN) since WSIS. ICANN was established in 1998 to take responsibility for overseeing policies related to the management of domain names and IP addresses, setting standards for registries and registrars concerned with global Top-Level Domains (gTLDs), and performing the IANA function (see above), with interim oversight by the United States Department of Commerce. The nature of future governance arrangements for IANA and the structure for mechanisms to secure independence of the domain name and root zone systems have continued to be subjects of widespread discussion since WSIS. There have been substantial differences of opinion concerning the role of governments in ICANN and the continued oversight role of the US Department of Commerce. Some governments and other stakeholders have favoured a multi-stakeholder framework for these functions, while others have preferred a more intergovernmental approach.

ICANN has a complex multi-stakeholder governance structure including representation of more than twenty different constituencies with different interests in the DNS and other critical Internet resources. This includes a Governmental Advisory Committee (GAC) whose membership has grown from approximately 100 member-states in 2005 to 140 in 2014, together with observers from 30 international organizations.[603] Two major developments have taken place in ICANN's governance since WSIS.

In 2009, ICANN and the Government of the United States adopted an *Affirmation of Commitments* in which they affirmed their commitment to 'a multi-stakeholder, private sector led, bottom-up policy development model for DNS technical coordination.'[604] This provided for periodic reviews of key ICANN objectives to be undertaken by review teams independent of the ICANN Board. These objectives were concerned with: ensuring accountability, transparency and the interests of global Internet users; preserving security, stability and resiliency of the domain name system;

promoting competition, consumer trust and consumer choice; and addressing policy relating to WHOIS, the protocol which enables identification of Internet registrations.

In March 2014, the United States National Telecommunications and Information Administration (NTIA), which is responsible for the US Government's oversight responsibilities concerning the IANA contract, announced its intention to transfer stewardship of the IANA functions to 'the global multi-stakeholder community.' It requested ICANN to convene a multi-stakeholder dialogue that would develop a proposal 'to transition the current role played by NTIA in the coordination of the … DNS,' including 'the procedural role of administering changes to the authoritative root zone file,' thereby potentially ending the oversight role exercised by the NTIA. It stipulated that the transition process 'must have broad community support' and should address four principles: that it should 'support and enhance the multistakeholder model; maintain the security, stability and resiliency of the … DNS;' meet the 'needs and expectation' of IANA users; and 'maintain the openness of the Internet.' It also said that it 'will not accept a proposal that replaces the NTIA role with a government-led or an inter-governmental organization solution.'[605] The current IANA contract expires in September 2015. Following a consultation process, ICANN has convened the IANA Stewardship Transition Coordination Group representing its diverse stakeholder communities to develop proposals concerning future management of the IANA function. A separate, but directly linked, process is reviewing how ICANN can enhance its accountability to the global community once the current IANA contract expires.[606]

7. Internet domains and multilingualism

The pivotal role of ICANN in the domain name system means that the impact of its decision-making on technical aspects of the Internet reaches into public policy arenas such as intellectual property[607] and multilingualism. It has been particularly concerned with two major developments in the DNS since WSIS: the expansion in the range of available gTLDs and the introduction of internationalized top level domains (IDNs TLDs).

Internet domains are principally divided into global and national (or country code) TLDs (gTLDs and ccTLDs). In March 2014 there were approximately 148 million gTLD registrations and 125 million ccTLD registrations worldwide.[608] The number of different gTLDs has historically been limited, initially to six with a small number of additional domains authorized in the early years of this century. In 2012, ICANN initiated an open application process to allow a much more extensive range of gTLDs, which it argued would offer wider choice to Internet users and increase competition in the market for domain registrations. Although there was some criticism of the complexity and cost involved in the application process, which some believe inhibited applications from developing countries, over 1,900 applications were received, including more than 100 for IDN gTLDs. By the end of 2014, 469 new gTLDs had been delegated while a further thousand were in process.[609]

The *Tunis Agenda* called on relevant stakeholders to implement 'programmes that allow for the presence of multilingual domain names and content on the Internet.'[610] The Internet was first developed in countries that use the Latin alphabet. Technical innovations to enable top level domains to be registered in characters outside this alphabet were expedited after WSIS, with involvement of ICANN, other technical entities and UN agencies, including UNESCO and ESCWA. Since 2010, ICANN has authorized a number of (IDN TLDs) that use characters beyond the ASCII character set, including non-Latin characters. By late 2014, 78 IDN TLDs had been delegated, including 38 IDN ccTLDs representing 28 countries and 40 IDN gTLDs. Approximately four million internationalized domain names, of various kinds, had been registered by December 2013.[611]

While it is difficult to measure the prevalence of different languages online, some analysis of trends towards multilingualism on the Internet was published in the *WSIS Final Targets Review.* It was estimated that the proportion of English speakers online in 1996 was as high as 80 per cent. In early 2014 it was still estimated that 56 per cent of the top 10 million websites had some English content (though this does not mean that English was their primary language). However, the proportion of English-speaking users of the Internet had fallen to around 35 per cent in 2004 to 27 per cent in 2011, while the proportion of Chinese-speaking users was estimated to have risen from around 14 per cent to 24 per cent, and there was increased usage

of a wider range of languages. The proportion of Wikipedia articles in English fell from 46 per cent in 2003 to 15 per cent in 2013, illustrating greater diversity in content creation on global online platforms. The *Final WSIS Targets Review* concluded that 'there has been a marked increase in the web presence of some languages using non-Latin scripts [since WSIS], especially Chinese,' but that 'there is still a long way to go before content is as readily available in national and local languages as it is in global languages, particularly English.'[612]

Significant efforts to promote content in a wider range of languages have been made by a number of international agencies, including initiatives by ESCWA and regional partners to promote digital Arabic content.[613] Other significant developments concerning multilingualism have included the increased deployment of multiple language versions of browser and other Internet-related software, and the increased use of social media platforms which allow users to generate content in the language of their choice. The most significant emerging trend which the *Review* identified in this area concerns automated translation which 'has the potential to allow end-users to access content written in languages with which they are unfamiliar, when that content would otherwise be inaccessible to them.' By 2013, the leading online translation service was available in 80 languages.[614]

8. Internet principles since WSIS

The *Tunis Agenda* emphasized that the principles for the Information Society set out in the *Geneva Declaration* should apply to the development of the Internet, recognizing in particular 'the continuing internationalization of the Internet and the principle of universality.'[615] It also called, within the framework of enhanced cooperation (see above), for cooperation to develop 'globally-applicable principles on public policy issues associated with the coordination and management of critical Internet resources.'[616] A number of different international fora and individual organizations have proposed the adoption of core Internet principles during the period since WSIS. Participants in the IGF meeting in 2013 identified some 25 documents concerned with Internet principles that had been developed and adopted by different groups, noting that these shared substantial common ground.[617] The following paragraphs describe a number of initiatives which have received widespread attention.

- In 2009, the Brazil Internet Steering Committee published a set of *Principles for the Internet Governance and Use* which identified as key principles freedom, privacy and human rights; democratic and collaborative governance; universality; diversity; innovation; network neutrality (see above); 'non-liability of the network'; functionality, security and stability; standardization and interoperability; and legal and regulatory environments that 'preserve the dynamics of the Internet as a space for collaboration.'[618] The Brazilian principles were incorporated in 2013 in the country's *Marco Civil da Internet*, a legal framework for civil rights online, including freedom of expression and respect for privacy, open, multilateral and democratic governance, universality, cultural diversity and net neutrality.

- In 2011, the OECD adopted a *Recommendation of the Council on Principles for Internet Policy Making* including 'the global free flow of information,' the 'open, distributed and interconnected nature of the Internet,' the encouragement of multi-stakeholder co-operation in policy development processes, strengthened consistency and effectiveness in privacy protection, and encouragement of cooperation to promote Internet security.[619]

- Also in 2011, the multi-stakeholder Internet Rights and Principles dynamic coalition of the IGF drew up a ten point list of *Internet Rights and Principles* built around universality; affordability; neutrality; rights; freedom of expression; life, liberty and security; privacy; diversity; open standards and regulation aimed at inclusive interoperability; and rights-based governance.[620]

- In 2012, the UNECE, the Council of Europe and the Association for Progressive Communications jointly proposed a 'Code of good practice on information, participation and transparency in Internet governance,' for adoption by entities concerned with Internet governance.[621]

- The Open Stand initiative, developed by Internet technical bodies including ISOC, the IETF, IAB, W3C and the Institute of Electrical and Electronics Engineers (IEEE), seeks to promote and maintain market-driven open,

borderless standards for Internet development, based on commitments to 'technical merit, interoperability, competition, innovation and benefit to humanity,' and on voluntary adoption, which it believes have underpinned the successful development of the Internet to date.[622]

- In 2013, a *Montevideo Statement on the Future of Internet Cooperation* was signed by the leaders of a number of prominent technical entities, including ICANN, the IETF, the IAB, W3C, the Internet Society and the five RIRs. This 'reinforced the importance of globally coherent Internet operations' and 'warned against Internet fragmentation at a national level.' It expressed concern regarding 'the undermining of the trust and confidence of Internet users' following revelations of Internet surveillance, called for accelerated globalization of the ICANN and IANA functions (see above) and of the transition to IPv6, and urged 'community-wide efforts towards the evolution of global multi-stakeholder Internet cooperation.'[623]
- Also in 2013, UNESCO introduced the concept of 'Internet universality,' intended to provide 'a vision of a universalized Internet aligned with UNESCO's mandate and values.' This highlights four normative principles: that the Internet should be based around human rights; that it should be open to both technological innovation and economic participation; that it should be accessible to all; and that its development should be built through multi-stakeholder participation. UNESCO has also published a number of studies on different aspects of the Internet, including substantial reports on the relationship between connectivity and freedom of expression, Internet privacy, and (with the OECD and the Internet Society) *The Relationship between Local Content, Internet Development and Universal Access in Cyberspace.*[624]
- In April 2014, a Global Multi-stakeholder Meeting on the Future of Internet Governance, generally known as NETmundial, was organized by the Brazilian Internet Steering Committee and an international multi-stakeholder forum, 1Net, in Brazil. Signatories to the *NETmundial Multi-stakeholder Statement*[625] which emerged from the meeting affirmed that the Internet should be 'a globally coherent, interconnected, stable, unfragmented, scalable and accessible network-of-networks,' backed by an open and distributed architecture, open standards, and 'open, participative, consensus driven governance.' It declared that this should be built on 'democratic, multi-stakeholder processes' with 'the full and balanced participation of all stakeholders from around the globe,' 'permissionless innovation,' and the agility 'to accommodate rapidly developing technologies and different types of use.' It asserted that the 'respective roles and responsibilities of stakeholders' in multi-stakeholder governance 'should be interpreted in a flexible manner with reference to the issue under discussion.' The *Statement* also identified 'a set of common principles and important values that contribute for an inclusive, multi-stakeholder, effective, legitimate, and evolving Internet governance framework,' including human rights (citing freedoms of expression and association, privacy, accessibility for those with special needs, freedom of and access to information, and the right to development) and respect for cultural and linguistic diversity.
- A Panel on Global Internet Cooperation and Governance Mechanisms was convened in 2013 by ICANN and the World Economic Forum, under the chairmanship of President Toomas Hendrik Ilves of Estonia. It endorsed the principles identified at the NETmundial event and advocated a decentralized Internet governance ecosystem, built around the identification of issues and the mapping, formulation and implementation of solutions developed by the Internet community.[626]
- The development of the Internet has been discussed in many multilateral and multi-stakeholder fora since WSIS, including the IGF, regular meetings of ICANN, the IETF and other Internet entities; conferences and other activities of UNESCO, the ITU and other UN bodies; and stand-alone conferences organized by other agencies or multi-stakeholder partnerships to address particular issues or explore broader issues of Internet development.

- The ITU has frequently addressed Internet-related issues in its work, reflecting the complex technical, economic and developmental interrelationships between the Internet and other communications media. The ITU Council established a Working Group on International Internet Public Policy Issues following its 2010 Plenipotentiary Conference. Issues related to Internet governance were discussed during the 2012 World Conference on International Telecommunications (WCIT-12), the 2013 World Telecommunication/ICT Policy Forum and the ITU Plenipotentiary Conference in 2014.

- In November 2013, UNESCO's General Conference initiated a comprehensive study of Internet-related issues, which focuses on access to information and knowledge, freedom of expression, privacy and ethics on a global Internet, building on the concept of 'Internet universality' and looking towards possible options for future action. An initial draft of this report was discussed at a multi-stakeholder conference, 'CONNECTing the Dots', organized by UNESCO in March 2015.[627] The final outcomes of this study will be presented to UNESCO's General Conference in November 2015.

- A series of Global Conferences on Cyberspace has been held in London (2011), Budapest (2012) and Seoul (2013), at which government ministers concerned with ICTs and international affairs have discussed the development of the Internet, including Internet principles, with other leading stakeholders. The Seoul Conference in 2013 concluded with the *Seoul Framework for, and Commitment to, an Open and Secure Cyberspace*, which included sections on economic growth and development, social and cultural issues, cybersecurity, international security, cybercrime and capacity-building.[628] A further Conference was held in The Hague in April 2015.[629]

- In addition to the statement of principles described above, the NETmundial Meeting in 2014 proposed a roadmap for the future evolution of Internet governance. This roadmap was built around:

  - multi-stakeholder decision-making processes, at both international and national levels;
  - improved implementation of principles for transparency, accountability and inclusiveness in Internet governance processes, including the strengthening of the IGF in line with the recommendations of the CSTD Working Group on IGF Improvements, and the globalization of ICANN; and
  - stronger international cooperation on cybersecurity and Internet stability, including steps to ensure that any 'collection and processing of personal data by state and non-state actors should be conducted in accordance with international human rights law.'[630]

It identified four issues requiring further discussion in other fora, including the roles and responsibilities of different stakeholders in Internet governance, jurisdictional issues, benchmarking and indicators relating to Internet governance principles, and issues of net neutrality.[631]

A number of contributions to the open consultation for the CSTD ten-year review of WSIS referred to the NETmundial outcome document, some seeing it as an important new initiative and a potential model for future Internet governance activity. The European Commission, for example felt that, in it, 'the international community has shown unprecedented capacity to reach a rough consensus,' from which future discourse could develop.[632] Other governments and stakeholders were more critical of the event, pointing out that its outcome documents did not achieve or represent a consensus among governments, which in their views could only be achieved through United Nations fora.

Discussions concerning Internet principles and the future direction of Internet governance are continuing in the period up to the United Nations General Assembly in 2015. A NETmundial Initiative for Internet Governance Cooperation and Development was launched in August 2014 by the World Economic Forum, ICANN and the Brazilian Internet registry CGI.br, to stimulate further discussion following the conference. A Global Commission on Internet Governance was also established in 2014 by the Centre for International Governance Innovation (CIGI) and the Royal Institute of International Affairs (Chatham

House), chaired by the former Swedish Prime Minister Carl Bildt, with the aim of improving the understanding of ways to promote Internet access and championing 'the free flow of ideas over the Internet.'[633] The outcomes of the NETmundial and other current discussions were discussed at the Ninth IGF meeting held in Istanbul in September 2014.

F. SUMMARY

The future of Internet governance was, along with financial mechanisms, a principal concern of the *Tunis Agenda for the Information Society.* It defined Internet governance as including both technical and public policy issues and outlined a framework for it, which was intended to 'be inclusive and responsive to the exponential growth and fast evolution of the Internet as a common platform for the development of multiple applications.'[634] Multi-stakeholder participation and cooperation have played an important part in the practice of Internet governance, including the implementation of WSIS outcomes, since the Summit.

The Internet Governance Forum, which was established following a recommendation in the *Tunis Agenda*, has become an important part of international discourse on the Internet, providing a space within which all stakeholders can discuss technical and public policy issues. The IGF is widely considered to have fostered greater understanding of different perspectives concerning Internet governance within different stakeholder communities, and thereby facilitated decision-making in other fora. The period since WSIS has also seen the establishment of regional and national IGFs. It is generally agreed that further improvements to the IGF can be made, particularly concerning inclusiveness of developing country stakeholders and progress towards more substantive outcomes. Nevertheless a number of governments and other stakeholders have supported a further extension of its mandate.

Less progress has been made towards achieving the *Tunis Agenda*'s mandate to promote '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.' While some governments and other stakeholders believe that there have been significant achievements in improving cooperation through a variety of existing mechanisms, others believe that little has been achieved and that new mechanisms should be established through which enhanced cooperation could be implemented. Issues of particular controversy concern the role of governments in relation to one another and to other stakeholders, and in connection with critical Internet resources. Several consultation processes have been held, but it has not proved possible to resolve these differences of opinion.

A number of other important developments have taken place concerning Internet governance alongside the IGF and debates about enhanced cooperation. Technical innovations with governance implications have included IPv6, DNSSEC, the introduction of new gTLDs and internationalized domain names. The structure of ICANN has evolved and a process is currently underway to transition governance of the IANA function. A variety of proposals has been made concerning principles that should underpin the future development of the Internet. The importance of Internet governance will continue to grow as the Internet continues to evolve in technology and services, to become more pervasive in the lives of citizens and communities, and to affect economic, social and cultural development worldwide.

NOTES

548 ITU, 2005a, *Geneva Declaration*, paras. 48-50. These principles were reiterated in the *Tunis Agenda*, paras. 29ff.

549 Working Group on Internet Governance, 2005.

550 *Tunis Agenda*, para. 34.

551 Ibid., para. 35.

552 Ibid., para. 36.

553 Ibid., paras. 55-56

554 Ibid., paras. 55-60.

555 Ibid., paras. 61-65, 80.

556 Contribution by APC to the open consultation for the CSTD review, http://unctad.org/Sections/un_cstd/docs/cstd_wsis10_apc_en.pdf..

557 D Souter, 2012, 'Assessing National Internet Governance Arrangements', Internet Society, April.

558 See https://www.icann.org/ (accessed 25 November 2014).

559 The work of the RIRs is coordinated by the Number Resource Organization (NRO): see https://www.nro.net/ (accessed 25 November 2014).

560 See http://www.internetassignednumbersauthority.com/ (accessed 25 November 2014).

561 See http://www.iab.org/ (accessed 25 November 2014).

562 See https://www.ietf.org/ (accessed 25 November 2014).

563 See http://www.w3.org/ (accessed 25 November 2014).

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565 *Tunis Agenda*, paras. 68-71.

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568 United Nations General Assembly and ECOSOC, 2011, Enhanced cooperation on public policy issues pertaining to the Internet. Report of the Secretary-General A/66/77-E/2011/103.

569 Ibid.

570 United Nations General Assembly, 2012a, Information and communications technologies for development (Resolution A/RES/66/184).

571 United Nations General Assembly (2013). Information and communications technologies for development. Resolution A/RES/67/195. 5 February.

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573 See http://unctad.org/en/Pages/CSTD/WGEC-Responses.aspx (accessed 25 November 2014).

574 *Tunis Agenda*, paras. 72-78.

575 Ibid.

576 http://www.intgovforum.org/cms/.

577 See www.intgovforum.org (accessed 25 November 2014).

578 See http://www.intgovforum.org/cms/2013-bali (accessed 25 November 2014).

579 See http://www.intgovforum.org/cms/igf-2014 (accessed 25 November 2014).

580 A list of relevant events can be found at http://www.intgovforum.org/cms/national-and-regional-igf-initiatives-2014.

581 See http://www.intgovforum.org/cms/dynamiccoalitions (accessed 25 November 2014).

582 DESA, 2011, Annual report on WSIS implementation: 2010, available at http://unctad.org/en/PublicationsLibrary/a66d64_UNDESA.pdf (accessed 25 November 2014).

583 United Nations General Assembly and ECOSOC, 2012, Report of the Working Group on Improvements to the Internet Governance Forum (A/67/65-E/2012/48), para. 2.

584 ECOSOC, 2010, *Assessment of the progress made in the implementation of and follow-up to the outcomes of the World Summit on the Information Society* (Resolution E/2010/2). The ECOSOC's decision was welcomed by the United Nations General Assembly in its Resolution A/RES/65/141 of 20 December 2010, http://www.un.org/en/ga/search/view_doc.asp?symbol=A/RES/65/141&referer=/english/&Lang=E.

585 United Nations General Assembly and ECOSOC, 2012, *Report of the Working Group on Improvements to the Internet Governance Forum* (A/67/65–E/2012/48). See also http://www.intgovforum.org/cms/igf-2014 (accessed 25 November 2014).

586 United Nations General Assembly and ECOSOC (2012). Report of the Working Group on Improvements to the Internet Governance Forum. A/67/65-E/2012/48.

587 Contribution by DESA to the open consultation for the CSTD review, http://www.unctad.org/Sections/un_cstd/docs/cstd_wsis10_undesa_en.pdf.

588 See 'Recommendation to the United Nations General Assembly for an Open Ended Mandate of the Internet Governance Forum (IGF),' available at http://igfcontinuation.org/node/1?page=2 (accessed 25 November 2014).

589 http://www.un.org/en/ga/search/view_doc.asp?symbol=A/RES/67/195

590 See IGF, 'Call for Information – 2014 preparatory cycle: Synthesis report' available at http://www.intgovforum.org/cms/documents/contributions/call-for-information/232-internet-governance-forum-igf-call-for-information-2014-preparatory-cycle-synthesis-report/file.

591 Contribution by the Russian Federation to the open consultation for the CSTD review, available at http://unctad.org/Sections/un_cstd/docs/cstd_wsis10_russian_federation_en.pdf (accessed 18 November 2014).

592 Contribution by China to the open consultation for the CSTD review, available at http://unctad.org/Sections/un_cstd/docs/cstd_wsis10_china_en.pdf (accessed 18 November 2014).

593 DESA contribution to the WSIS+10 High Level Event preparatory process, http://www.google.co.uk/url?sa=t&rct=j&q=&esrc=s&source=web&cd=1&cad=rja&uact=8&ved=0CCQQFjAA&url=http%3A%2F%2Fwww.itu.int%2Fwsis%2Freview%2Finc%2Fdocs%2Fralfreports%2FWSIS10_ALF_Reporting-C11.Summary.docx&ei=tEwAVYGHPlmzaYGMgogJ&usg=AFQjCNEYTULKizFQmbeEnSs6WdyzfJAWzg&sig2=23Hov1_naTYE1xL_6x8E9w&bvm=bv.87611401,d.d2s.

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595 It is said to offer 100 addresses for every atom on the planet.

596 See http://en.wikipedia.org/wiki/IPv6 (accessed 25 November 2014).

597 Deployment statistics for DNSSEC can be found at http://www.internetsociety.org/deploy360/resources/dnssec-deployment-statistics-for-tlds-rick-lamb/.

598 *Tunis Agenda*, para. 27.

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600 See https://www.euro-ix.net/af-ix-region (accessed 9 January 2015).

601 See http://www.itwebafrica.com/network/333-africa/232391-internet-society-to-kick-off-african-ixp-workshops (accessed 25 November 2014). Cooperation between IXPs and IXP Associations is described in the website of the Internet eXchange Federation, http://www.ix-f.net/. One example of regional cooperation is the African Internet Exchange Point Operators' Association (http://www.af-ix.net/).

602 UNESCO, 2014c, http://unesdoc.unesco.org/images/0023/002311/231162e.pdf.

603 See https://gacweb.icann.org/display/gacweb/About+The+GAC (accessed 25 November 2014).

604 This document can be found at https://www.icann.org/resources/pages/affirmation-of-commitments-2009-09-30-en (accessed 25 November 2014).

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606 ICANN's process is outlined at https://www.icann.org/resources/pages/process-next-steps-2014-06-06-en (accessed 25 November 2014).

607 There are significant issues, for example, concerning the relationship between domains and trademarks.

608 ITU, 2014a, Target 9.

609 ICANN's website concerning new gTLDs is at http://newgtlds.icann.org/en/ (accessed 25 November 2014).

610 *Tunis Agenda*, para. 53.

611 ITU, 2014a, Target 9.

612 Ibid.

613 See, *e.g.*, ESCWA, 2012, *Status of the Digital Arabic Content Industry in the Arab Region* (New York, United Nations publication).

614 ITU, 2014a, Target 9.

615 *Tunis Agenda*, para. 66.

616 Ibid., para. 70.

617 IGF Chairman's Report 2013, at http://www.intgovforum.org/cms/Chair%27s%20Summary%20IGF%202013%20Final.Nov1v1.pdf. This document said that about 80% of the principles expressed were shared across the range of documents reviewed.

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619 See http://www.oecd.org/internet/ieconomy/49258588.pdf (accessed 25 November 2014).

620 See http://internetrightsandprinciples.org/wpcharter/ (accessed 25 November 2014).

621 See http://www.apc.org/en/system/files/COGP_IG_Version_1.1_June2010_EN.pdf (accessed 25 November 2014).

622 See http://open-stand.org/ (accessed 25 November 2014).

623 See https://www.icann.org/news/announcement-2013-10-07-en (accessed 25 November 2014).

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625 NETmundial Multi-stakeholder Statement, available at http://netmundial.br/wp-content/uploads/2014/04/NETmundial-Multi-stakeholder-Document.pdf (accessed 25 November 2014).

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627 The draft, entitled *Keystones to foster inclusive Knowledge Societies*, is available at http://www.unesco.org/new/fileadmin/MULTIMEDIA/HQ/CI/CI/pdf/Events/internet_draft_study_simple_version.pdf. The outcome document of the conference is at http://www.unesco.org/new/fileadmin/MULTIMEDIA/HQ/CI/CI/pdf/outcome_document.pdf.

628 See http://www.mofat.go.kr/english/visa/images/res/SeoulFramework.pdf (accessed 25 November 2014).

629 https://www.gccs2015.com/.

630 NETmundial Multi-stakeholder Statement, http://netmundial.br/wp-content/uploads/2014/04/NETmundial-Multistakeholder-Document.pdf.

631 Ibid.

632 Contribution by the European Commission to the open consultation for the CSTD review, available at http://unctad.org/Sections/un_cstd/docs/cstd_wsis10_eeas_en.pdf (accessed 18 November 2014).

633 See http://www.cigionline.org/activity/global-commission-internet-governance (accessed 25 November 2014).

634 *Tunis Agenda*, para. 56.

CHAPTER 8

MULTI-STAKEHOLDER IMPLEMENTATION AND COOPERATION

CHAPTER 8 – MULTI-STAKEHOLDER IMPLEMENTATION AND COOPERATION

The *Geneva Declaration of Principles* recognized 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. Realizing that the ambitious goal of this Declaration - bridging the digital divide and ensuring harmonious, fair and equitable development for all - will require strong commitment by all stakeholders, we call for digital solidarity, both at national and international levels.*[635]

The *Geneva Plan of Action* identified roles and responsibilities of different stakeholders in this context, which it summarized as follows:

> *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.*
>
> *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.*
>
> *The commitment and involvement of civil society is equally important in creating an equitable Information Society, and in implementing ICT-related initiatives for development.*
>
> *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.* [636]

The *Tunis Agenda* underlined the importance of 'the participation of all stakeholders in implementing WSIS outcomes.' It called for 'strengthened and continuing cooperation between and among stakeholders to ensure effective implementation of the Geneva and Tunis outcomes, for instance through the promotion of national, regional and international multi-stakeholder partnerships including Public-Private Partnerships (PPPs), and the promotion of national and regional multi-stakeholder thematic platforms, in a joint effort and dialogue with developing and less developed countries, development partners and actors in the ICT sector.'[637] The value of multi-stakeholder cooperation in implementing WSIS outcomes was reiterated throughout the Geneva and Tunis outcome documents, and has become a hallmark of subsequent implementation arrangements, including the Action Line process and the Internet Governance Forum.

Within the context of multi-stakeholder implementation and partnership, the *Tunis Agenda* identified a number of specific responsibilities for different stakeholders. Within the UN system:

- It asked the Secretary-General to establish a coordinating body of UN agencies to support system-wide implementation. The UN Group on the Information Society (UNGIS) was established in 2006 by the Chief Executives' Board (CEB) to fulfil this role.
- It allocated responsibility for coordinating work around the WSIS Action Lines to a number of UN agencies, particularly the ITU, UNESCO, UNCTAD and UNDP (see Chapter 5).
- It called on each UN entity to support WSIS objectives through existing programmes of activity, acting 'according to its mandate and competencies, … pursuant to decisions of … respective governing bodies, and within existing approved resources,' and to involve governments and other stakeholders in this work.[638]
- It urged regional intergovernmental organizations 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.'[639]

The role of other stakeholders in implementing WSIS outcomes was also considered in the *Tunis Agenda*. Governments were encouraged to prioritize ICTs, develop national e-strategies, and facilitate an enabling environment for investment. Governments of developing countries were encouraged to incorporate ICTs into their national development plans and Poverty Reduction Strategies, while donor governments and multilateral agencies were encouraged to mainstream ICTs into Official Development Assistance (ODA).[640] Emphasis was placed on the role of the private sector in relation to infrastructure investment and the development of applications, while both business and civil society were described as playing crucial roles as 'the drivers of innovation and private investment in the development of the Internet.'[641] Special recognition was given to the value of public-private partnerships (PPPs).[642]

This chapter is concerned with the implementation activities at international and regional levels of diverse stakeholders and the development of multi-stakeholder partnership and cooperation. Its first two sections describe the work of UNGIS and UN Regional Commissions. The third section summarizes the types of implementation activity undertaken by stakeholders outside the UN system, illustrating this through examples of activity drawn from diverse stakeholder communities and regions. The final section assesses progress towards achieving cooperation and dialogue between and among stakeholders in WSIS implementation. More detailed information about implementation activities by diverse stakeholders, particularly the work of governments, can be found in earlier chapters of this report, particularly Chapter 5, and in UN and other agency reports, professional and academic literature, and contributions to this and other WSIS review processes.

A. THE UN GROUP ON THE INFORMATION SOCIETY (UNGIS)

The *Tunis Agenda* requested that the United Nations Secretary-General establish, within the UN Chief Executives' Board (CEB), a UN Group on the Information Society 'consisting of the relevant UN bodies and organizations, with the mandate to facilitate the implementation of WSIS outcomes….'[645] UNGIS was established in response to this request in April 2006. It has sought to facilitate the implementation of WSIS outcomes by fostering synergies and collaboration between different UN agencies, ensure that all WSIS outcomes are addressed by appropriate bodies within the UN system, and encourage agencies to mainstream ICTs within their work. In 2009, its mandate was extended to include strengthening the UN role in facilitating developing country access to new and emerging technologies. Thirty agencies now participate in the work of UNGIS, including the OECD, the World Bank and WTO. UNGIS has no independent financial resources and its secretariat has to date been provided in rotation by the ITU, UNCTAD and UNESCO.[646]

In the five years following WSIS, UNGIS supported initiatives concerned with child online protection, open access to scientific knowledge, and national reviews of science, technology and innovation (STI) policy. In 2009, it hosted an open consultation

Box 10: The WSIS Stocktaking Database and Platform

Some of the activities that are undertaken by different WSIS stakeholders are described in the WSIS Stocktaking Database, which is maintained by the ITU. This was initiated in 2004, after the Geneva phase of WSIS, to provide 'a register of activities carried out by governments, international organizations, the business sector, civil society and other entities, in order to highlight the progress made' since WSIS. By May 2012, it included over 6,000 entries, submitted by diverse stakeholders, organized according to WSIS Action Lines. The majority of entries had been submitted by governments, the largest numbers falling within Action Lines C4 (capacity-building), C8 (cultural diversity, language and local content) and C3 (access to information and knowledge). Only 11 per cent of those listed in 2012 were concerned with the eight application areas included in Action Line C7. An annual report on the Database is published by the ITU, summarizing and highlighting entries by Action Line.[643] The Stocktaking Platform, launched in 2010, developed the database into a portal, with additional functionality.[644]

The Stocktaking Database provides a useful source of information on a range of work that has been implemented with the explicit aim of implementing WSIS outcomes. However, not all the activities concerned with ICTs and ICT4D that have been undertaken by different stakeholders, including UN agencies, are reported through it. Information concerning them can be found in their own reports and publications.

and forum on 'Financial mechanisms – meeting the challenges of ICT for development,' the outcomes of which are discussed in Chapter 6.[647] In 2011 it promoted a Joint Initiative on Mobile for Development, led by the ITU.[648]

The *Tunis Agenda* urged that existing multilateral programmes, including UN Development Assistance Frameworks (UNDAFs), 'should be used whenever appropriate to assist governments in their implementation efforts at the national level.' UNDAFs are strategic frameworks to coordinate and prioritize UN activities in individual developing countries, agreed with relevant governments and aligned with national development plans. In 2009, ECA noted that only two of twenty UNDAFs in Africa included reference to ICTs.[649] The ECOSOC regretted that year that the guidelines for UNDAF implementation did not yet include a component on ICTs and WSIS outcomes, urging that coordinated action be taken to achieve this in line with the *Tunis Agenda*.[650] In 2011, UNGIS requested UNDAF coordinators to address this WSIS requirement.

UNGIS has organized joint inputs by member-agencies to several United Nations summits and meetings held since WSIS, including the UN Conference on Least Developed Countries (2012), the third UN Summit on Sustainable Development (Rio+20, 2012) and the thirteenth UNCTAD conference (2012).[651] In 2013, it submitted a Joint Statement to the dialogue on the post-2015 development agenda, representing the agreed position of UNGIS agencies on the role of the Information Society (see Chapter 2).[652] It also played an important role in coordinating UN activity ahead of the WSIS+10 review, including an open consultation on review modalities in 2012.[653] The *WSIS+10 Vision for WSIS Beyond 2015* reaffirmed its importance 'as an efficient and effective inter-agency mechanism' for coordinating 'substantive and policy issues' facing UN implementation of WSIS outcomes.[654]

B. UNITED NATIONS REGIONAL COMMISSIONS

Within the UN system, the lead role in implementing WSIS outcomes at regional level is played by the five Regional Commissions: ECA (Africa), ESCAP (Asia and the Pacific), ESCWA (West Asia),[655] ECLAC (Latin America and the Caribbean) and ECE (Europe).[656] The *Tunis Agenda* suggested that these Commissions should assist Member States with 'technical and relevant information for the development of regional strategies and the implementation of the outcomes of regional conferences.' It also said that they might 'organize regional WSIS follow-up activities in collaboration with regional and sub-regional organizations,' if requested by Member States and within existing budgetary resources.[657]

Each Regional Commission has provided annual reports on WSIS implementation to the CSTD.[658] These have reported on a range of work including consensus-building among governments and between governments and other stakeholders, regional cooperation on infrastructure deployment, harmonization of ICT policies and regulations, joint programmes of activity to leverage regional value, collaborations in capacity-building, experience-sharing, and the provision of expertise to Governments and other stakeholders. However, there have also been significant differences in the approaches adopted by different Commissions resulting from their regions' distinct development and communications characteristics and the preferences of Member States.

ECA was one of the first UN agencies to address the Information Society, initiating its Africa Information Society Initiative (AISI) in 1996 with the vision 'that Africa should build, by the year 2010, an Information Society in which every man, woman, child, village, public and private sector office has secure access to information and knowledge through the use of computers and the communication media.'[659] A principal vehicle within this has been encouragement of National Information and Communication Infrastructure Plans (NICIs). By 2013, 48 African countries had NICIs in place, many established with ECA support.[660] ECA played an important part in coordinating Africa's contribution to WSIS and subsequently developed continental inputs into the African Regional Plan on the Knowledge Economy (ARAPKE), launched in 2006 as 'Africa's roadmap on ICT for the next ten years.'[661] In 2009, it organized the first African follow-up conference on WSIS, *Tunis+3*, which identified four principal constraints on WSIS follow-up: lack of funds to implement ICT policies and plans; lack of legislation for e-business; lack of digital literacy; and poor integration or unavailability of ICT applications.[662]

ECA summarized progress to date in Africa in 2013 as 'gradual but very encouraging,' adding that:

- *Progress could be faster if the financing, infrastructure and capacity constraints that many countries on the continent face … can be attenuated. Enhanced international and regional cooperation is needed to not only fill the financing constraint (especially with respect to broadband insofar as progress on ICT-applications is constrained by limited bandwidth), the infrastructure gap, but to also deal with rising cyber-crime and terrorist acts that are cyber-facilitated.*[663]

ESCAP responded to WSIS in 2006 by adopting a *Regional Action Plan towards the Information Society*, developed following consultation with 600 regional participants.[664] Its Committee on Information and Communications Technology established core priorities in 2008 following an expert meeting on *WSIS+5 and Emerging Issues in Asia and the Pacific*. The Committee now prioritizes integration of ICT-related issues in development policies, plans and programmes, the development of human and institutional capacity in the use of ICTs; and ICT applications for disaster risk reduction.[665] In 2006, ESCAP initiated the Asian and Pacific Training Centre for Information and Communication Technology for Development (APCICT), which has developed a comprehensive training curriculum, the *Academy of ICT Essentials for Government Leaders*.[666] ESCAP also promotes the concept of an Asia-Pacific Information Superhighway, which seeks to achieve a more affordable and more ubiquitous internet access through increased regional capacity, competition and cross-border connectivity.[667]

ESCAP undertook an overall review of WSIS outcomes in its region in 2013. This found that almost all regional countries have achieved 100 per cent mobile coverage, but that there are still rural areas in which access and usage are limited. Mobile broadband is driving Internet take-up but has failed, so far, to replicate the pace of adoption of mobile telephony, with an increasing gap between more and less prosperous countries. As a result, 'progress in terms of Internet connectivity, and progress against the WSIS targets varies … across the region,' with landlocked countries, small island states and LDCs on the wrong side of the digital divide. The review also recognized the importance of ICT developments for the post-2015 development agenda and the likelihood of wide-ranging 'commercial, societal and even ethical implications that will require interventions from policymakers and regulators.'[668]

ESCWA developed its first *Regional Plan of Action for Building the Information Society* in 2005, before the end of the second phase of WSIS.[669] This identified 'the components and programmes needed for the creation of a sustainable information society' and contributed towards agreement of an Arab ICT Strategy in 2007. In 2009, Member States adopted the *Damascus Proclamation for the Promotion of the Arab Knowledge Society for Sustainable Economic and Social Development*. The revised *Regional Plan of Action* that followed focused attention on three challenges: the lack of national backbones and affordable bandwidth in many countries; the need for more public-private partnerships for ICT projects; and the problem of obtaining sufficient reliable data on Information Society developments consistent with regional requirements.[670] Other important areas of work for ESCWA since WSIS have been the development of digital Arabic content,[671] the introduction of internationalized domain names in Arabic and the establishment of an Arab IGF.[672]

ESCWA's biennial *Regional Profile of the Information Society in Western Asia* summarizes developments in the region and in individual countries, using information gathered from its Information Society Portal for the ESCWA region (ISPER) and other sources.[673] The 2013 *Profile* noted considerable differences in ICT performance between the region's oil-rich and lower-income countries. It added that, while some governments in the region have clearly articulated visions and implementation plans for Information Society development, others are handicapped by 'a dearth of funds, the non-existence of a realistic implementation plan, the lack of a monitoring and evaluation process or more pressing national priorities.'[674] Political turmoil has hampered development of the Information Society in a number of countries in the region, inhibiting infrastructure investment and disrupting information access.

ECLAC has addressed regional opportunities and challenges through a series of *Plans of Action for the Information and Knowledge Societies in Latin America and the Caribbean*, known as eLACs.[675]

These have sought to provide a platform for public, private, civil and academic action across the region, stimulate dialogue, act as catalysts for intra-regional cooperation and support efforts to identify and design public policies through technical evaluations. They are supported by a regional Observatory for the Information Society in Latin America and the Caribbean (OSILAC), which gathers household data across the region.[676] The first plan, *eLAC 2007*, was drawn up as a short-term measure following the second phase of WSIS. Its successor, *eLAC 2010*, adopted in 2008, sought to integrate ICTs in all development sectors while focusing on six priority areas.[677] The third regional plan, *eLAC 2015*, adopted in 2010, identified eight priority areas.[678] Where *eLAC2010* placed particular emphasis on education, *eLAC2015* prioritizes achieving universal access to broadband, which ECLAC sees as 'the cornerstone of a system for economic, organizational and social innovation which … is driving a positive dynamic across all economic and social sectors.'[679] A Regional Dialogue on Broadband was initiated in 2010, supported by a Regional Broadband Observatory.[680]

Reviewing experience in 2013 in order to adjust implementation for the second half of *eLAC2015*, ECLAC concluded that 'clear progress' has been made in its priority areas but that efforts need to be 'broadened and intensified.' It emphasized the importance of looking forward in implementing strategy as follows:

> *Although the goals in the Plan of Action remain valid, new emerging areas must be addressed, such as the rights and obligations in the digital era, open government data policies, the promotion of telework strategies, the use of new technologies in public safety, efficient allocation and use of the electromagnetic spectrum, digital television and the inclusion of women in the ICT ecosystem. Priority must also be given to enhancing regional cooperation on urgent or strategic matters, such as the digital economy, active participation in international forums on Internet governance and regional participation in WSIS review processes, and in the discussions on the agenda beyond 2015.*[681]

Member States of ECLAC discussed objectives for the next eLAC, the Digital Agenda eLAC2018, at the Fifth Ministerial Conference on the Information Society in Latin America and the Caribbean, held in Costa Rica in November 2014.

ECE has led United Nations work on the development and standardization of international trade, including ICT applications such as single window processes for trade facilitation. It has undertaken pioneering work on intelligent transport systems and on public participation in environmental decision-making, for example through the *Convention on Access to Information, Public Participation in Decision-making and Access to Justice in Environmental Matters*[682] and the European Pollution Release and Transfer Register.[683] These offer models for potential replication in other regions.

These summaries of United Nations Regional Commission activity illustrate similarities and variations between different regional circumstances and priorities. Commissions have paid most attention to three areas of activity:

- regional integration, harmonization and sharing of experience, with the aim of leveraging greater developmental gains from regional coordination than can be achieved in individual countries;
- the development of infrastructure, particularly cross-border infrastructure; and
- support for development interventions, including access support and capacity-building, designed to accelerate ICT deployment and take-up in less developed countries, thereby reducing or mitigating digital divides.

Growing attention has been paid to broadband infrastructure and services since WSIS, particularly by ECLAC. Commissions have also focused on issues of specific regional importance. ESCWA, for example, has focused on digital Arabic content and the introduction of multilingual domain names, seeking to build a stronger Arabic presence on the Internet. ESCWA and ECA have played prominent roles in the development of the Arab and African IGFs. ECLAC has concentrated in successive eLACs on education and on broadband, while ESCAP has placed particular emphasis on emergencies and disaster preparedness. Regional Commissions have worked with other regional organizations in addressing these challenges (see below).

The Commissions have also taken different approaches to strategic planning. ECLAC, ESCAP and ESCWA have established regional plans within which they seek to build regional dialogue and facilitate regional infrastructure and policy development, while ECA has paid more attention to supporting development of national ICT strategies. ECLAC's approach has been built around 'a short-term plan with a long-term vision,' successive eLACs identifying immediate and short-term priorities within a framework of established long-term goals. This has allowed more flexibility in adapting to the rapid changes in technology and markets described in Chapter 4. Both ESCWA and ECLAC have benefited from regional Information Society observatories, while ECLAC has also devoted significant resources to research and analysis of regional ICT developments.[684]

C. IMPLEMENTATION BY STAKEHOLDERS

The *Geneva Declaration* called for 'new forms of solidarity, partnership and cooperation among Governments and other stakeholders,' including in particular 'the private sector, civil society and international organizations.'[685] The roles and responsibilities identified for different stakeholders in this partnership in the *Geneva Plan of Action* were listed in the introduction to this chapter.

The mandate of the ECOSOC to the CSTD in 2006 concerns progress in implementing WSIS outcomes at the international and regional levels,[686] and does not therefore include the work undertaken by governments at national level. Governments were enjoined, in the *Tunis Agenda*, to set up national implementation mechanisms for WSIS implementation 'with the participation of all stakeholders and bearing in mind the importance of an enabling environment.' They were encouraged to mainstream and align 'national e-strategies, across local, national, and regional action plans, as appropriate and in accordance with local and national development priorities, with in-built time-bound measures.'[687] Many governments have introduced national strategies for ICTs and/or for ICT4D in response to this call from WSIS, in some cases with support from UN Regional Commissions or development agencies. The role of governments in this context is outlined in Chapters 5 and 6, while many individual government projects and programmes are described in the WSIS Stocktaking Database.[688] Governments also play a critical role in multi-stakeholder cooperation and dialogue alongside international organizations, the private sector and civil society.

The following paragraphs summarize and illustrate the diversity of work to implement WSIS outcomes undertaken by a variety of stakeholders at international and regional levels.

1. United Nations and other international organizations

The *Tunis Agenda* called on each United Nations agency to work for the implementation of WSIS outcomes 'according to its mandate and competencies,' and to include both intergovernmental and multi-stakeholder components in its work.[689] It gave particular responsibilities to four agencies – the ITU, UNESCO, UNCTAD and UNDP – for coordinating work on WSIS Action Lines, with a number of other agencies also taking roles in Action Line facilitation. The most extensive range of WSIS-related activities has been undertaken by the ITU and UNESCO, whose mandates reach widely across the ICT sector and Knowledge Societies.

The ITU is the UN specialized agency responsible for communications technology. It hosts the annual WSIS Forum, acts as sole facilitator of three WSIS Action Lines and co-facilitator of a further five, plays a leading role in the Partnership on Measuring ICT for Development, and maintains the WSIS Stocktaking Database. It provided the secretariat for the Multi-stakeholder Preparatory Process ahead of the WSIS+10 High Level Event in June 2014, which was hosted at its headquarters in Geneva.

The majority of ITU work to implement WSIS outcomes falls within its Telecommunication Development Sector (ITU-D), whose mission seeks 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.'[690] ITU-D collects and publishes detailed statistics on the deployment and use of ICTs in its regularly updated *World Telecommunication/ICT Indicators Database*,[691] publishing statistical analyses in its annual *World Telecommunication/ICT Development Report (WTDR)* and in annual reports *Measuring the*

Information Society, which include the ICT Development Index and ICT Price Basket (see Chapter 3). Other important publications include an annual series on *Trends in Telecommunication Reform* and studies, manuals and guidelines on technical, policy and regulatory issues. Policy and regulatory issues are also addressed through an annual Global Symposium for Regulators (GSR) which enables networking between policymakers, regulators and industry leaders on latest developments in the policy and regulatory landscape.[692]

The ITU's work to implement WSIS outcomes to 2010 was summarized in the CSTD's midterm review.[693] Its work programme for 2011-2014, the *Hyderabad Action Plan* (HAP) of 2010,[694] included five programme areas. These were concerned with:

- ICT infrastructure and technology development, including spectrum management, Next Generation Networks, broadband development and the digital switchover;[695]
- cybersecurity and ICT applications;
- the enabling environment, including 'the elaboration and implementation of national ICT policies and plans, the creation and adaptation of legal and regulatory frameworks, the promotion of investments through effective financial mechanisms …, the inclusion of ICTs in national poverty reduction strategies, and fostering accessible ICT use by people with special needs;'
- capacity-building in the ICT sector; and
- the needs of Least Developed Countries (LDCs), landlocked developing countries (LLDCs) and Small Island Developing States (SIDS).

A full account of its work in these areas can be found in the report, *Tracking Four Years of Achievements*, which was submitted to the World Telecommunication Development Conference (WTDC) in 2014.[696] The *Dubai Action Plan*, agreed at that meeting, sets out the framework for ITU-D activities between 2015 and 2018 and has five core objectives:

- to foster international cooperation on telecommunication and ICT issues;
- to foster an enabling environment conducive to ICT development and the development of ICT networks as well as relevant applications and services, including bridging the standardization gap (the low level of developing country participation in standardization processes);
- to enhance confidence and security in the use of ICTs, and the roll-out of relevant applications and services;
- to build human and institutional capacity, promote digital inclusion and provide concentrated assistance to countries in special need; and
- to enhance climate change adaptation and mitigation, and disaster management efforts through telecommunications and ICTs.[697]

The Connect 2020 Agenda, agreed at the ITU Plenipotentiary Conference in 2014, highlighted the role of ICTs as an enabler for development, focusing on four key goals: growth, inclusiveness, sustainability, and innovation and partnership. The Agenda identified 17 targets for the development of ICTs within these four goals, with the aim that these should be achieved by the year 2020. These are described in Chapter 3.

UNESCO is the United Nations' specialized agency for education, sciences and culture. It established a Communication and Information sector in 1990 and subsequently adopted the aim of 'building inclusive knowledge societies through information and communication' as one of five over-arching objectives.[698] Its concept of Knowledge Societies, developed in a World Report, *Towards Knowledge Societies*, published in 2005, refers to '… 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.'[699] UNESCO hosted the first WSIS+10 event, the conference *Towards Knowledge Societies for Peace and Sustainable Development*, at its headquarters in Paris in February 2013 (see Chapter 2).

Four themes underpin UNESCO's work to develop Knowledge Societies: freedom of expression; quality education for all; universal access to information and knowledge; and cultural and linguistic diversity. UNESCO's work to implement WSIS outcomes

is summarized in a report on *Building Inclusive Knowledge Societies*, published in 2014. This is divided into three main areas:

- work undertaken through its core programmes for education, natural and social sciences, culture and communication and information (including the IFAP and IPDC programmes described below);
- coordination with other UN agencies within the UN system; and
- facilitation of the six Action Lines for which it took responsibility in the *Tunis Agenda.*[700]

UNESCO's Information for All Programme (IFAP) provides a platform for international policy discussion, the development of guidelines, and other work concerned with information for development as well as information literacy, preservation, ethics and accessibility.[701] Its International Programme for the Development of Communications (IPDC) has been an important vehicle for ICT-related work since 1980, focusing on freedom of expression and media pluralism, capacity development for journalists and media professionals, and the convergence of traditional and new media in the digital age.[702]

Within these programmes and other work, UNESCO has emphasized:

- the importance of media and information literacy (MIL), defined as the capacity of people to recognize their information needs, locate and evaluate worthwhile information, store, retrieve and make ethical use of that information, and apply it to create and communicate knowledge;[703]
- the role of local content and language in enabling digital inclusion, building on Recommendations concerning the Promotion and Use of Multilingualism and Universal Access in Cyberspace[704] and on the UN Declaration on the Rights of Indigenous Peoples;[705] and
- the role of freedom of expression and media freedom in the development of Knowledge Societies.

A report entitled *Freedom of Connection, Freedom of Expression* published in 2011, developed a conceptual framework for the 'ecology' of freedom of expression, exploring the relationship between new opportunities for expression, including social media, and new restrictions on expression, including filtering and blocking of websites and other online resources.[706] More recently, UNESCO published a *Global Survey on Internet Privacy and Freedom of Expression*[707] and an overview report on *World Trends in Freedom of Expression and Media Development*.[708] In 2013, it developed a new concept of 'Knowledge-Driven Media Development', with the aim of supporting efforts by traditional and new media organizations to make information available to the wider community for use in research, education and advocacy.[709] It has also developed a concept of 'Internet universality' and initiated a global Internet Study which are described in Chapter 7.

UNCTAD focuses on ICTs in trade and development. Its flagship publication on the Information Society is its annual *Information Economy Report*. Recent reports have focused on *ICTs, Enterprise and Poverty Alleviation* (2010), *ICTs as an Enabler for Private Sector Development* (2011), *The Software Industry and Developing Countries* (2012) and *The Cloud Economy and Developing Countries* (2013).[710] The 2015 report is concerned with *Unlocking the Potential of E-Commerce for Developing Countries*, and includes a new global database mapping laws concerned with electronic transactions, cybercrime, data protection and consumer rights. UNCTAD has also developed e-business indicators for the Partnership on Measuring ICT for Development and a methodology for reviewing national ICT policies in conjunction with national governments.[711]

The UN Development Programme (UNDP) published an influential *Human Development Report* on *Making New Technologies Work for Human Development* in 2001.[712] Its focus in recent years has been on e-governance, including initiatives to improve the efficiency, transparency and accountability of public services (including citizen participation), to mainstream ICTs into democratic processes, and to address issues such as privacy, censorship and the control of information and communications access. It has undertaken work concerned with the role of ICTs in supporting national stabilization after periods of conflict.

The United Nations Department for Economic and Social Affairs (DESA) is the lead facilitator for Action Lines C1, C7 (e-government) and C11, provides the institutional home for the

IGF secretariat, and plays an active part in the Partnership on Measuring ICT for Development. DESA has monitored the development of e-government since 2003. It has published five editions of the biennial *United Nations Global E-Government Survey* since 2005, ranking progress against an E-Government Development Index that was developed in 2001.[713] This work is discussed in the section of Chapter 4 concerned with Action Line C7 (e-government). In addition to the *Survey*, DESA has developed Measurement and Evaluation Tools for E-Government Readiness (METER) and for Engagement and e-Participation. It is responsible for the United Nations Public Administration Network (UNPAN), which facilitates information sharing between governments and builds capacity in e-government,[714] and, with the Inter-Parliamentary Union, jointly administers the Global Centre for ICT in Parliament, which seeks 'to strengthen the role of parliaments in advancing the Information Society and to encourage the use of ICT in legislatures to promote transparency, openness and accountability.'[715]

Other UN specialist agencies focus on ICTs as they relate to their own specific areas of responsibility. For example:

- The Food and Agriculture Organization (FAO) acts as the secretariat for the e-Agriculture Community of Practice, which shares knowledge and provides a framework for enhancing the use of ICTs within the sector (see Chapter 5 Action Line C7). It has worked with the World Bank to publish an *ICT in Agriculture* sourcebook focused on smallholder farming,[716] and in the AGORA partnership which makes more than 6,000 agricultural journals available free or at low cost to developing country institutions.[717]

In the World Health Organization (WHO) the Global Observatory for eHealth, established in 2005, monitors progress on e-health around the world. The findings of global surveys of e-health in 2005 and 2009 were used to develop a series of thematic publications concerned with issues including telemedicine, the management of patient information, m-health, e-learning and e-health country profiles.[718] The findings of a third survey are in the process of being published.[719] It has also worked with ITU to publish a report on *Implementing e-Health in Developing Countries*.[720]

- The World Intellectual Property Organization (WIPO) is responsible for overseeing the international intellectual property (IP) regime. It has been the principal forum for discussion of the impact of ICTs and the Internet on aspects of IP, including the impact of the Internet on copyright and disputes over Internet domain names.[721]
- The United Nations Entity for Gender Equality and the Empowerment of Women (UN Women), which became operational in 2011, promotes gender equality and women's empowerment. It envisages ICTs playing a 'catalytic role' in the empowerment of women and gender equality, including expanded economic opportunities, political participation, social welfare, community development and personal safety.[722] It participated in the Broadband Commission's Gender Working Group, whose report *Doubling Digital Opportunities* was published in 2013,[723] and in the Multi-stakeholder Preparatory Process ahead of the WSIS+10 High Level Event, during which it advocated more research and greater attention to gender dimensions of the Information Society.
- The United Nations Children's Fund (UNICEF) is the UN entity that focuses on the lives of children, including children's rights, their ability to access information and express themselves, and online child safety. In 2013, it published an overview study concerned with *Children, ICTs and Development*, based on a comprehensive literature review and expert interviews.[724] This found that ICTs have considerable potential for child-focused development, but emphasized that 'real and sustainable benefits' will only be achieved when they are embedded into wider processes of social change. It stressed the importance of considering children's experience holistically, focusing on ways to leverage greater value for young people from ICT access, content and services as well as protecting children from potential harm.

More information concerning these and other United Nations agencies can be found in the United Nations Secretary-General's annual reports on WSIS implementation, and in input documents to those reports[725] Other multilateral agencies have played

important parts in WSIS implementation, alongside these UN agencies. The work of the International Financial Institutions, such as the World Bank and regional development banks, is discussed in Chapter 6. That of global entities concerned with Internet governance is discussed in Chapter 7. A number of multilateral agencies outside the UN system have responsibilities for overseeing or coordinating particular aspects of the global economy and society which affect the development of the Information Society or are affected by it. The World Trade Organization (WTO), for example, oversees international trade relationships. Its 1998 WTO's Basic Telecommunications Agreement established the basis for cross-border investment flows in telecommunications markets and formalized principles for telecommunications regulation, while its 1997 Information Technology Agreement aims to lower taxes and tariffs on IT products in order to foster their adoption.[726]

Regional multilateral and multi-stakeholder organizations have diverse mandates and responsibilities, some concerned specifically with ICTs and others with more general regional cooperation and integration. Those which have played a part in WSIS implementation include:

- regional multilateral organizations (such as the African Union, the Council of Europe and the League of Arab States);
- regional economic communities (such as the European Union and the Southern African Development Community);
- regional development banks (such as the African Development Bank and the Inter-American Development Bank);
- ICT sector organizations (such as the Pacific Islands Telecommunications Association and the Caribbean Telecommunication Union);
- regional Internet organizations (such as the Regional Internet Registries); and
- regional business and civil society associations.

Some multilateral agencies representing specific economic groups have also contributed significantly to WSIS implementation.

- The Organization for Economic Cooperation and Development (OECD), for example, which provides a forum for developed countries, set out its agenda for the Information Society in the *Seoul Declaration for the Future of the Information Economy* in 2008,[727] and adopted a *Communiqué on Principles for Internet Policy-Making* in 2011.[728] Its Development Assistance Committee (DAC) coordinates the work of bilateral donors (see Chapter 6).
- The multi-donor trust fund *info*Dev, managed by the World Bank,[729] coordinated ICT-related programmes on behalf of a number of bilateral and multilateral donors in the years following WSIS. It has published an influential *ICT Regulation Handbook/Toolkit*,[730] analysed the impact of ICTs on education and enterprise, and sought to build capacity for ICT innovation in developing countries.

As well as multilateral agencies, the decade since WSIS has seen the development of new multi-stakeholder initiatives to advance WSIS objectives at global and regional levels in areas including advocacy and awareness-raising, research, capacity-building and the financing of specific development programmes or projects. Examples of these are described in Section 4 below. Public-private partnerships, which have become prominent vehicles for cooperation between governments, IFIs and communications businesses in infrastructure investment, are discussed in Chapter 6.

2. The private sector

The *Geneva Plan of Action* noted the central role of the private sector in 'developing and diffusing information and communication technologies (ICTs), for infrastructure, content and applications.'[731] Both before and since WSIS, private sector investment has been critical in the deployment of infrastructure and in the design, development and deployment of services and applications that have responded to consumer needs. The principal role has been played by businesses within the ICT sector, including hardware manufacturers and software companies, telecommunications network and service providers, and new enterprises that have built business models around the opportunities created by technological innovation. The pace of change in ICT technology and markets has enabled some online service providers and other businesses that were small-scale or yet to emerge in 2005 to become leading global corporations by

2015. As well as these large businesses, start-up and other small-scale enterprises have played a crucial part in the application of new technology, extending its reach and providing niche services for individuals and communities at local levels. A number of contributors to the open consultation for the CSTD ten-year review of WSIS stressed the importance that they attach to maintaining the dynamic role of private enterprise in development of the Information Society.

There is insufficient space to explore the scope and diversity of the private sector contribution to WSIS implementation in detail in this report. The following paragraphs provide a small number of examples which illustrate the scope and range of this activity. A more systematic and comprehensive study of business implementation of WSIS outcomes would add to understanding of the private sector's role and the enabling environment for innovation.

A number of international associations have represented businesses and coordinated private sector participation in international fora discussing Information Society developments since WSIS. Business Action to Support the Information Society (ICC-BASIS), a platform of the International Chamber of Commerce, has sought to act as 'the voice of global business in the international dialogue … on how information and communication technologies … can better serve as engines of economic growth and social development.'[732] The World Information Technology and Services Alliance (WITSA) acts as an advocacy body for IT companies and business associations in international fora like the WTO.[733] The GSM Association (GSMA) publishes statistical and analytical reports on the mobile sector,[734] and implements programmes concerned with mobile money, the use of mobiles in health, agriculture, and disaster response, and the promotion of gender equity and women's inclusion.[735] Some industry associations focus on particular issues, like the Global e-Sustainability Initiative (GESI), which seeks to provide 'information, resources and best practices for achieving integrated social and environmental sustainability through ICTs.'[736] Regional associations such as the African ICT Association (AfICTA), and the African ISP Association (AfrISPA), contribute to policy discussions concerned with industry development in areas such as infrastructure deployment, policy and regulatory frameworks, spectrum management and the introduction of IXPs.[737]

Some ICT businesses and entrepreneurs have undertaken developmental activities or commissioned research into the impact of ICTs in developing countries. MTN Foundations, for example, act as corporate social responsibility providers in 22 countries, using a proportion of local post-tax profits to work with government and other development partners on projects concerned with economic empowerment, health and education.[738] Vodafone's *Socio-Economic Impact of Mobile* reports have published research addressing policy, regulatory and developmental challenges including the relationship between mobile telephones and economic growth, rising demand for spectrum, and the emergence of mobile Internet in developing countries.[739] While not exclusively concerned with ICT projects, the Omidyar Network, established in 2004 by the founder of eBay, seeks to leverage the capacity of the Web and mobile technologies in support of development objectives.[740]

3. Civil society

Many civil society organizations participated in the WSIS plenary sessions in 2003 and 2005. A Civil Society Declaration, *Shaping Information Societies for Human Needs*, was adopted by the WSIS Civil Society Plenary, which brought together civil society participants at the Geneva Summit.[741] Many civil society organizations, including independent development agencies, have been involved in Information Society activity at national, regional and global levels since the Summit. Civil society organizations and advocates have played a prominent part in WSIS processes, including the IGF, the WSIS Forum and WSIS Action Lines. The following paragraphs describe the diversity of civil society involvement in WSIS implementation at international and regional levels, using examples to illustrate the kind of work undertaken in each area of activity. Civil society stakeholders include:

- Development agencies. The International Institute for Communications and Development (IICD), for example, is a non-profit foundation that has specialized in ICTs as a tool of development activity since 1996. It provides programme funding, mostly sourced through ODA, to non-governmental and multi-stakeholder programmes in Africa and Latin America that use ICTs to address development goals in economic development, education, health, water resources and climate resilience.[742]

- Professional associations. The International Federation of Library Associations and Institutes (IFLA), for example, which represents the interests and concerns of librarians and information management professionals in all countries, works with other civil society organizations to encourage the provision of online access in libraries, enabling less advantaged members of communities to overcome barriers to knowledge that result from poverty, illiteracy or discrimination.[743]
- Advocacy bodies. The Association for Progressive Communications (APC), for example, is a network of 50 organizations, mostly from developing countries, which are concerned with ICT rights, development and public policy. Its vision is that 'All people [should] have easy and affordable access to a free and open internet to improve their lives and create a more just world.'[744] It plays an active part in the IGF and other WSIS implementation processes as well as other ICT fora, co-publishes an annual *Global Information Society Watch* report that reviews a particular theme of WSIS implementation both globally and in individual countries,[745] and seeks to build civil society expertise in both technical and policy aspects of ICTs. Between 2009 and 2012, it worked with ECE and the Council of Europe to develop a code of practice on information transparency and accountability in Internet governance. It has also published two editions of an ICT Policy Handbook for civil society organizations.[746]
- Educational and other sector-specific bodies. The Global eSchools and Communities Initiative (GeSCI), for example, an international non-profit technical assistance agency based in Kenya, was founded in 2004 'to assist Governments in the socio-economic development of their countries through the widespread integration of technology for knowledge society development.' It provides independent advice to governments aimed at improving policymaking and enhancing education and training systems through systematic use and integration of technology.[747]
- Capacity-building organizations. The Diplo Foundation, for example, is a non-profit organization that seeks to build the skills and understanding of stakeholders involved in international negotiations and international fora. Its annual Internet Governance Capacity Building Programme has trained over 1,500 professionals from 160 countries since 2003. Graduates of Diplo's programme have gone on to play significant parts in national and international Internet governance activity in the years since WSIS.[748]
- Research institutes. LIRNEasia, Research ICT Africa (RIA) and Diálogo Regional sobre Sociedad de la Información (DIRSI), for example, are research institutes based in the global South, launched around the time of WSIS with support from the International Development Research Centre (IDRC), which focus on access and affordability of communications, ICT policy and regulation, the social and economic impact of ICTs, and developing analytical capacity in Asia, Africa and Latin America.[749]

4. The academic and technical communities

Academic and technical communities represent a further stakeholder group engaged in WSIS implementation. Innovation in computer science and communications has been driven by synergies and cooperation between universities and the private sector. Critical funding for 'blue sky' research has often come from governments. Communities of technical specialists, with backgrounds in public and private sectors and in academia, have played the leading role in developing standards for the new technologies and services that are at the heart of the Information Society, working through collaborative structures such as the IETF and the W3C (see Chapter 7). Academic social scientists have also been at the forefront of understanding the implications of the Information Society for social and economic development. Two types of organizations have been particularly prominent in these communities' contribution to WSIS implementation:

- Academic associations. The Ubuntunet Alliance, for example, is a regional networking organization, formed in 2005, which aims 'to secure affordable broadband and efficient ICT access and usage for African NRENs and their associated communities of practice.' It manages the regional backbone network

Ubuntunet, which interconnects 13 NRENs in East and Southern Africa, with financial support from the European Commission.[750]

- Internet associations. The Internet Society (ISOC), for example, is a global association with a membership of some 65,000 Internet professionals and 145 organizations that undertakes research, advocacy and capacity-building on Internet issues. It describes its mission as 'working in a multi-stakeholder fashion towards the development of an Open and Sustainable Internet for the benefit of all people.'[751] It has played a prominent part in discussions about the Information Society at WSIS and in WSIS-related fora such as the IGF. It provides the institutional home for the IETF and the IAB (see Chapter 7).

D. MULTI-STAKEHOLDER COOPERATION

The previous sections of this chapter have illustrated the diversity of international and regional stakeholders involved in WSIS implementation, including multilateral organizations, governments, private sector, civil society and academic and technical stakeholders.

The WSIS outcome documents emphasized the importance of cooperation between and among these stakeholders in achieving WSIS outcomes. The *Geneva Declaration* 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.'[752] The *Tunis Agenda* described 'multi-stakeholder participation' to be 'essential to the successful building of a people-centred, inclusive and development-oriented Information Society.'[753] 'The coordination of multi-stakeholder implementation activities,' the *Agenda* said, including 'information exchange, creation of knowledge, sharing of best practices,' would help to avoid duplication of activities undertaken by diverse agencies. It requested that the ECOSOC oversee 'the system-wide follow-up' of WSIS outcomes, 'taking into account the multi-stakeholder approach.' It also proposed the establishment of the IGF as 'a new forum for multi-stakeholder policy dialogue,' and 'the development of multi-stakeholder processes at the national, regional and international levels to discuss and collaborate on the expansion of the Internet' in support of internationally agreed development goals.[754]

The multi-stakeholder approach described in the *Geneva Declaration* and the *Tunis Agenda* has been a hallmark of subsequent implementation activities, including Action Line processes (see Chapter 5), public-private partnerships and the Internet Governance Forum (see Chapter 7). A good deal of the literature that has discussed WSIS outcomes, and a number of contributors to the consultation processes for the WSIS+10 High Level Event and for this report, have described the multi-stakeholder approach as an important contribution to international governance, both within and beyond the Information Society, and as an important legacy of the WSIS process. Some multilateral agencies such as the OECD, and regional ICT associations, have developed new ways of enabling non-governmental stakeholder groups, including the private sector and civil society organizations, to play a part in their policy development and cooperate in programme implementation.

The impact of the multi-stakeholder principles set out in the WSIS outcome documents has been significant in two distinct areas of WSIS implementation activity:

- cooperation between and among stakeholders in the implementation of programmes and projects intended to achieve Information Society objectives on the ground; and
- dialogue between and among stakeholders in policymaking fora both within and beyond the WSIS implementation framework.

Much of the cooperation between and among stakeholders which has taken place in the ICT sector since WSIS can be found in the development and implementation of individual programmes and projects – for example in infrastructure investment partnerships between IFIs, governments and private sector businesses; in funding relationships between bilateral donors and developing country NGOs; and in international collaborations concerned with ICTs in development sectors in areas such as health and education. Examples of these cooperative relationships are described elsewhere in this report.

A number of global multi-stakeholder fora have been formed since WSIS to pursue particular implementation objectives. The Global Alliance for ICT and Development (GAID), for example, was established in 2006 as a multi-stakeholder forum in succession to the UN ICT Task Force, with a mandate to mainstream ICTs within the UN development agenda, bring together organizations engaged in ICT4D, raise awareness of relevant policy issues, and act as a forum for new ideas.[755] The Broadband Commission for Digital Development, which was established jointly by the ITU and UNESCO in 2010, brings together senior representatives from UN and other intergovernmental agencies, ICT businesses and the academic and cultural spheres to promote the case for broadband as critical infrastructure for the post-2015 development era.[756] The Alliance for Affordable Internet (A4AI), a coalition of more than sixty public, private and non-profit organizations, was launched in 2012 by the World Wide Web Foundation to promote low-cost Internet and broadband access, developing statistical and best practice information to support policy, regulatory and business approaches to Internet affordability.[757] These and other multi-stakeholder partnerships have undertaken joint research, advocacy and, in some cases, project implementation activity.

Multi-stakeholder bodies have also been established at national level. In Kenya, for example, the Kenya ICT Action Network (KICTANet) acts as 'a multi-stakeholder platform for people and institutions interested and involved in ICT policy and regulation,' with participation from senior government officials, the private sector and civil society. It played a key role in the emergence of the Kenyan national and East African regional IGFs.[758] The Brazilian Internet Steering Committee (CGI.br), which administers the Brazilian ccTLD –.br – includes representatives of government, business, civil society and academic specialists in ICTs. Its public policy work has included the development of a set of *Principles for the Governance and Use of the Internet* and co-organization of the NETmundial conference on Internet governance (see Chapter 7).[759] Governments such as those of Finland and the United Kingdom have established multi-stakeholder advisory fora concerned with ICT and Internet policy and regulatory issues, in both national and international contexts, which contribute to their national policy positions.

Different forms of participation in multi-stakeholder dialogue have emerged in different contexts. In the IGF itself, for example, people participate on equal terms as individuals irrespective of their stakeholder community while, in its Multi-stakeholder Advisory Group (MAG), quotas have been used to balance participation between governments and non-governmental representatives and between those from different non-governmental stakeholder groups. Attention has also been paid in multi-stakeholder processes to the need to balance representation by geography and gender.

The value of multi-stakeholder dialogue in implementing WSIS outcomes has been emphasized in many reports published by UN and other agencies since WSIS, including those of Action Line facilitators, and in contributions from across the stakeholder spectrum to the consultation for CSTD's review, the WGEC and the Multi-stakeholder Preparatory Process for the WSIS+10 High Level Event. 'A key benefit of the multi-stakeholder model of Internet public policy-making,' in the view of one civil society stakeholder, 'is that the sum of all stakeholder inputs can be greater than their parts.'[760] Stakeholders from different communities have expressed the view that multi-stakeholder engagement has allowed governments, businesses and civil society organizations to build a stronger understanding of one another's different perspectives, facilitating the development of consensus on issues that might otherwise have been divisive. It has been particularly helpful, supporters have argued, for governments, business leaders and technical experts to share perceptions of the very rapid changes that are taking place in ICT technology and markets and the potential implications of these on economies and societies. One government advocate of the multi-stakeholder principle described it as 'a unique channel for the exchange of opinions and ideas of the different stakeholders.'[761]

Not all respondents to the open consultation for the CSTD ten-year review of WSIS, however, were supportive of experience with multi-stakeholder cooperation and dialogue. Some governments expressed concern that the emphasis on multi-stakeholder cooperation may detract from the significance and responsibilities of government and multilateral institutions. Other commentators have been concerned that the range of stakeholders

participating in WSIS-related activities has not diversified sufficiently, or that it does not sufficiently include government ministries responsible for mainstream social and economic activities, business users or representatives of mainstream civil society organizations that are not primarily focused on ICTs and the Internet. A number of contributions to the consultation drew attention to the challenge of ensuring equitable involvement from developing and developed countries. Attempts have been made to address this in the IGF and elsewhere through programmes of financial support for physical participation and through the increasing use of remote participation in formal conference sessions. Private sector and civil society stakeholders are also more effectively organized in some countries, particularly developed countries, than in others, affecting the level of participation from different stakeholder groups likely to feed through to regional and global levels.

The importance of multi-stakeholder participation and cooperation was emphasized in both the WSIS+10 conference *Towards Knowledge Societies for Peace and Sustainable Development* and the Multi-stakeholder Preparatory Process for the WSIS+10 High Level Event. The Final Statement of the conference *Towards Knowledge Societies* recognized that 'Multi-stakeholder processes have become an essential and unique approach to engagement in addressing issues affecting the knowledge and information societies.'[762] The *Statement on the Implementation of WSIS Outcomes*, agreed at the WSIS+10 High Level Event, noted that:

> *Since the WSIS process started, emphasis has been given to the multi-stakeholder approach and its vital importance in the WSIS implementation at the national, regional and international levels and in taking forward the WSIS themes and Action Lines.*

This approach, it said, 'contributed to strengthening the engagement of all stakeholders to work together, within their respective roles and responsibilities.'[763] The *WSIS+10 Vision for WSIS Beyond 2015* added that 'international cooperation and multi-stakeholder collaboration on the strategic use of ICTs to address a wide range of issues during the past decade has produced a wealth of knowledge, experience and expertise – resources which constitute a valuable foundation for future cooperation.'[764]

C. SUMMARY

A wide range of implementation activities has been undertaken by diverse stakeholders since WSIS, including UN and other international agencies, governments, private sector and civil society organizations. The large majority of these are not formally reported through WSIS Action Lines or the WSIS Stocktaking Platform, but build on the growth in ICT adoption and use within society and on the rapid changes in technology, services and markets that are taking place. There is general agreement that cooperation between diverse stakeholders, with different expertise and competences, has enabled some developmental gains to be achieved more rapidly, and that cooperation is particularly important in areas such as cybersecurity.

Experience of multi-stakeholder cooperation and dialogue in the Information Society is still relatively new. Many institutions are adjusting to new ways of doing things, becoming accustomed to building multi-stakeholder partnerships and experimenting with new governance mechanisms. Responses to the open consultation for the CSTD ten-year review of WSIS show that there are diverse views concerning the extent to which multi-stakeholder principles should be applied, particularly in policymaking contexts, the areas of the Information Society in which multi-stakeholder processes add most value, the difficulties of ensuring representativeness between and within stakeholder communities, and the relationship between multilateral and multi-stakeholder institutions. A comprehensive assessment of the impact and potential of multi-stakeholder participation in WSIS implementation, exploring the different mechanisms and experiences of multi-stakeholder cooperation, would be valuable but is yet to be undertaken.

NOTES

635 *Geneva Declaration*, para. 17.

636 *Geneva Plan of Action*, para. 3.

637 *Tunis Agenda*, paras. 97-98.

638 Ibid., para. 102.

639 Ibid., para. 101.

640 Ibid., para. 100.

641 Ibid., para. 54.

642 Ibid., para. 98.

643 About a quarter of projects identified in the 2012 report were international or global in scope, while another third were concerned with developments in Europe and North America. 18 per cent of entries were concerned with the Asia-Pacific region, 13 per cent with Africa and 8 per cent with Latin America and the Caribbean. Fifty-five per cent of entries had been submitted by governments and 25 per cent by international organizations, with 6 per cent coming from the private sector and 12 per cent from civil society organizations: ITU, 2012, *Report on the World Summit on the Information Society Stocktaking* (Geneva, United Nations publication).

644 By the end of 2014, it had 20,000 registered users, and was described by the ITU as the largest online platform concerned with ICT4D. WSIS Project Prizes have also been awarded as part of the Stocktaking Process. Entries can be searched at http://groups.itu.int/stocktaking/Database/SearchDatabase.aspx (accessed 26 November 2014).

645 *Tunis Agenda*, paras. 101-102.

646 Information about UNGIS is at http://www.ungis.org/ (accessed 26 November 2014).

647 See http://www.ungis.org/ThematicMeetingsActivities/OpenConsultationsonFinancialMechanisms.aspx (accessed 26 November 2014).

648 See http://www.ungis.org/Initiatives/JointInitiatives/MobileforDevelopment.aspx (accessed 26 November 2014).

649 UNCTAD, 2010, *Information Economy Report*: *ICTs, Enterprises and Poverty Alleviation* (New York and Geneva, United Nations publication), p. 105.

650 Economic and Social Council resolution 2009/7, para. 13, available at http://www.un.org/en/ecosoc/docs/2009/resolution%202009-7.pdf.

651 These are available at http://www.ungis.org (accessed 26 November 2014).

652 See UNGIS, 2013.

653 http://www.ungis.org/ThematicMeetingsActivities/OpenConsultationProcess-WSIS+10.aspx.

654 ITU 2014c: *WSIS+10 Vision*, part III.

655 ESCWA now includes Arabic-speaking countries in North Africa as well as West Asia.

656 ECE includes countries in North America and parts of Central Asia as well as continental Europe.

657 *Tunis Agenda*, para. 101.

658 These can be accessed at http://unctad.org/en/Pages/CSTD/WSIS-UNSG-Report.aspx (accessed 26 November 2014).

659 ECA, 2008, *The African Information Society Initiative (AISI): A decade's perspective* (Addis Ababa, United Nations publication).

660 ECA annual report on WSIS implementation 2013, at http://unctad.org/en/PublicationsLibrary/a69d65_bn_ECA.pdf (accessed 26 November 2014).

661 The Plan identified nine priority areas – 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. It can be found at https://www.itu.int/ITU-D/connect/africa/2007/bgdmaterial/ARAPKE.pdf (accessed 26 November 2014).

662 Abebe Chekol, Report on the Outcomes of the 1st Follow-up Workshop on WSIS, Tunis+3, http://www.powershow.com/view1/272b68-ZDc1Z/Report_on_the_outcomes_of_the_1st_Follow_up_Workshop_on_WSIS_Tunis_3_powerpoint_ppt_presentation (accessed 1 December 2014).

663 ECA annual report on WSIS implementation, 2013, *supra* note 618.

664 ESCAP Information Communication and Space Technology Division, 2006, *Regional Action Plan towards the Information Society in Asia and the Pacific* (United Nations publication).

665 See www.unescap.org/about/committees (accessed 1 December 2014).

666 By 2014, the Academy had been rolled out to 27 countries in the region, offering modules ranging from Internet governance and disaster risk management to project management and the role of ICTs in stimulating SME development. Its curricula are also used by ECA, ECLAC and ESCWA. See http://www.unapcict.org/academy (accessed 1 December 2014).

667 See http://www.unescap.org/our-work/ict-disaster-risk-reduction/asia-pacific-information-superhighway (accessed 1 December 2014).

668 ESCAP, 2013, Assessing the outcome of the World Summit on the Information Society in Asia and the Pacific, http://www.unescap.org/sites/default/files/ESCAP%20regional%20WSIS%20review_0.pdf.

669 ESCWA, 2004, Regional Plan of Action for Building the Information Society, available at https://www.itu.int/wsis/docs2/regional/escwa-rpoa-jan2005.pdf (accessed 1 December 2014).

670 See ESCWA, 2009, Regional Plan of Action (RPoA) for Building the Information Society, available at http://www.escwa.un.org/divisions/div_editor/Download.asp?table_name=divisions_other&field_name=ID&FileID=1157 (accessed 1 December 2014).

671 See ESCWA, 2012. In 2009, it identified 'the absence of specific strategies for the content industry, weak research and development efforts in the use of Arabic software tools and the lack of a regional vision on this issue' as the principal factors obstructing digital content development in its region. A project for Promoting the Digital Arabic Content Industry through Incubation was launched in 2007 and followed by a study of *Business Models for Digital Arabic Content* in 2013, which identified education and learning, content aggregation and curation, public services, entertainment and social media as areas for development.

672 http://igfarab.org/.

673 Reports can be accessed through http://www.escwa.un.org/wsis/profiles.html (accessed 1 December 2014).

674 ESCWA, 2013b, *Regional Profile of the Information Society in the Arab Region*, http://www.escwa.un.org/information/publications/edit/upload/E_ESCWA_ICTD_13_6_E.pdf.

675 These have been supported by the European Commission's @LIS2 programme.

676 OSILAC has been supported by Canada's International Development Research Centre (IDRC). See http://www.cepal.org/cgi-bin/getprod.asp?xml=/socinfo/noticias/paginas/8/44988/P44988.xml&xsl=/socinfo/tpl-i/p18f-st.xsl&base=/socinfo/tpl-i/top-bottom.xsl (accessed 1 December 2014).

677 The priority areas were education, infrastructure and access, health, public management and e-government, the productive sector, and the adoption of appropriate policy and strategy instruments: see http://www.cepal.org/socinfo/noticias/noticias/3/32363/2008-2-TICs-San_Salvador_Commitment.pdf (accessed 1 December 2014).

678 The priority areas are concerned with access for all, e-government, the use of ICTs to address environmental challenges, social security and health, the development of ICT innovation and productive capacity, ICTs in education and an enabling environment to promote the use of ICTs for regional integration: see http://www.cepal.org/cgi-bin/getprod.asp?xml=/elac2015/noticias/paginas/0/44210/P44210.xml&xsl=/elac2015/tpl-i/p18f.xsl&base=/elac2015/tpl-i/top-bottom.xslt (accessed 1 December 2014).

679 Contribution by ECLAC to the CSTD review, available at http://www.unctad.org/Sections/un_cstd/docs/cstd_wsis10_eclac_en.pdf (accessed 18 November 2014).

680 ECLAC published a keynote report in 2010 on *Fast-Tracking the Digital Revolution: Broadband for Latin America and the Caribbean*, which emphasized the role of broadband in improving economic competitiveness, followed in 2013 by a new analysis of *Broadband in Latin America*, published jointly with the research institute DIRSI. This focused attention on broadband's potential to facilitate job creation and improve income distribution, and encouraged national broadband strategies built around public-private partnerships.

681 ECLAC Plan of Work for the Implementation of eLAC2015 for the period 2013-2015, available at http://www.cepal.org/socinfo/noticias/documentosdetrabajo/8/49568/eLAC-Plan_of_work_2013-2015.pdf (accessed 1 December 2014).

682 Known as the Aarhus Convention, http://www.unece.org/fileadmin/DAM/env/pp/documents/cep43e.pdf.

683 http://prtr.ec.europa.eu/.

684 In 2013 alone, ECLAC published important analyses concerning *Information and Communication Technologies for Agricultural Development in Latin America,* on *Women in the Digital Economy,* and on *The Digital Economy for Structural Change and Equality*, drawing on regional academic and professional expertise as well as on government and industry inputs.

685 *Geneva Declaration*, article 17.

686 ECOSOC, 2006, *Follow-up to the World Summit on the Information Society and review of the Commission on Science and Technology for Development* (Resolution E/2006/46).

687 *Tunis Agenda*, para. 100.

688 http://groups.itu.int/stocktaking/Database/SearchDatabase.aspx.

689 *Tunis Agenda*, para. 102.

690 See http://www.itu.int/ITU-D/information/aboutbdt.html (accessed 1 December 2014).

691 See http://www.itu.int/en/ITU-D/Statistics/Pages/stat/default.aspx (accessed 1 December 2014).

692 See http://www.itu.int/en/ITU-D/Conferences/GSR/Pages/gsr2014/default.aspx (accessed 1 December 2014).

693 CSTD, 2011, *Implementing WSIS Outcomes*, p. 99-100.

694 See https://www.itu.int/ITU-D/pdf/op/HAP.pdf (accessed 1 December 2014).

695 The transition from analogue to digital broadcasting, which will release spectrum for the expansion of wireless communications networks.

696 ITU, 2014d, *Tracking Four Years of Achievements: Implementing the Hyderabad Action Plan* (Geneva, United Nation publication).

697 See http://www.itu.int/en/newsroom/wtdc-14/Pages/highlights10.aspx (accessed 1 December 2014).

698 See http://www.unesco.org/new/en/communication-and-information/ (accessed 1 December 2014).

699 UNESCO, 2005: http://www.unesco.org/new/en/communication-and-information/flagship-project-activities/unesco-and-wsis/about/.

700 UNESCO, 2014a.

701 The IFAP Information Society Observatory provides access to policy and other resources on information access issues. See http://www.unesco.org/new/en/communication-and-information/intergovernmental-programmes/information-for-all-programme-ifap/ (accessed 1 December 2014).

702 Since 1980, it has committed more than US$100 million to more than 1,500 projects in 140 countries, many concerned with capacity-building in areas such as community media, training of journalists and freedom of expression. Almost half of these have been implemented since the first WSIS summit in 2003. See http://www.unesco.org/new/en/communication-and-information/intergovernmental-programmes/ipdc/ (accessed 1 December 2014).

703 See the *Alexandria Proclamation on Information Literacy and Lifelong Learning* (2005). This was reinforced by the *Moscow Declaration of Media and Information Literacy* (2012), CITATION. In 2008, UNESCO published a conceptual framework *Towards Information Literacy Indicators* and in 2013 a *Global Media and Information Literacy Assessment Framework*, which provides a rationale and methodology for country assessments of MIL readiness. See http://www.unesco.org/new/en/communication-and-information/media-development/media-literacy/mil-as-composite-concept/ (accessed 1 December 2014).

704 Adopted in 2003: available at http://portal.unesco.org/en/ev.php-URL_ID=17717&URL_DO=DO_TOPIC&URL_SECTION=201.html (accessed 1 December 2014).

705 Adopted in 2008: see http://www.un.org/esa/socdev/unpfii/documents/DRIPS_en.pdf (accessed 1 December 2014). Relevant work has focused on the inclusion of disadvantaged and minority communities in government programmes, the development of multilingualism online (particularly the introduction of internationalized domain names), and the development of community media. See also OECD, ISOC and UNESCO, *The Relationship between Local Content, Internet Development and Access Prices*, 2013.

706 Dutton W H, Dopatka A, Hills M, Law G and Nash V, 2011.

707 UNESCO, 2012.

708 UNESCO, 2014b.

709 See UNESCO website at http://www.unesco.org/new/en/communication-and-information/intergovernmental-programmes/ipdc/initiatives/knowledge-driven-media-development/ (accessed 1 December 2014).

710 See http://unctad.org/en/Pages/Publications/InformationEconomyReportSeries.aspx (accessed 1 December 2014).

711 Partnership on Measuring ICT for Development, *Core ICT Indicators* 2010, Chapter 4, http://new.unctad.org/upload/docs/ICT_CORE-2010.pdf; UNCTAD, 2014d, *A Framework For Information And Communications Technology Policy Reviews: Helping Countries Leverage ICT for Development* (New York and Geneva, United Nations publication).

712 UNDP, 2001, *Human Development Report 2001: Making new technologies work for human development* (New York and Oxford, Oxford University Press).

713 The surveys are available at http://www.unpan.org/egovkb/global_reports/08report.htm (accessed 1 December 2014). The 2010 edition focused on *Leveraging e-government at a time of financial and economic crisis*, exploring ways in which governments could use e-government to address the challenges posed by economic recession. The 2012 edition considered *E-Government for the People*, concluding that 'e-government provides administrators with powerful tools for grappling with problems of social equity and the digital divide,' but that 'governments must find effective channels of communication that fit national circumstances' and actively promote usage of online and mobile services.

714 See http://www.unpan.org/Home/AboutUNPAN/tabid/736/language/en-US/Default.aspx (accessed 1 December 2014).

715 See http://www.ictparliament.org/ (accessed 1 December 2014).

716 The World Bank, 2011b, *ICT in Agriculture: Connecting Smallholders to Knowledge, Networks, and Institutions* (Washington D.C., The International Bank for Reconstruction and Development and The World Bank).

717 Access to Global Online Research in Agriculture.

718 See http://www.who.int/goe/data/en/ (accessed 1 December 2014).

719 http://www.who.int/goe/survey/2013survey/en/.

720 ITU, 2008, *Implementing E-Health in Developing Countries Guidance and Principles* (Geneva, United Nations publication).

721 See contribution by WIPO to the open consultation for the CSTD review, available at http://www.unctad.org/Sections/un_cstd/docs/cstd_wsis10_wipo_en.pdf (accessed 18 November 2014).

722 See https://papersmart.unmeetings.org/media2/107565/special-briefing-on-women-and-ict.pdf (accessed 1 December 2014).

723 Broadband Commission, 2013a,.

724 United Nations Children's Fund, 2013, *Children, ICT and Development: Capturing the potential, meeting the challenges* (Florence, Innocenti Insight).

725 Accessible at http://unctad.org/en/Pages/CSTD/WSIS-UNSG-Report.aspx.

726 The texts of these are available, respectively, at http://www.tiaonline.org/trade/world-trade-organization/wto-agreement-basic-telecommunications-services and https://www.wto.org/english/tratop_e/inftec_e/inftec_e.htm.

727 See http://www.oecd.org/internet/innovation/48348748.pdf (accessed 1 December 2014). This gave a central role in economic development to the Information Economy, but insisted that achieving this required improvements in infrastructure, expanded Internet access and the development of a trusted Internet environment, as well as more efficient use of spectrum, adoption of IPv6 and respect for intellectual property. Reviewing these themes in 2011 in the light of rapid changes in ICTs, the Organisation emphasized the importance of broadband access and its role of broadband in innovation, economic growth and social development. A comprehensive review of progress since the *Seoul Declaration*, published in 2013 as *The Internet Economy on the Rise*, summarized progress to date and identified critical areas for future work including the implementation of high-speed networks, digital content creation and the deployment of smart ICT applications. It explored four 'framework conditions' that it considered necessary 'to ensure that the Internet economy functions well and that its potential benefits are fully realised' – cybersecurity, privacy, consumer protection and empowerment, and openness – and identified a number of critical 'socio-economic objectives for the Internet economy,' including access to the Internet economy, skills development, promoting applications and their use, and Internet-related innovations such as cloud computing. The 2016 Ministerial Meeting of the OECD will be on the theme of 'Maximising the Benefits of the Internet Economy.'

728 See http://www.oecd.org/internet/innovation/48289796.pdf (accessed 1 December 2014).

729 See http://web.worldbank.org/WBSITE/EXTERNAL/TOPICS/EXTINFORMATIONANDCOMMUNICATIONANDTECHNOLOGIES/0,,contentMDK:21031721~menuPK:282849~pagePK:210058~piPK:210062~theSitePK:282823,00.html (accessed 1 December 2014).

730 See http://www.ictregulationtoolkit.org/en/home (accessed 1 December 2014).

731 *Geneva Plan of Action*, para. 3.

732 ICC-BASIS has played an active part in the WSIS Forum, the IGF, the CSTD, the Multi-stakeholder Preparatory Process for the WSIS+10 High Level Event and the 2014 NETmundial conference, where it has emphasized four main themes: liberalization 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, and thereby facilitate multi-stakeholder outcomes including public-private partnerships. It also advises governments and others on 'investment and business-friendly frameworks.' See http://www.iccwbo.org/advocacy-codes-and-rules/basis/ (accessed 1 December 2014).

733 WITSA organises a major international event at which businesses in its sector discuss policy priorities and showcase innovations – the biennial World Congress on Information Technology, most recently held in October 2014 in Guadalajara, Mexico. See http://witsa.org/witsa-wp-site/ (accessed 1 December 2014).

734 Including an annual overview report of *The Mobile Economy*. See http://www.gsma.com/ (accessed 1 December 2014).

735 See http://www.gsma.com/.

736 See http://gesi.org/About_ICT_sustainability (accessed 1 December 2014).

737 See http://aficta.org/ (accessed 1 December 2014).

738 In South Africa, the Foundation has focused on six 'cluster communities', where it aims to tackle multiple development challenges including education, health, entrepreneurship, arts and culture. See http://www.mtnonline.com/mtnfoundation/ (accessed 1 December 2014).

739 Reports can be accessed through http://www.vodafone.com/content/index/about/sustainability/news_research_and case studies/research.html (accessed 1 December 2014).

740 See http://www.omidyar.com/who-we-are (accessed 1 December 2014).

741 See https://www.itu.int/wsis/docs/geneva/civil-society-declaration.pdf (accessed 1 December 2014).

742 IICD is concerned especially with the role that these 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. See http://www.iicd.org/ (accessed 1 December 2014).

743 See http://www.ifla.org/ (accessed 1 December 2014). IFLA's Trend Report, *Riding the Waves or Caught in the Tide?*, published in 2013, explores the changing role of libraries in the emerging Information Society. At its World Congress in 2014, IFLA announced a new grant, in conjunction with the Bill and Melinda Gates Foundation, to support national and regional capacity-building activities to raise awareness of links between libraries and digital information access, helping librarians to negotiate the transition to the Information Society environment.

744 See http://www.apc.org/ (accessed 1 December 2014). Its work is organized in programme areas that deal with communications and information policy 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 use of technology and capacity building, through which it supports the use of ICTs by civil society organizations. Strategic priorities for 2013-2015 include continued work on Internet access and rights, including the development of a training curriculum on rights issues; fostering good Internet governance; strengthening the use and development of transformative technology; and ending technology-based violence against women and girls.

745 Subjects have included access to infrastructure (2008), environmental sustainability (2010), and corruption (2012). The 2013 issue reviewed civil society perspectives on *Communication Rights Ten Years after the World Summit on the Information Society*. Co-publication is with the development agency Hivos.

746 See https://www.apc.org/en/system/files/COGP_IG_Version_1.1_June2010_EN.pdf; http://www.apc.org/en/pubs/books/apc-ict-policy-handbook-second-edition.

747 Its current portfolio includes countries in Africa, Asia and Latin America, and covers all levels of education (primary, secondary and tertiary) as well as education leadership and planning. Its Masters-level African Leadership in ICT course has been implemented for more than 200 public sector managers from twelve countries and for the African Union Commission. See http://gesci.org/ (accessed 1 December 2014).

748 See http://www.diplomacy.edu/ (accessed 1 December 2014).

749 LIRNEasia acts as a research and policy advice centre for the Asia-Pacific region. It was responsible for designing a new approach to assessing the Telecommunications Regulatory Environment (TRE) through the perceptions of stakeholders in the ICT sector, and has conducted influential research into ICT use in 'bottom of the pyramid' markets and into mobile applications including m-health and mobile payments. RIA has a network of more than twenty specialist researchers in Africa, and has been responsible, among other work, for two extensive household surveys of ICT use across the continent, in 2007 and 2011. DIRSI's focus for 2014-2015 is on new information networks and the social inclusion of women and young people in Latin America. Websites are at http://lirneasia.net/, http://www.researchictafrica.net/home.php and http://dirsi.net/web/ (accessed 1 December 2014).

750 Funding was to develop its network and connect with the global REN community through the European regional network GÉANT. In the period from 2014 to 2018 it aims to achieve working and sustainable NRENs in every country within its region, benefiting from affordable broadband Internet connections both with one another and with other regional research networks. See http://www.ubuntunet.net/ (accessed 1 December 2014).

751 ISOC focuses its work in an Internet development context on five key issues (access, country code top level domains (ccTLDs), innovation, interconnection and Internet traffic exchange, and Internet Exchange Points (IXPs)), represents Internet professionals in international fora including the IGF and the CSTD, and funds grants for Internet experts in developing countries. In 2012, ISOC developed a methodology for assessing national Internet governance frameworks. In the same year, it undertook a large-scale Global Internet User Survey which asked 10,000 people in 20 countries about their personal behaviour online, their attitudes towards the Internet, and the Internet's potential to address issues including education and economic development. See http://www.internetsociety.org/ (accessed 1 December 2014).

752 *Geneva Declaration*, para. 17.

753 *Tunis Agenda*, para. 97.

754 Ibid., paras. 67, 80, 105, 110.

755 See http://www.un-gaid.org/ (accessed 1 December 2014). In 2008, GAID agreed that its priorities in the short term should be access, connectivity, content and education. Annual fora were held in the years following WSIS, that in 2010 focusing on 'ICTs for achieving the MDGs.' In 2012, it hosted a discussion at the Rio+20 summit on 'ICT as a catalyst for sustainable development.'

756 See http://www.broadbandcommission.org/Pages/default.aspx (accessed 1 December 2014). It is chaired jointly by President Paul Kagame of Rwanda and Carlos Slim, chairman and chief executive of the Mexican telecommunications operator Telmex. A succession of reports beginning with *The Future Built on Broadband* that it described as 'a 2010 leadership imperative,' was concerned particularly with ICTs and the Millennium Development Goals. It publishes annual reports on the current *State of Broadband*, and in 2011 proposed four targets for broadband delivery by 2015, which are discussed in Chapter 3. It has continued to emphasize the potential of broadband in relation to the post-2015 development agenda in a report, *Broadband and Sustainable Development*, and a manifesto, *Transformative Solutions for 2015 and Beyond.* It has also established working groups and published reports on broadband and gender and, with UNESCO, broadband and education.

757 It draws particular attention to the Foundation's Web Index, which seeks to measure the World Wide Web's 'growth, utility and impact on people and nations.' See http://www.broadbandcommission.org/Pages/default.aspx (accessed 1 December 2014).

758 See http://www.kictanet.or.ke/ (accessed 1 December 2014).

759 See http://www.cgi.br/pagina/about-the-cgi-br/148 (accessed 1 December 2014).

760 https://www.apc.org/en/system/files/APC_response_CSTD_WGEC_10092013.pdf.

761 Submission by the Government of Austria, http://www.unctad.org/Sections/un_cstd/docs/cstd_wsis10_austria_en.pdf (accessed 1 December 2014).

762 See UNESCO, 2013b.

763 ITU, 2014f, p. 10.

764 ITU, 2014f, p. 24.

CHAPTER 9

SUMMARY AND CONCLUSION

CHAPTER 9 – SUMMARY AND CONCLUSION

This report has described the evidence that is available concerning the implementation of WSIS outcomes and the development of an Information Society since the World Summit in 2003-2005, in order to help the CSTD prepare its ten-year review of progress made in the implementation of WSIS outcomes for the United Nations General Assembly. It has drawn on the reports of United Nations agencies and responses by diverse stakeholders to WSIS+10 consultation processes, particularly the open consultation undertaken for the CSTD ten-year review of WSIS, supplemented by evidence from other international agencies, non-governmental and academic sources, to provide an overall account of progress made in the implementation of WSIS outcomes. This final chapter briefly summarizes the main conclusions that can be drawn from the evidence in the report. It then identifies important challenges that have arisen during implementation and makes a number of suggestions for consideration by the Commission on Science and Technology for Development as it prepares its review for the General Assembly.

A. SUMMARY

The WSIS outcome documents set out a vision of an Information Society that would enhance the opportunities and quality of life for people worldwide and facilitate sustainable development. They also established mechanisms for monitoring progress towards this vision, identified targets for connectivity and access, established processes for implementing Information Society objectives in specific areas, including WSIS Action Lines, and addressed financial mechanisms and Internet governance.

The vision of a 'people-centred, inclusive and development-oriented Information Society' has continued to inspire efforts to implement WSIS outcomes during the past decade. The rapid growth in ICT adoption and use, and in technology and services, which has been experienced since WSIS has led to new ways of thinking about the role of ICTs in economic and social development as they have become increasingly important in all aspects of economy, society and culture. Increased use of ICTs has led to changes in the underlying structure of societies, in economic production, distribution and consumption, access to and use of information and knowledge, relationships between citizens, businesses and governments, patterns of work and leisure, and people's participation in decisions that affect their lives. The growing presence of ICTs has also affected frameworks concerning international law and human rights. Alongside these underlying changes in economies and societies, governments and development agencies have adopted national strategies, policies and programmes designed to leverage greater developmental value from ICTs. New challenges and threats have emerged as part of the Information Society, requiring responses at national and international level. A core challenge of WSIS implementation for the future concerns the relationship between ICTs, the Information Society and sustainable development, including the role which ICTs can play in the post-2015 development agenda.

The years since WSIS have seen rapid growth in the reach of ICTs throughout the world, particularly in wireless networks, which now cover almost all communities, and in the adoption and use of mobile phones, subscriptions to which are now almost as numerous as world population. Access to the Internet has grown less rapidly, but it is estimated that about 40 per cent of the world's population now goes online, at least on an occasional basis. Internet services are increasingly widely accessed through wireless networks and on mobile devices as well as through computers. While increased connectivity and access to basic voice telephony have significantly closed the digital divide in access to basic ICTs, which was identified as the central challenge of the emerging Information Society at the time of WSIS, this does not mean that digital divides have been overcome. Basic telephone access remains expensive for people living on marginal incomes in many countries, while the costs of Internet access are still much higher, relative to incomes, in developing than in developed countries. Network capabilities are generally poorer in rural than in urban areas. Local language content and other services are less widely available in low-income countries and in marginalized communities.

Rapid developments in ICT technology and services have also opened up new divides in ICT access and use within and between societies. Broadband networks and services are now the benchmark against which progress towards an Information Society is measured. They have been and are being deployed extensively across the world, but their deployment to date has been more rapid in developed than developing countries, in higher-income developing countries than in LDCs, and in urban than in rural areas, widening divides in the capabilities of ICTs between countries and communities. While almost all countries are now connected to international broadband submarine cable networks, either directly or through neighbouring countries, broadband terrestrial networks are still insufficient in many parts of many countries to enable full advantage to be taken of emerging Information Societies. Broadband investment has become a critical priority for the international community.

The opportunities presented by the Information Society have grown markedly since WSIS. Moore's Law suggests that the capabilities of ICT networks and services today are some thirty times what they were at the time of the Summit. This has enabled the introduction of many new services for individuals and communities, facilitated the growth of new businesses, and established new modalities for the implementation of WSIS outcomes in social and economic development that were not envisaged at the Summit. Alongside the rapid growth of mobile and Internet markets, and the increasingly rapid deployment of broadband networks, there have been major changes in the services available through mobile phones and computers and in the ways in which these are being used. The World Wide Web has become a much more interactive platform than it was at the time of WSIS, with the emergence and rapidly growing popularity of social media and other platforms for user-generated content. Very rapid growth in the capabilities of both computing and communications resources has enabled new models of usage, such as cloud computing, and new forms of data storage and analysis, such as 'big data' and social media analytics. These have led to new forms of business and government practice. Further growth in ICT capabilities, the emergence of the Internet of Things and other innovations in technology and services will lead to more changes in business, government and development opportunities in the years to come. These developments were succinctly summarized by one government in its response to the open consultation process for the CSTD ten-year review of WSIS as follows:

> *When the WSIS took place, internet was starting to become widespread, most of devices were desktop focused, mobile was in its infancy and the foundations to what would become cloud computing were being deployed. Since then Mobile and Cloud took off and have completely changed the way we interact with data and with ourselves. Trends such as the Internet of Things and connected devices represent a new opportunity to deliver new ways to communicate to next billion of people who are not yet in the Information Society in an extremely affordable way. We definitely should rethink our approach to the Information Society given this new scenario where Cloud and Big Data are now leading the Information Revolution.*[765]

This rapid evolution of the Information Society, in particular the scope and reach of ICTs within societies, has changed the parameters for implementation of WSIS outcomes. The WSIS outcome documents provided a framework for reporting the initiatives undertaken by international agencies, governments, private sector and civil society stakeholders. Other work towards the Information Society has been undertaken by these stakeholders within their own programmes and activities. Some of these Action Lines and activities have been concerned with the ICT sector itself, for example with infrastructure, the enabling environment of legal and regulatory governance, and issues such as e-business and cybersecurity. Others have been concerned with the impact of the emerging Information Society on economic and social development, in areas such as e-government, agriculture, health and education. There has been very considerable growth and diversification in ICT-enabled development activity since WSIS, much of it now mainstreamed within other development sectors. Alongside development interventions, the spread of ICT adoption within societies has led to new patterns of behaviour and relationships emerging between people, businesses and governments, which have had profound impacts on economic

and social development outcomes. As well as opportunities, changes in ICTs have led to new challenges including risks to the stability and security of the Internet, criminality, and environmental problems.

ICTs and ICT for development (ICT4D) interventions by diverse stakeholders have had extensive impacts on most areas of social and economic activity, but there are still significant variations in the extent to which different countries and communities have been able to take advantage of them. The evidence in this report, and in contributions to CSTD's review, suggests the importance of a number of factors in leveraging developmental gains from ICTs, including a positive enabling environment for investment and innovation, national strategies for ICT and broadband deployment and development, and the availability and fostering of ICT skills through education and capacity-building. While these various factors have relevance in all societies, experience also shows the importance of focusing interventions on the specific developmental characteristics and challenges of each society in order to maximize the value of ICT-enabled innovation and meet the needs of local communities and businesses. While there have been many achievements in different areas of ICT4D, therefore, the evidence also shows that much remains to be done, particularly in ensuring the inclusiveness of development outcomes.

Financial investment is an important aspect of the enabling environment. The primary role in ICT sector investment since WSIS, both for infrastructure and services, has been played by the private sector, though significant roles have also been assumed by International Financial Institutions and national governments, particularly in fostering enabling environments for investment. The dynamic growth of ICT technology has led to high levels of continuous investment in leading markets, though there was a significant dip in investment following the international economic recession in 2008. Much experience has been gained in establishing regulatory frameworks to encourage private investment, in developing mechanisms to promote universal access, and in implementing public-private partnerships. Contributions by multilateral and bilateral donors have focused more on content and applications development and on capacity-building.

Internet governance was another area of particular focus in the WSIS outcome documents. The Internet has continued to grow rapidly in both scope and services since WSIS and there have been important changes in its technical modalities, including the diversification of top level domains and the deployment of IP version 6. The Internet Governance Forum, which was introduced following WSIS, has generally been welcomed as a new forum for multi-stakeholder discussion of Internet issues and is seen as having contributed to greater understanding and cooperation, though it is felt that its contribution could be enhanced through further improvements to its inclusiveness and ways of working. There has been less success in reaching consensus on ways to achieve enhanced cooperation in international public policy issues pertaining to the Internet. A number of other initiatives have taken place over the past ten years to broaden debate, develop Internet principles and facilitate governance concerning technical and public policy aspects of the Internet.

The WSIS outcome documents emphasized the responsibility of all stakeholders in implementing WSIS outcomes. Multi-stakeholder cooperation in WSIS implementation has extended beyond joint activities such as public-private partnerships to broader cooperation in the development of technical standards and of new approaches to development strategies, policies and programmes. Multi-stakeholder participation has been particularly evident in the Internet Governance Forum, where it has built on established experience in other entities concerned with Internet governance. Many contributions to the WSIS+10 consultation processes emphasized the value that stakeholders attach to multi-stakeholder participation in improving understanding and facilitating innovation in the complex and rapidly changing environment of the Information Society.

B. CHALLENGES

The analysis in this report demonstrates the importance of the emerging Information Society in global development. It also demonstrates the dynamism of that Information Society, generated by continuous innovation in technology and services. The context for WSIS implementation has changed enormously as a result over the past ten years. The implementation activities now undertaken by

international agencies, governments and other stakeholders make use of different technologies and services than those that were available at the time of the Summit. New modalities for implementation have become available as a result of innovation and the spread of access, while new challenges have emerged because of developments in the ICT sector and in the context of economic and social change. In assessing the implementation of WSIS outcomes today, it is necessary both to look back at the targets and objectives set in 2005 and forward towards the challenges and opportunities of the post-2015 development agenda.

Five major challenges arise from this, each of which was raised in contributions to the WSIS+10 High Level Event and to the consultation process for this ten-year review.

- The first concerns the digital divide, the nature and scope of which has changed greatly since the Summit. At that time, as summarized above, the biggest problem facing WSIS implementation concerned access to basic ICTs. At least as big a problem today concerns the digital divide in the availability of networks providing higher bandwidth that enables effective use of a wider range of services. The divide in broadband connectivity and access appears to be widening, between developed and the majority of developing countries, between the majority of developing countries and LDCs, and within countries where it is exacerbated by differences in people's capabilities to make use of ICTs. This challenge will continue into the future. As the divide in today's communications technology and services narrows, new divides will open up in access to and use of new technologies such as broadband and the cloud economy. The digital divide, as a result, is and will continue to be a moving target. The challenge for policymakers and practitioners lies in designing policies to implement WSIS outcomes that respond to this and adapt accordingly.

- The second challenge stems from the unpredictability of the changes taking place in technology and services and the effects they have on people's behaviour and wider social and economic outcomes. As summarized above, many important aspects of the Information Society today have emerged since WSIS, including mass markets for mobile telephony and mobile Internet, extensive broadband networks, social media and other Web 2.0 services, and cloud computing. These were not anticipated at the time of WSIS because it is very difficult to predict what innovations will become available or how users will respond to them. The same challenge of predictability arises now. This makes it difficult for international agencies and governments to adopt long-term goals and strategies for the Information Society. Ideally, goals and strategies need to be adaptable in order to meet changing circumstances, including both opportunities and threats. One approach to achieving the adaptiveness required, which might be suitable for wider replication, could be the combination of long-term goals with short-term targets such as those adopted in ECLAC's eLAC plans. Strategic foresight exercises can also contribute positively to enhancing preparedness, maximizing the value and minimizing the negative impacts of new developments.[766]

- A third challenge concerns the mainstreaming of ICTs into wider social and economic development policies and programmes. Although there is a growing literature concerning ICT4D, more of this is still concerned with the potential of ICTs to achieve developmental objectives than with evaluating what has been achieved to date and what lessons can be derived from past experience. This is partly a result of the pace of change: experience with earlier generations of technology is not necessarily relevant when considering what can be done with those that have become available today. Some experts have suggested, however, that the emphasis in ICT4D needs to shift away from programmes and projects which are designed to introduce ICTs and ICT-enabled services into communities, towards programmes and projects that seek to leverage the increasingly pervasive use of ICTs within them. ICTs now form an integral part of development programmes in areas like health and education, and are increasingly used for the delivery of other government services. Insufficient analysis has been undertaken to date of this changing emphasis and of its implications for development policy and practice. The potential role of ICTs and their underlying sig-

nificance for social and economic change are of particular importance in the context of the post-2015 development agenda, which will underpin international development policies at a time of further rapid growth in the reach and scope of ICTs.

- Many stakeholders, including contributors to the CSTD ten-year review of WSIS, have emphasized a fourth challenge: the importance of increased attention to education and capacity-building in ensuring that ICTs and the Information Society contribute most effectively to development. Education in the use of ICTs and of the information and knowledge that they unlock is critically important for equipping the young and future generations to take full advantage of them; but it is also vital to improve the capacity of those currently in work, whether in the public and private sectors or in self-employment, in factories and fields, at all levels of work. Particular attention needs to be paid to ICT technical skills, to policy and regulation, and to the day-to-day media and information literacy skills that are valuable in everyday life. These, too, are changing rapidly as technology evolves.

- The fifth challenge concerns the monitoring and measurement of WSIS outcomes. It is much easier to measure inputs on the supply side of the ICT sector, such as connectivity and adoption rates for different technologies, than it is to measure impacts on the demand side of the sector, such as the ways in which devices and services are used by governments, businesses and individuals to serve their requirements and the ways in which these then affect outcomes in social and economic domains such as health, education and enterprise development. However, as the Partnership on Measuring ICT for Development found in preparing its *Final WSIS Targets Review*, even data on the supply side are currently insufficient to enable a thorough analysis of the changes that are underway. If governments and international agencies are to grasp fully the opportunities provided by the Information Society, they need to have a better quantitative and qualitative understanding of developments on both supply and demand sides of communications.

C. CONCLUSION

The following paragraphs include a number of suggestions concerning aspects of WSIS implementation. These draw on previous discussions within the CSTD, on contributions to the CSTD ten-year review of WSIS and on the evidence presented in this report.

One general issue that has been raised in previous CSTD discussions concerns the need for discourse on international policy towards the Information Society and future implementation of WSIS outcomes to be located in the present and the future rather than the past. The WSIS Targets and Action Lines have been helpful in enabling monitoring of WSIS outcomes over the last decade, but the reach and capabilities of ICTs are now much greater than they were in 2005. Those capabilities, it is generally believed, are continuing to double every two years or so. Cloud computing and social networks were in their infancy at the time of WSIS, while the Internet of Things and big data analysis were then on the horizon rather than imminent realities. In this context, a number of contributors to the CSTD ten-year review of WSIS suggested that it was vital that international discourse on the future of the Information Society should begin from an understanding of current circumstances, opportunities and challenges and from the best understanding that can be achieved of likely future progress. This was considered particularly critical for the post-2015 development agenda.

A number of other priorities were identified, by diverse stakeholders in their contributions to the CSTD ten-year review of WSIS, as requiring attention by the international community. Eight issues in particular stand out among these.

- The rapid development of broadband networks is widely considered essential if developing countries are to leverage the benefits now available through ICTs and avoid the widening of development divides that could result from differential rates of growth in digital technology.

- Inclusiveness remains a key priority for many stakeholders, including access to more advanced networks and services in remote and rural areas, lower costs for international bandwidth, affordable access for lower-income users, reduction and removal of the gender gap

in communications access, and the inclusion of marginalized groups including people with disabilities, indigenous peoples and users of minority languages.

- The growing importance of the Internet in all aspects of economy and society makes it increasingly important to resolve differences concerning Internet governance, enabling all stakeholders to play their roles in accordance with the WSIS outcome documents, and facilitating continued innovation in technology and services.
- Education and capacity-building are regarded by many stakeholders as highly important in enabling people at all levels of society to take advantage of the emerging Information Society, requiring increased investment and prioritization by all stakeholders.
- Cybersecurity is a growing concern for all stakeholders as the Internet becomes more important in every aspect of government and business, and as ICTs become increasingly central to many aspects of more and more individuals' lives. Stakeholders have emphasized the need for more international and national coordination in cybersecurity in order to ensure continued public confidence.
- The emergence of the cloud economy, in which large volumes of data and applications are held in data centres, owned and managed by large corporations and located outside the territorial jurisdictions of those creating or using them, presents opportunities for adding economic and social value while posing new challenges including issues of economic and content regulation, data sovereignty and security.
- There have been calls from a number of stakeholders for more attention to be paid to rights aspects of the Information Society, particularly those concerning access, freedom of expression, privacy and surveillance, including the implications of equivalence between rights online and offline and of the growth of cloud computing and big data analysis.
- ICTs and the Internet present both threats to the environment, through e-waste and increased greenhouse gas emissions, and opportunities to improve the productivity and energy efficiency of other industries, which have potential implications for sustainable development and climate change.

Earlier chapters of this report have summarized challenges concerned with the monitoring, measurement, evaluation and implementation of WSIS outcomes. The following suggestions arise from these challenges.

- There are major weaknesses in the availability of data for monitoring and measuring WSIS implementation and the development of the Information Society. No indicators were set for the Targets agreed in the Geneva Plan of Action and it has proved difficult to obtain data for many of the indicators that were subsequently agreed by the Partnership on Measuring ICT for Development. The Partnership's *Final WSIS Targets Review* emphasized that any new targets should be forward-looking, and set out a framework for their adoption and implementation (see Chapter 3). This would significantly improve monitoring and understanding of the Information Society, but considerable effort will also be required to improve the capacity of National Statistical Offices to gather and analyse statistics on a comparable basis, especially in developing countries. This should be a priority for future implementation by the international community. ICT businesses, which undertake extensive analysis of ICT traffic and usage data for commercial purposes, could also contribute more towards improving understanding of the changes taking place within the Information Society.
- The WSIS Action Lines have provided a useful framework for reporting on WSIS implementation, particularly for UN agencies, but have not attracted extensive participation from the wider stakeholder communities in their areas and have not covered all of the issues raised by the Information Society. New technologies and services emerging since 2005 have also significantly affected the parameters for addressing issues that arise within the Action Lines. The *WSIS+10 Vision for WSIS Beyond 2015* agreed at the WSIS+10 High Level Event in 2014 made recommendations for the future development of the Action Lines,

including the need for all Action Lines to pay greater attention to gender dimensions of the Information Society.

- Many stakeholders have emphasized the importance of education and capacity-building in ensuring the effective implementation of WSIS outcomes and maximizing the impact of ICTs on social and economic development. United Nations agencies and other stakeholders should pay particular attention to integrating education and capacity-building concerning ICTs into their programmes and policies for social and economic development, with the aim of equipping both current and future generations to take maximum advantage of the potential of ICTs and to feel confident and secure in their productive use.
- United Nations agencies have taken steps to incorporate WSIS outcomes into their activities, and a number of Regional Commissions have facilitated regional discourse and the development of regional plans to promote the Information Society. However, WSIS outcomes have not been well integrated into UN Development Assistance Frameworks (UNDAFs). This needs to be addressed if the United Nations system as a whole is to leverage the role of ICTs effectively in its development activity. The UN Group on the Information Society (UNGIS) could be strengthened to enable it to play a more effective role in coordinating the work of UN agencies, as envisaged in the *Tunis Agenda*.
- Renewed attention should be paid to financial mechanisms for the Information Society. Developments in this area include the growing significance of public-private partnerships and of investments in new aspects of infrastructure such as data centres. More attention needs to be paid by policymakers to changes in demand for infrastructure and to policy and regulatory requirements that will arise from growing data traffic volumes, the cloud economy and the Internet of Things, including the facilitation of e-commerce. More also needs to be known about levels of ODA and other financial flows concerned with or arising from increased use of ICTs in social and economic development. A systematic review of ODA commitments, similar to that undertaken by the OECD at the time of WSIS, would be helpful in improving understanding of current circumstances and future priorities, enabling more effective integration of ICTs in national development strategies, donor strategies and UNDAFs.
- Issues related to Internet governance take up a great deal of attention in international fora concerned with WSIS implementation, and there remains a high level of divergence of views concerning aspects of governance, in particular those concerned with 'enhanced cooperation … in international public policy issues pertaining to the Internet.' Concern has been expressed that the prominence given to the IGF and enhanced cooperation in discussions concerning WSIS has distracted attention from more development-oriented activities, and that this in turn has inhibited integration between WSIS and the post-2015 development agenda.[767] The Internet is now extremely important not just within the ICT sector but to all aspects of economy, society and culture. It is important, therefore, that discussions concerning its future should reflect this wide-ranging significance, and that differences of view concerning Internet governance should not inhibit discussion of how to take best advantage of innovation in technology and services and the positive impact that the Internet can have on economic and social development. Renewed efforts should be made to resolve differences and achieve consensus on the future of Internet governance, and to find solutions that enable all governments to carry out their roles and responsibilities, on an equal footing, in international public policy issues pertaining to the Internet.
- The Geneva Declaration of Principles emphasized that the implementation of WSIS outcomes would require new forms of solidarity and cooperation between and among stakeholders. The *Tunis Agenda* likewise emphasized the importance of a multi-stakeholder approach to the Information Society, including Internet governance. Multi-stakeholder cooperation and dialogue have been hallmarks of the subsequent implementation of WSIS outcomes. These have taken a number

of different forms, ranging from public-private partnerships for infrastructure deployment to the formal and informal participation of those from different stakeholder communities in decision-making processes. Development partnerships in ICTs have involved international agencies, national governments, multilateral and bilateral donors, businesses, NGOs and other civil society organizations. New fora, including the WSIS Forum and the global, regional and national IGFs, have given opportunities for different stakeholders to build greater understanding of one another's perspectives and move towards the development of consensus on controversial issues. A body of experience has arisen from these different contexts, including different ways of addressing the inclusiveness of multi-stakeholder participation and its relationship with multilateral institutions. More analysis and multi-stakeholder discussion of the benefits and challenges arising from this experience could help to improve the inclusiveness and effectiveness of future multi-stakeholder co-operation and dialogue.

The United Nations General Assembly's review of the implementation of WSIS outcomes will take place in 2015 alongside its review of the achievements of the MDGs, consideration of forthcoming SDGs and the adoption of a new post-2015 development agenda. The evidence set out in this report emphasizes the extent to which an Information Society has emerged since WSIS and to which ICTs have affected all aspects of economy, society and culture. As ESCAP has put it, 'ICT has created a new paradigm of sustainable development that did not exist at the time of the Brundtland Commission, the Rio Summit, and even the Millennium Summit in 2000.'[768] The *WSIS+10 Vision for WSIS Beyond 2015* also recognized that 'ICTs will play a critical role in achieving the sustainable development goals.'[769]

One government contribution to the consultation for CSTD's review suggested that an opportunity was missed in 2000 to integrate ICTs sufficiently into the implementation of the MDGs, and stressed that this opportunity should not be missed again as the SDGs are finalized.[770] The development of a people-centred, inclusive and development-oriented Information Society is, therefore, of great significance to sustainable development and the post-2015 development agenda. ICTs have already had profound impacts on society, economy and culture, which need to be taken into account in consideration of future development strategies. As well as changing underlying parameters of social and economic life, they offer many new tools to achieve the goals of sustainable development. The rapid growth of ICT adoption and use and the dynamic pace of innovation in the ICT sector will ensure that their impact on society, economy and culture continues to grow rapidly between 2015 and the proposed terminal date of 2030 for the forthcoming Sustainable Development Goals. This reinforces the importance of ensuring that WSIS outcomes and the role of ICTs in development are integrated fully into the SDGs and the post-2015 development agenda. Many stakeholders have expressed concern that ICTs and the Information Society have not been sufficiently integrated into the preparatory work that is being undertaken towards the Agenda and the SDGs. More attention should be given to this as a priority.

While great progress has been made in implementing WSIS outcomes over the past decade, much remains to be done, in extending the potential benefits of the Information Society to all, in addressing new challenges that have arisen from its development, and in adapting to the continual innovation that is taking place in information and communication technologies and the services that they enable. The overall objectives set out in the WSIS outcome documents remain relevant, even as the priorities for individual targets and Action Lines evolve with changing technologies and services. There is a need for continued efforts by all stakeholders, working independently and through multi-stakeholder partnership and dialogue, to achieve the WSIS vision that people everywhere, regardless of their background or origin, have the opportunity to play a full part in a people-centred, inclusive and development-oriented Information Society.

NOTES

765 Contribution by the Dominican Republic to the open consultation for the CSTD review, http://www.unctad.org/Sections/un_cstd/docs/cstd_wsis10_dominican_republic_en.pdf (accessed 25 November 2014).

766 See *e.g.* ECOSOC, 2015, Strategic Foresight for the Post-2015 Development Agenda *(*Report of the Secretary-General E/CN.16/2015/3).

767 See *e.g.* contribution by Center for Democracy & Technology (CDT) to the open consultation for the CSTD review, http://www.unctad.org/Sections/un_cstd/docs/cstd_wsis10_center_for_democracy_technology_en.pdf.

768 ESCAP, 2013, Assessing the outcome of the World Summit on the Information Society in Asia and the Pacific (Regional survey and review by the ESCAP secretariat).

769 ITU, 2014c, p. 25.

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ANNEX

ANNEX: CONTRIBUTIONS TO THE OPEN CONSULTATION FOR THE CSTD TEN-YEAR REVIEW OF THE IMPLEMENTATION OF WSIS OUTCOMES

The CSTD secretariat carried out an open consultation between 27 June and 15 September 2014 to collect inputs for the CSTD ten-year review of the implementation of WSIS outcomes. All stakeholders were invited to contribute their experiences, views and priorities to the CSTD review by responding to an online questionnaire, and to forward copies of relevant literature to the secretariat. Written contributions were received to the open consultation from the following entities:

Governments:
Armenia
Austria
Azerbaijan
Canada
China
Colombia
Costa Rica
Côte d'Ivoire
Cuba
Dominica
Dominican Republic
Ecuador
Egypt
Georgia
Hungary
India
Japan
Kazakhstan
Latvia
Lesotho
Malta
Mauritius
Mexico
Nigeria
Pakistan
Philippines
Portugal
Russian Federation
Saudi Arabia
Sri Lanka
Sweden
Switzerland
Trinidad and Tobago
United Kingdom
United States of America
Zambia
State of Palestine

Civil Society:
Access
Agencia LatinoAmericana de Informacion (ALAI)
Anais_AC
Association for Progressive Communications (APC)
Association for Proper Internet Governance (APIG)
Austrian Computer Society (OCG)
Center for Democracy & Technology
EU Kids Online
International Federation of Library Associations and Institutions (IFLA)
Just Net Coalition (JNC)
LIRNEasia
Native Public Media
Observatory for Cultural and Audiovisual Communication in the Mediterranean (OCCAM)
Paradigm Initiative Nigeria
Web Foundation - A4AI
World Federation of the Deaf, Expert Group on Accessibility and Technology
World Summit Award - International Center for New Media

Technical and Academic Communities:
African Academy of Sciences
David Townsend & Associates
ICANN
ICT4 Peace Foundation
Japan Registry Services Co., Ltd.
Mr. John Laprise
The Internet Society
Vienna Centre for Legal Informatics

Private Sector:
Africa ICT Alliance (AfICTA)
eNotus
GSMA
Intel
Nahak Overseas Ltd
Nominet
Telefónica S.A.
The US Council for International Business (USCIB)

International and Intergovernmental Organizations:
Economic and Social Commission for Asia and the Pacific (ESCAP)
Economic and Social Commission for Western Asia (ESCWA)
Economic Commission for Latin America and the Caribbean (ECLAC)
European Commission Services and European External Action Service (EEAS)
Food and Agriculture Organization of the United Nations (FAO)
International Telecommunication Union (ITU)
International Trade Centre (ITC)
Organisation for Economic Co-operation and Development (OECD)
UN Women
United Nations Children's Fund (UNICEF)
United Nations Department of Economic and Social Affairs (DESA)
United Nations Development Fund (UNDP)
United Nations Educational, Scientific and Cultural Organization (UNESCO)
United Nations High Commissioner for Refugees (UNHCR)
World Health Organization (WHO)
World Intellectual Property Organization (WIPO)
World Meteorological Organization (WMO)
World Trade Organization (WTO)

Others:
CSTD Gender Advisory Board
Finnish WSIS-multi-stakeholder Community
Mr. Laurent Straskraba
Mr. Nick Thorne
The United Methodist Church

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