

Academy of ICT Essentials for Government Leaders

Module 1

The Linkage between ICT Applications and Meaningful Development

Usha Rani Vyasulu Reddi

The Academy of ICT Essentials for Government Leaders Module Series

Module 1: The Linkage between ICT Applications and Meaningful Development

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FOREWORD

The world we live in today is inter-connected and fast-changing, largely due to the rapid development of information and communication technologies (ICTs). As the World Economic Forum fittingly states, ICTs represent our “collective nerve system”, impacting and connecting every fabric of our lives through intelligent, adaptive and innovative solutions. Indeed, ICTs are tools that can help solve some of our economic, social and environmental challenges, and promote more inclusive and sustainable development.

The increased access to information and knowledge through development of ICT has the potential to significantly improve the livelihoods of the poor and marginalized, and promote gender equality. ICTs can serve as a bridge connecting people from different countries and sectors in the region and beyond by providing more efficient, transparent and reliable means and platforms for communication and cooperation. ICTs are essential to the connectivity that facilitates more efficient exchange of goods and services. Success stories from Asia and the Pacific region abound: e-government initiatives are improving access to and quality of public services, mobile phones are generating incomes and professional opportunities for women and the voices of the vulnerable are louder than ever through the power of social media.

Yet, the digital divide in Asia and the Pacific is still seen to be one of the widest in the world. This is evidenced by the fact that the countries of the region are placed across the whole spectrum of the global ICT Development Index ranking. Despite the impressive technological breakthroughs and commitments of many key players in the region, access to basic communication is still not assured for all.

In order to complete the bridging of the digital divide, policymakers must be committed to further realizing the potential of ICTs for inclusive socio-economic development in the region. Towards this end, the Asian and Pacific Training Centre for Information and Communication Technology for Development (APCICT) was established as a regional institute of the United Nations Economic and Social Commission for Asia and the Pacific (UN/ESCAP) on 16 June 2006 with the mandate to strengthen the efforts of the 62 ESCAP member and associate member countries to use ICT in their socio-economic development through human and institutional capacity development. APCICT’s mandate responds to the Declaration of Principles and Plan of Action of the World Summit on the Information Society (WSIS), which states that: “Each 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.”

In order to further respond to this call to action, APCICT has developed a comprehensive information and communication technology for development (ICTD) training curriculum, the *Academy of ICT Essentials for Government Leaders*. Launched in 2008 and based on strong demand from member States, the *Academy* presently consists of 10 stand-alone but interlinked modules that aim to impart essential knowledge and expertise to help policymakers plan and implement ICT initiatives more effectively. Widespread adoption of the *Academy* programme throughout Asia-Pacific attests to the timely and relevant material covered by these modules.

ESCAP welcomes APCICT's ongoing effort to update and publish high quality ICTD learning modules reflecting the fast-changing world of technology and bringing the benefits of ICTD knowledge to national and regional stakeholders. Moreover, ESCAP, through APCICT, is promoting the use, customization and translation of these *Academy* modules in different countries. It is our hope that through their regular delivery at national and regional workshops for senior- and mid-level government officials, the acquired knowledge would be translated into enhanced awareness of ICT benefits and concrete actions towards meeting national and regional development goals.

Noeleen Heyzer

Under-Secretary-General of the United Nations
and Executive Secretary of ESCAP

PREFACE

In the effort to bridge the digital divide, the importance of developing the human resource and institutional capacity in the use of ICTs cannot be underestimated. In and of themselves, ICTs are simply tools, but when people know how to effectively utilize them, ICTs become transformative drivers to hasten the pace of socio-economic development and bring about positive changes. With this vision in mind, the *Academy of ICT Essentials for Government Leaders (Academy)* was developed.

The *Academy* is the flagship programme of the United Nations Asian and Pacific Training Centre for Information and Communication Technology for Development (APCICT), and is designed to equip government officials with the knowledge and skills to fully leverage ICT for socio-economic development. The *Academy* has reached thousands of individuals and hundreds of institutions throughout the Asia-Pacific and beyond since its official launch in 2008. The *Academy* has been rolled out in over 20 countries in the Asia-Pacific region, adopted in numerous government human resource training frameworks, and incorporated in the curricula of university and college programmes throughout the region.

The impact of the *Academy* is in part a result of the comprehensive content and targeted range of topics covered by its eight initial training modules, but also due to the *Academy's* ability to configure to meet local contexts and address emerging socio-economic development issues. In 2011, as a result of strong demand from countries in the Asia-Pacific, APCICT in partnership with its network of partners developed two new *Academy* training modules designed to enhance capacity in the use of ICT for disaster risk management and climate change abatement.

Adhering to APCICT's "We D.I.D. It In Partnership" approach, the new *Academy* modules 9 and 10, like the initial modules 1 to 8, were Developed, Implemented and Delivered in an inclusive and participatory manner, and systematically drew upon an extensive and exceptional group of development stakeholders. The entire *Academy* has been based on: needs assessment surveys from across the Asia-Pacific region; consultations with government officials, members of the international development community, and academics and educators; research and analysis on the strengths and weaknesses of existing training materials; and a peer review process carried-out through a series of APCICT organized regional and sub-regional workshops. These workshops provided invaluable opportunities for the exchange of experiences and knowledge among users of the *Academy* from different countries. The result is a comprehensive 10-module *Academy* curriculum covering a range of important ICTD topics, and indicative of the many voices and contextual nuances present across the region.

APCICT's inclusive and collaborative approach to development of the *Academy* has also created a network of strong partnerships to facilitate the delivery of ICTD training to government officials, policymakers and development stakeholders throughout the Asia-Pacific region and beyond. The *Academy* continues to be rolled out and adopted into training frameworks at the national and regional levels in different countries and regions as a result of close collaboration between APCICT and training institutions, government agencies, and regional and international organizations. This principle will continue to be a driving force as APCICT works with its partners to continuously update and further localize the *Academy* material, develop new *Academy* modules to address identified needs, and extend the reach of *Academy* content to new target audiences through new and more accessible mediums.

Complementing the face-to-face delivery of the *Academy* programme, APCICT has also developed an online distance learning platform called the APCICT Virtual Academy (<http://e-learning.unapcict.org>), which is designed to enable participants to study the material at their own pace. The APCICT Virtual Academy ensures that all the *Academy* modules and accompanying materials are easily accessible online for download, dissemination, customization and localization. The *Academy* is also available on DVD to reach those with limited or no Internet connectivity.

To enhance accessibility and relevance in local contexts, APCICT and its partners have collaborated to make the *Academy* available in English, Bahasa Indonesia, Mongolian, Myanmar language, Russian, Tajik and Vietnamese, with plans to translate the modules into additional languages.

Clearly, the development and delivery of the *Academy* would not have been possible without the commitment, dedication and proactive participation of many individuals and organizations. I would like to take this opportunity to acknowledge the efforts and achievements of our partners from government ministries, training institutions, and regional and national organizations who have participated in *Academy* workshops. They not only provided valuable inputs to the content of the modules, but more importantly, they have become advocates of the *Academy* in their countries and regions, and have helped the *Academy* become an important component of national and regional frameworks to build necessary ICT capacity to meet the socio-economic development goals of the future.

I would like to extend heartfelt acknowledgments to the dedicated efforts of the many outstanding contributors who have made Module 1 possible, with a special note of gratitude to module author Usha Rani Vyasulu Reddi. I would also like to thank the more than 7,500 participants that have attended over 100 *Academy* workshops in over 20 countries, and whose invaluable insight and feedback have helped to make sure that the *Academy* has had a lasting impact.

I sincerely hope that the *Academy* will continue to help nations narrow ICT human resource gaps, remove barriers to ICT adoption, and promote the application of ICT in accelerating socio-economic development and achieving the Millennium Development Goals.

Hyeun-Suk Rhee

Director
UN-APCICT/ESCAP

ABOUT THE MODULE SERIES

In today's "Information Age", easy access to information is changing the way we live, work and play. The "digital economy", also known as the "knowledge economy", "networked economy" or "new economy", is characterized by a shift from the production of goods to the creation of ideas. This underscores the growing, if not already central, role played by information and communication technologies (ICTs) in the economy and in society as a whole.

As a consequence, governments worldwide have increasingly focused on ICTs for development (ICTD). For these governments, ICTD is not only about developing the ICT industry or sector of the economy but also encompasses the use of ICTs to engender economic as well as social and political growth.

However, among the difficulties that governments face in formulating ICT policy is that policymakers are often unfamiliar with the technologies that they are harnessing for national development. Since one cannot regulate what one does not understand, many policymakers have shied away from ICT policymaking. But leaving ICT policy to technologists is also wrong because often technologists are unaware of the policy implications of the technologies they are developing and using.

The *Academy of ICT Essentials for Government Leaders* module series has been developed by the UN-APCICT/ESCAP for:

1. Policymakers at the national and local government level who are responsible for ICT policymaking;
2. Government officials responsible for the development and implementation of ICT-based applications; and
3. Managers in the public sector seeking to employ ICT tools for project management.

The module series aims to develop familiarity with the substantive issues related to ICTD from both a policy and technology perspective. The intention is not to develop a technical ICT manual but rather to provide a good understanding of what the current digital technology is capable of or where technology is headed, and what this implies for policymaking. The topics covered by the modules have been identified through a training needs analysis and a survey of other training materials worldwide.

The modules are designed in such a way that they can be used for self-study by individual readers or as a resource in a training course or programme. The modules are standalone as well as linked together, and effort has been made in each module to link to themes and discussions in the other modules in the series. The long-term objective is to make the modules a coherent course that can be certified.

Each module begins with a statement of module objectives and target learning outcomes against which readers can assess their own progress. The module content is divided into sections that include case studies and exercises to help deepen understanding of key concepts. The exercises may be done by individual readers or by groups of training participants. Figures and tables are provided to illustrate specific aspects of the discussion. References and online resources are listed for readers to look up in order to gain additional perspectives.

The use of ICTD is so diverse that sometimes case studies and examples within and across modules may appear contradictory. This is to be expected. This is the excitement and the challenge of this newly emerging discipline and its promise as all countries begin to explore the potential of ICTs as tools for development.

Supporting the *Academy* module series in print format is an online distance learning platform—the APCICT Virtual Academy—with virtual classrooms featuring the trainers’ presentations in video format and presentation slides of the modules (visit <http://e-learning.unapcict.org>).

In addition, APCICT has developed an e-Collaborative Hub for ICTD, or e-Co Hub (<http://www.unapcict.org/ecohub>), a dedicated online site for ICTD practitioners and policymakers to enhance their learning and training experience. The e-Co Hub gives access to knowledge resources on different aspects of ICTD and provides an interactive space for sharing knowledge and experiences, and collaborating on advancing ICTD.

MODULE 1

The linkage between information and communication technologies (ICTs) and the achievement of the Millennium Development Goals (MDGs) appears at times clear and at other times fuzzy. But the linkage exists and it merits elaboration and explanation. This module invites readers to explore the various dimensions of the linkage through case studies of ICT applications in key sectors of development in Asia-Pacific countries. The module also highlights key issues and decision points, from policy to implementation, in the use of ICTs to meet development needs. The aim is to foster a better understanding of how ICTs can be used for social and economic development, and to equip policymakers and programme managers with a development-oriented framework for ICT-based and ICT-supported interventions in a range of social sectors.

Module Objectives

The module aims to:

1. Argue the case for ICTs in development;
2. Describe the macro relationship between human development and ICTs;
3. Foster a better understanding of how ICTs can be used to achieve social and economic development; and
4. Provide a development-oriented framework for ICT-based and ICT-supported projects and interventions in a range of social sectors.

Learning Outcomes

After working on this module, readers should be able to:

1. Provide a rationale for the use of ICTs to achieve development goals;
2. Cite and discuss examples of ICT applications in key sectors of development, in particular poverty alleviation, agriculture, education, health, gender, government and governance, and disaster and risk management;
3. Discuss challenges in the effective application of ICTs for development; and
4. Discuss key factors in the design and implementation of ICT for development programmes and projects.

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Acronyms

ABIA	Annual Bibliography of Indian Archaeology
ADPC	Asian Disaster Preparedness Center
AIDS	Acquired Immunodeficiency Syndrome
APC	Association for Progressive Communications (Philippines)
APCICT	Asian and Pacific Training Centre for Information and Communication Technology for Development
APDIP	Asia-Pacific Development Information Programme (UNDP)
AusAID	Australian Agency for International Development
BPoA	Barbados Programme of Action
ENRAP	Electronic Networking for Rural Asia/Pacific
ESCAP	Economic and Social Commission for Asia and the Pacific (UN)
FOSS	Free and Open Source Software
GDP	Gross Domestic Product
GEM	Gender Evaluation Methodology
GeoCMS	Geospatial Content Management System
GIS	Geographic Information System
HDI	Human Development Index
HDR	Human Development Report
HINARI	Health InterNetwork Access to Research Initiative
HIV	Human Immunodeficiency Virus
HPI	Human Poverty Index
ICT	Information and Communication Technology
ICTD	Information and Communication Technology for Development
IDRC	International Development Research Centre (Canada)
IFAD	International Fund for Agricultural Development
IGNCA	Indira Gandhi National Centre for the Arts (India)
IMF	International Monetary Fund
IT	Information Technology
ITES	Information Technology Enabled Services
ITU	International Telecommunication Union
KADO	Karakoram Area Development Organization (Pakistan)
LDC	Least Developed Country
MDG	Millennium Development Goal
MIGIS	Mobile Interactive Geographic Information System (China)
MIS	Management Information System
NFE	Non-Formal Education
OCHA	Office for the Coordination of Humanitarian Affairs (UN)
OECD	Organisation for Economic Co-operation and Development
OTOP	One Tambon One Product (Thailand)
PC	Personal Computer
PFnet	People First Network (Solomon Islands)
PIC	Public Internet Centre (Mongolia)
PPP	Public-Private Partnership
RML	Reuters Market Light
SARS	Severe Acute Respiratory Syndrome
SIDS	Small Island Developing States
SIDSnet	Small Island Developing States Network
SME	Small and Medium Enterprise

SMS	Short Message Service
SOPAC	SPC Applied Geoscience and Technology Division (formerly Pacific Islands Applied Geoscience Commission)
SPC	Secretariat of the Pacific Community
TEIN2	Trans-Eurasian Information Network 2
TEWS	Tsunami Early Warning System
TV	Television
UN	United Nations
UNDP	United Nations Development Programme
UNESCO	United Nations Educational, Scientific and Cultural Organization
UNFCCC	United Nations Framework Convention on Climate Change
UNICEF	United Nations Children's Emergency Fund
UNOPS	United Nations Office for Project Services
VoIP	Voice over Internet Protocol
VP	Village Phone (Bangladesh)
VUSSC	Virtual University for Small States of the Commonwealth
WHO	World Health Organization
WNSP	Women's Network Support Programme (APC)
WSIS	World Summit on the Information Society

List of Icons



Case Study



Questions To Think About



Something To Do



Test Yourself

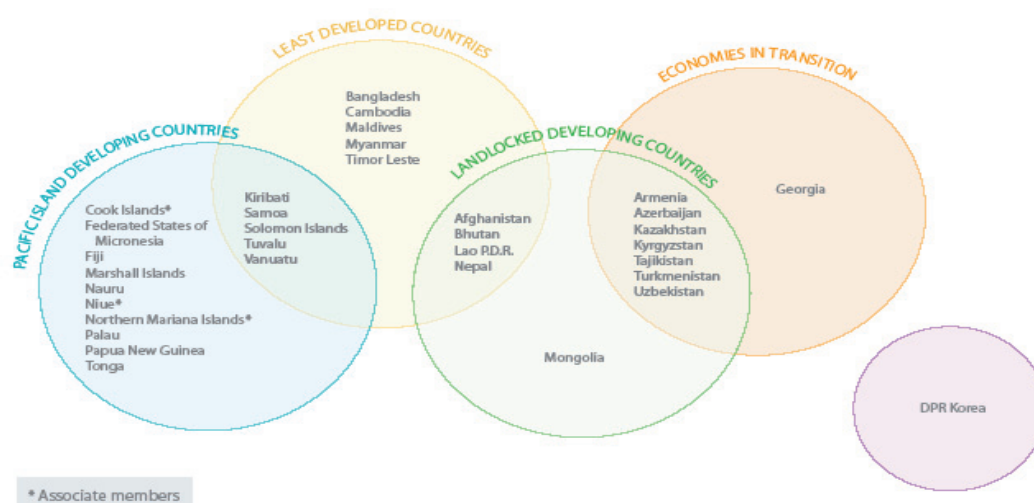
1. INTRODUCTION

The Asia-Pacific region is home to about a quarter of the world's population. Compared to the rest of the world, this region has the greatest diversity, with the oldest as well as the youngest civilizations, and the most populous states on continental Asia as well as the sparse and distant island countries of the Pacific. People of all races, ethnicities, and religions live here, and amidst great wealth there is also intimidating poverty. In this region the world's fastest growing economies coexist with the least developed countries and with countries in transition. The Asia-Pacific region also has the fastest growing telecommunications market.

The challenge of development that the Asia-Pacific region poses to the global community of donors, development agencies and practitioners is massive. There is no one-size-fits-all, and a solution that works admirably in one country can fail miserably in another part of the same region.

For this reason, there is a critical need to segment the region's countries on the basis of some common parameters and subsequently look for innovative ways of addressing the challenges of development. Through the targets 13 and 14 of Millennium Development Goal (MDG) #8 the global community has been charged with the special responsibility of addressing the special needs of island, mountainous, landlocked and least developed countries. More than half of the Asia-Pacific region comprises of "countries with special needs". These countries with special needs include the least developed countries (LDCs), landlocked developing countries, Pacific island developing countries and economies in transition. They not only face the problem of extreme poverty but also problems resulting from limited human resources, an economy vulnerable to exogenous changes, and remote geographical location. The United Nations Economic and Social Commission for Asia and the Pacific (ESCAP) has identified these countries as its priority for development assistance and is focusing its attention on them.

Figure 1. ESCAP high-priority countries



Despite their diversity, the high-target countries face common problems. They are small in size and population, they have small markets, and they have limited human, technical and/or natural resources. Both island states and remote mountain communities are exposed to major environmental changes and disaster risks such as tsunamis and earthquakes, floods and landslides. The threat of climate change on their fragile ecosystems was poignantly highlighted by countries such as Maldives and Nepal when they held their government meetings in 2009¹ underwater and in the higher reaches of the Himalayan Mountains, respectively. Politically, these countries are increasingly conscious of their vulnerability and fear that in the absence of a critical mass they could easily become marginalized and dependent upon the technologies, systems, goods, services and materials developed by the larger and more successful states. At the same time, they recognize that they cannot afford to be left out of the mainstream of international growth and development.

There is a need therefore to find innovative approaches and solutions to address the developmental needs of the high-target countries. In the era of the knowledge society, cutting-edge applications of information and communication technologies (ICTs) make possible such innovative approaches and out-of-the-box solutions.

This module views the problems of development in the high-target countries through the prism of ICT applications, particularly computer, Web-based, mobile and digital technologies.² The module seeks to establish the link between the application of ICTs and the achievement of a country's human development goals, and to argue for the wise and meaningful application of ICT for development (ICTD). It is important to note at the outset, however, that there is no one way of using ICTs to address these goals. Each country must determine its own goals, objectives, strategies and pathways to implementation. The module simply introduces readers to the linkage between the goals and the strategies, and suggests ways of applying these strategies more effectively.

The section that follows this introduction provides an overview of human development and introduces the ICTs. The next section describes ICT applications in various sectors of development. While the development sectors are discussed separately, it is important to remember that applications in one sector, say in education, has inter-linkages with other sectors and will have spin-off benefits for other sectors. The final section of the module provides insights into the broad challenges that confront programme and project implementation. This section is particularly important for those engaged in the task of project implementation.

The module is meant to provide a general background to the issues under discussion. Subsequent modules address key issues in detail. Thus, while some may find the information new, others may find it rudimentary. There is also, for pedagogical purposes, some redundancy built into the module and in the series of which this module is a part. This is the nature of this complex field where the same issue can be explored from different perspectives and dimensions, making it all the more challenging and interesting.

1 See The Telegraph, "Maldives Government Holds Underwater Cabinet Meeting", (17 October 2009), <http://www.telegraph.co.uk/news/newstopics/howaboutthat/6356036/Maldives-government-holds-underwater-cabinet-meeting.html>; and CNN, "Everest Hosts Nepal Cabinet Meeting", (4 December 2009), http://articles.cnn.com/2009-12-04/world/everest.cabinet.meeting_1_everest-region-ministers-himalayas?_s=PM:WORLD.

2 Older heritage technologies such as radio and TV will be discussed only in so far as they are integrated with digital technologies.

2. HUMAN DEVELOPMENT AND ICTS: THE BIG PICTURE

This section aims to:

- Review the region's progress toward achieving development goals, with the MDGs as milestones;
- Describe the key features of ICTs; and
- Provide an overview of how the strategic use of ICTs can help address problems of development.

2.1 Human Development in Brief

Current development perspectives originated from the post World War II era when the term “development” was used as part of a rationale for post-war reconstruction in Europe and the “underdeveloped parts” of the world. These perspectives also emerged from the immediate post-colonial experience where most of the newly independent countries of Asia and Africa were, according to Western values, left far behind in terms of progress.

Much of the policy and advocacy of the World Bank Group of Institutions, including the International Monetary Fund (IMF), has been based on this economic theory since their formation in the post World War II era. Over time, new paradigms emerged, such as the Washington Consensus,³ structural adjustments, and a view that poverty could essentially be alleviated through increased private sector generated growth. Many countries adopted the economic reforms proposed in the Washington Consensus with varying results, but there was extensive criticism of the social and political consequences of such reform, especially in the context of growing globalization. The Asian financial crisis of the 1990s and more recently, the 2008 global economic crisis, ended the era of the belief that economic change through private sector led growth could, by itself, trigger development.

Other criticisms of these early approaches also quickly emerged. Macro level statistics collected in many countries often hid the ground realities. Improved economic growth did not necessarily lead to the eradication of poverty; instead it sometimes led to greater inequalities in the distribution of income. Empirical evidence continued to point to the failure of growth theories to alleviate poverty and reduce hunger. Instead, there were often high growth rates alongside large scale poverty and deprivation, inequalities, social disorder and environmental degradation. The dissatisfaction of countries with existing theories of development came from a realization that these theories did not really address or translate into improving the quality of people's lives. Human rights groups and grass-roots movements continuously drew attention to the failure of economic models to address core issues concerning people all over the world, and especially in the poor, developing countries.

Concurrent to all the activity in development discourse and practice taking place throughout the 1970s, 1980s and the 1990s, in the work of eminent economists and thinkers, Mahbub ul

³ The term **Washington Consensus** most commonly refers to an orientation towards free market policies that from about 1980-2008 was influential among mainstream economists, politicians, journalists and global institutions like the IMF and the World Bank. The term can refer to market friendly policies that were generally advised and implemented both for advanced and emerging economies. See http://en.wikipedia.org/wiki/Washington_Consensus.

Haq⁴ and Amartya Sen,⁵ a new paradigm on development emerged that looked at the process of development through a more people-centred and humane approach. Mahbub ul Haq argued in his seminal publication, *Reflections on Human Development*⁶ that increase in income is to be treated as an essential means, but not as the end of development, and certainly not as the sum of human life. Haq offered a new vision of human security for the twenty-first century where real security is equated with security of people in their homes, their jobs, their communities, and their environment. Haq is known as the father of the Human Development Reports (HDRs) published annually by the United Nations Development Programme (UNDP).

The failure of economic models to address issues relating to development led to the search for a new approach that placed people at the centre of the development process. The UNDP “human development” approach, based on the work of Haq and Sen, has both interest and merit because it stresses human well-being as an end for any process of economic and social development. It does so by overturning the view that focuses on material progress as the sole end. Instead, the new approach focuses on the well-being of individuals as the ultimate objective.

The basic purpose of development is to enlarge people’s choices. In principle, these choices can be infinite and can change over time. People often value achievements that do not show up at all, or not immediately, in income or growth figures: greater access to knowledge, better nutrition and health services, more secure livelihoods, security against crime and physical violence, satisfying leisure hours, political and cultural freedoms and sense of participation in community activities. The objective of development is to create an enabling environment for people to enjoy long, healthy and creative lives.

Mahbub ul Haq (1934-1998)
Founder of the Human Development Report

Source: UNDP, “The Human Development Concept”, <http://hdr.undp.org/en/humandev>.

This approach is called the human development approach and focuses on development within a human rights framework. According to this framework, every individual has basic rights, including economic, cultural, social, political and civil. And in order to exercise these rights, every individual consequently has a right to access to education, health care and a safe environment regardless of their nationality, ethnicity, religion, gender, language or any other consideration.

Human development is measured by the Human Development Index (HDI). The HDI is the way in which countries are described and ranked in terms of their development levels. The HDR, which has been published annually since 1990 by UNDP, is intended to open the development debate through well researched scientific and policy analyses and thematic presentations followed by recommendations for action.

The HDRs are based on five development indices—the HDI; the Human Poverty Index 1 (HPI 1) for developing countries and HPI 2 for selected member countries of the Organisation for Economic Co-operation and Development (OECD); the Gender Related Development Index; and the Gender Empowerment Measure. Each of these is developed using different dimensions and indicators.⁷

4 A world renowned Pakistani economist whose work focused on social realities and who is acknowledged as the originator of the Human Development Index.

5 Amartya Sen is the Nobel laureate whose perspectives on development as freedom underpins current development theory and approaches in the MDGs today.

6 Mahbub ul Haq, *Reflections on Human Development* (Oxford University Press, 1995).

7 For a detailed explanation of how the calculations are done, see UNDP, “Technical Note 1: Calculating the human development indices”, in *Human Development Report 2007/2008* (New York, 2007), http://hdr.undp.org/en/media/HDR_20072008_Tech_Note_1.pdf.

The HDI is the average of measures of three indices: life expectancy, education/literacy, and standard of living. It is purported to be a way of comparing the level of development of a particular group of people (as in, developed, developing, underdeveloped) based on the availability of options—the logic is that the more developed a group of people are, the more options are available to them).

To study change and progress in different countries, it is not enough to look only at one year's report. Which is why a look at the composite trends from 1970 to 2010, as analysed in the HDR 2010, is useful and sheds light on important trends. Table 1 shows the composite trends in the HDI from 1970 to 2010.

Table 1. Trends in HDI, 1970-2010

Trends in the hybrid HDI and components by regional and HDI groups, 135 countries, 1970–2010

	Hybrid HDI			Life expectancy			Literacy			Gross enrolment			Income		
	Value	% change		Value	% change		Value	% change		Value	% change		Value	% change	
	2010	1970–2010	1990–2010	2010	1970–2010	1990–2010	2010	1970–2010	1990–2010	2010	1970–2010	1990–2010	2010	1970–2010	1990–2010
Regional groups															
Developing countries	0.64	57	23	68	21	8	81	61	21	66	28	24	5,873	184	89
Arab States	0.66	65	20	70	37	10	74	149	41	64	89	22	8,603	66	44
East Asia and the Pacific	0.71	96	35	73	23	9	94	76	18	69	7	31	6,504	1,183	352
Europe and Central Asia	0.75	13	4	69	3	2	97	7	2	82	17	7	11,866	120	20
Latin America and the Caribbean	0.77	32	12	74	24	9	92	27	10	83	59	16	11,092	88	42
South Asia	0.57	72	31	65	33	12	66	113	46	59	64	29	3,398	162	119
Sub-Saharan Africa	0.43	53	21	52	19	7	65	183	43	54	109	42	1,466	20	28
Developed countries	0.89	18	7	80	13	6	99	2	1	92	33	14	37,185	126	38
OECD	0.89	18	7	80	13	6	99	2	1	93	33	14	37,105	125	38
Non-OECD	0.86	24	9	80	14	7	96	13	6	79	29	10	40,043	263	58
HDI groups															
Low	0.44	61	27	55	27	11	63	180	48	52	98	43	1,434	33	44
Medium	0.65	83	31	69	25	9	82	79	24	65	21	28	5,010	606	237
High	0.77	24	9	73	15	7	93	20	8	82	38	13	12,610	94	35
Very high	0.89	18	7	80	13	6	99	2	1	92	33	14	37,185	126	38
1970 hybrid HDI quartiles															
1 (lowest)	0.60	82	32	66	22	8	76	96	29	61	23	33	4,323	560	250
2	0.69	51	16	71	34	11	88	53	15	74	55	16	7,334	110	53
3	0.79	24	9	75	15	6	96	11	4	85	36	16	14,486	152	54
4 (highest)	0.88	16	6	79	11	5	99	1	0	91	29	11	34,585	122	36
World average	0.68	41	18	70	18	7	83	39	15	70	26	20	10,645	107	47

Note: All values are population weighted. Life expectancy is in years, literacy and gross enrolment are in percentages and income is in purchasing power parity 2008 US dollars. See *Definitions of statistical terms* for more detailed descriptions. The sample covers 135 countries, and thus the group aggregates may differ from those presented in statistical tables 1–17. The hybrid HDI is distinct from the 2010 HDI reported in statistical tables 1 and 2: it uses the same functional form but a different set of indicators that are available over a longer time period (see box 2.1). HDI groups are based on the 2010 HDI. Source: HDRO calculations using data from the HDRO database.

Source: UNDP, *Human Development Report 2010 – 20th Anniversary Edition: The Real Wealth of Nations – Pathways to Human Development*, (New York, UNDP, 2010), p. 28, <http://hdr.undp.org/en/reports/global/hdr2010/>.

By simply looking at the percentage of change between 1970 and 2010 in the Asia-Pacific region, you will see that there have been improvements in all dimensions of human development in life expectancy, literacy and income levels. However, the gap between developed countries and developing countries remains high. In summarizing these indexes, the *Human Development Report 2010* stated that:

The past 20 years have seen substantial progress in many aspects of human development. Most people today are healthier, live longer, are more educated and have more access to goods and services. Even in countries facing adverse economic conditions, people's health and education have greatly improved. And there has been

progress not only in improving health and education and raising income, but also in expanding people's power to select leaders, influence public decisions and share knowledge.⁸

Adding a word of caution, the HDR also stated that:

Yet not all sides of the story are positive. These years have also seen increasing inequality—both within and across countries—as well as production and consumption patterns that have increasingly been revealed as unsustainable. Progress has varied, and people in some regions—such as Southern Africa and the former Soviet Union—have experienced periods of regress, especially in health. New vulnerabilities require innovative public policies to confront risk and inequalities while harnessing dynamic market forces for the benefit of all.⁹

Since the 1990s, other international and multilateral agencies have also been producing annual reports on various development themes based on their areas of work and operation.¹⁰

The human development approach has changed the way that the world currently looks at development. This view is reflected both at international debates and underscores the commitment given by the global community to actively pursue development. In the current global scenario, it is hard to find a national constitution that does not guarantee equal rights for all its citizens regardless of ethnicity, sex, gender, colour, religious beliefs, political leanings, social and economic status, etc.

The Significance of the MDGs

The adoption of the Millennium Declaration in 2000 and the Millennium Development Goals (MDGs) by all 189 member States of the United Nations General Assembly was a watershed in global cooperation. While the importance of human development had been reiterated for decades and at various platforms and global conferences, it was the first time that all stakeholders—countries and governments, donor and development agencies, non-governmental and civil society organizations—acknowledged that unless they arrived at a common understanding and commitment, the goal of equitable development would never be reached.

The MDGs (box 1) are the most broadly supported and the most specific poverty reduction strategies that the global community has articulated and championed. For the international system consisting of donor and technical aid agencies, the goals constitute a common agenda for development assistance. Each of the eight goals has specific targets, all equally important, that countries will seek to meet as part of the progress toward achieving the goals by the year 2015.

For nation-states, the MDGs mean a commitment to internationally agreed upon minimum standards of development against which their performance will be measured. If the goals are met, it will mean that more than 1 billion people living in poverty and deprivation will have a means to a life of dignity and freedom.

Some countries, as part of their national priorities, have added additional goals to be achieved, or have added a few more years to the achievement of their individual MDGs. For instance,

8 UNDP, *Human Development Report 2010 – 20th Anniversary Edition: The Real Wealth of Nations – Pathways to Human Development* (New York, 2010), p. 1, <http://hdr.undp.org/en/reports/global/hdr2010>.

9 Ibid.

10 Almost all the United Nations agencies and those of the World Bank group publish annual reports on various development themes. For instance, UNICEF brings out a State of the World's Children report; while UNESCO brings out a similar report on education; and the ITU brings out the annual ICT Development Report.

Cambodia has added a Goal (Goal 9: De-mining, unexploded ordinance and victim assistance, which is an important factor for poverty reduction in Cambodia);¹¹ and Afghanistan, which has added “enhanced security” as Goal 9 and has defined its contribution as targets for 2020.¹²

Box 1. Millennium Development Goals and Targets

Goal 1: Eradicate Extreme Poverty and Hunger

Target 1: Halve, between 1990 and 2015, the proportion of people whose income is less than USD 1 a day

Target 2: Halve, between 1990 and 2015, the proportion of people who suffer from hunger

Goal 2: Achieve Universal Primary Education

Target 3: Ensure that, by 2015, children everywhere, boys and girls alike, will be able to complete a full course of primary schooling

Goal 3: Promote Gender Equality and Empower Women

Target 4: Eliminate gender disparity in primary and secondary education preferably by 2005 and in all levels of education no later than 2015

Goal 4: Reduce Child Mortality

Target 5: Reduce by two-thirds, between 1990 and 2015, the under-five mortality rate

Goal 5: Improve Maternal Health

Target 6: Reduce by three-quarters, between 1990 and 2015, the maternal mortality rate

Goal 6: Combat HIV/AIDS, Malaria, and Other Diseases

Target 7: Have halted by 2015, and begun to reverse, the spread of HIV/AIDS

Target 8: Have halted by 2015, and begin to reverse, the incidence of malaria and other major diseases

Goal 7: Ensure Environmental Sustainability

Target 9: Integrate the principles of sustainable development into country policies and programmes to reverse the loss of environmental resources

Target 10: Halve, by 2015, the proportion of people without sustainable access to safe drinking water

Target 11: By 2020, to have achieved a significant improvement in the lives of at least 100 million slum dwellers

Goal 8: Develop a Global Partnership for Development

Target 12: Develop further an open rule-based, predictable, non-discriminatory trading and financial system

Target 13: Address the special needs of the LDCs

Target 14: Address the special needs of land-locked countries and Small Island Developing States (through the Programme of Action for the Sustainable Development of Small Island Developing States and the outcome of the 22nd Special Session of the General Assembly)

Target 15: Deal comprehensively with the debt problems of developing countries through national and international measures in order to make debt sustainable in the long term

Target 16: In cooperation with the developing countries, develop and implement strategies for decent and productive work for youth

Target 17: In cooperation with pharmaceutical companies, provide access to affordable, essential drugs in developing countries

Target 18: In cooperation with the private sector, make available the benefits of new technologies, especially information and communications

Source: UNDP, Regional Human Development Report – Promoting ICT for Human Development in Asia: Realising the Millennium Development Goals (New Delhi, UNDP, Elsevier, 2005), <http://www.apdip.net/eLibrary#rhdr>.

11 UNDP, “What are the Cambodia Millennium Development Goals”, <http://www.un.org.kh/undp/mdgs/cambodian-mdgs/what-are-the-cambodia-millennium-development-goals>.

12 See UNDP, “Millennium Development Goals in Afghanistan”, <http://www.undp.org.af/MDGs/index.htm>.

Also part of the global commitment is a strategy and plan of action that requires programmes at global and national levels supported by activities at the regional level. At the global level is the United Nations system that will work toward the achievement of the goals through core elements such as monitoring, analysis, campaign and mobilization, and operational activities. At the national level, it is essential that there be enabling policy frameworks, partnerships, country studies and activities pursued through the policy dialogue and country-driven strategy-setting process envisaged in the Poverty Reduction Strategy Papers¹³ or other similar national plans and strategies.

Progress on the MDGs

There have been several reviews of global and regional progress in meeting the targets. The East Asia and the Pacific region is progressing well in many areas, particularly in education, gender parity and access to safe drinking water. South Asia is also closing the development gap. Its performance is encouraging for primary education completion, gender parity, maternal mortality and access to safe drinking water, although performance needs to improve for extreme poverty and hunger. Moreover, infant mortality is still high and HIV/AIDS prevalence continues to rise. And environmental degradation continues to be a cause for concern.

Although there are similarities across the entire Asia-Pacific region, in the ESCAP high-target countries contrasts need to be identified and described. The LDCs still have the region's highest rates of child and maternal mortality and tuberculosis. Central Asian countries are regressing on health-related targets and their progress in reducing child mortality is slow. Progress is also slow in the provisioning of clean water and basic sanitation. Data gaps are still making it difficult to assess progress in the Pacific subregion but the main areas of concern are similar to those in Central Asia. China and India are showing impressive progress towards achieving the goals but have huge intra-country disparities. The global economic crisis of 2008 has adversely impacted progress toward achievement of the MDGs in many parts of the world.¹⁴ Recovery from the crisis has been slow and the outlook for achievement of many of the goals in the developing countries is cause for serious concern. At the same time, there is also room for optimism with vast improvements in some basic sectors such as education and gender equality.

Close to the target year of 2015, what is important is that the MDGs are seen as milestones rather than as end posts or final goals in themselves. These goals may or may not be achieved by 2015; yet, they will remain to serve as a road map towards development. The crossing of the target date of 2015 will not diminish their importance as commitments from a global community to address human development goals.

There has also been, in many countries, a rethinking and re-evaluation of human development goals. While in the early years of the twenty-first century, the focus was largely on expanding access and improving service delivery, e.g. improving enrolments in schools or access to basic health care for many, attention has shifted to equally important development concepts such as inclusive growth, equity, quality, participation and accountability.

Inclusive growth refers to both a rapid and sustained poverty reduction and a pattern of growth that allows people to contribute to and benefit from economic growth. Rapid pace of growth is necessary for substantial poverty reduction, but it needs to be broad-based across sectors to be sustainable. While income redistribution may be a short-term way of reducing absolute

13 Poverty Reduction Strategy Papers are essentially policy and position documents that describe the individual country's macroeconomic, structural and social policies over a period of least three years. These are prepared by the member countries through a participatory process involving domestic stakeholders and in some instances, with support from international development partners.

14 The World Bank, *Global Monitoring Report 2010: The MDGs after the Crisis* (Washington, D.C., 2010), <http://go.worldbank.org/FDZK6VRIC0>.

poverty, focusing on productive employment for large sections of hitherto excluded people build the “capabilities” of individuals and families to lift themselves out of poverty. For this, there needs to be both equality and “equity”.

The concept of equity within a developing country context is complex. However, in its basic form it refers to: (1) an equality of opportunity to achieve one’s potential; (2) an equal share of benefits for relevant stakeholders in specific contexts; (3) positive discrimination and redistribution of resources and opportunities to right historic wrongs and in favour of systematically disadvantaged and vulnerable groups; and (4) empowerment of disadvantaged groups to enable access to information, fair representation and participation in decision-making in society.

As important as inclusiveness and equity is the concept of “quality”. It is not merely enough to provide services, if these services suffer from poor quality. For instance, within an educational context, the quality of education is reflected in: (1) safe, healthy and gender sensitive school environments; (2) relevant curricula and materials for the acquisition of basic skills; (3) well trained teachers and educational resources; and (4) educational outcomes that encompass knowledge, skills and attitudes linked to enabling the learner to participate in and benefit from inclusive development.

Within the human development framework, the concept of citizen participation and government accountability assumes importance. As early as 2005, the final report of the United Nations Millennium Project¹⁵ had identified four overarching reasons why the MDGs may not be met: poor governance, corruption, poor policy choices and the denial of human rights. For effective governance to take place, a two-way relationship between the government and citizens that enables not just good feedback but good policy choices and decision-making is an essential prerequisite.

Progress on achieving inclusiveness, equity and quality are based on effective engagement with citizenry, and by increased transparency in government processes. Without taking citizens as partners in the development process, it is not possible to achieve development goals. Hence, the concepts of participation and accountability assume importance as the focus of government attention.



Questions To Think About

1. What are the key development goals that your country has identified as part of its development policy and plan?
2. Which MDG targets is your country close to meeting?
3. Which targets is your country not likely to meet? Why?

ICTs are essential tools that governments can deploy in their poverty reduction programmes to accelerate growth. Indeed, within the last 10 years, the ability to effectively use computers, the Internet and mobile technologies has become a key driver of the rapid development of several Asian countries. ICTs can be used to provide improved and equitable delivery of services, to facilitate complex planning processes and coordination across sectors, and to enable increased

¹⁵ UN Millennium Project, *Investing in Development: A Practical Plan to Achieve the Millennium Development Goals* (New York, UNDP, 2005), <http://www.unmillenniumproject.org/reports/fullreport.htm>.

information sharing, outreach and monitoring of key efforts. Implementation problems have dogged efforts in key social sectors in developing countries. When ICTs are used to facilitate integrated approaches and cost-effective scalable solutions, the total implementation and operational costs are likely to be lower.

Recognizing this, countries in the region have indicated their desire to harness ICTs for development. Some promising areas for ICT integration are the delivery of lifesaving drugs, scaling up of access to education and improving teacher training, supplementing rural extension by providing a direct link to farming communities, and creating early warning and disaster management systems for geographically sensitive locations. In light of these, it is not an exaggeration to say that the achievement of a country's development targets is inextricably linked to the use of ICTs and, for this reason, an understanding of these technologies is imperative.

To sum up:

- The human development approach, which focuses on development within a human rights framework is the currently globally accepted concept of development.
- Progress on the achievement of the many development goals is uneven. While there are some visible and widespread gains across the Asia-Pacific region, the LDCs still have the region's highest rates of child and maternal mortality, the incidence of tuberculosis and HIV/AIDS continues to rise, and the region is regressing in environmental sustainability. There are huge data gaps in the Pacific region and great intra-country disparities for example in China and India.
- A rethinking of development policies has led to a focus on inclusive, equitable, improved quality, and participatory processes in development.
- Poor governance, poor policy choices, corruption and denial of human rights are factors impeding rapid progress.
- ICTs can be used to facilitate integrated approaches and cost-effective scalable solutions in key sectors of development, such as poverty reduction, education, health care, natural resources management and disaster risk management.

What is now required is to move from the "know how" of ICTs to the "do how"—in other words, to move toward a greater understanding of the nature of the ICTs and the conditions and contexts that will help in the optimum utilization of these strategic tools.

2.2 ICTs: What they are and what they can do

Scope and Definitions

ICTs are defined in so many ways in development literature that it can become quite confusing. Often, the term "ICTs" is used to describe the use of computers and the Internet. Sometimes, the term "ICTs" is associated with the most sophisticated and expensive computer-based technologies, and at other times, conventional technologies such as radio and television (TV), and telephony are included in the discussions. Definitions of ICTs vary widely, depending on contexts and conditions of use. The concern here is with the field of ICTD, that is with the convergence of development practice and the use of ICTs towards achieving inclusive and sustainable human development.

For this discussion, we adopt the definition provided by UNDP:

ICTs are basically information handling tools—a varied set of goods, applications, and services that are used to produce, store, process, distribute and exchange information. They include the “old” ICTs of radio, television and telephone, and the “new” ICTs of computers, satellites and wireless technology and the Internet. These different tools are now able to work together, and combine to form our “networked world”, a massive infrastructure of interconnected telephone services, standardized computer hardware, the Internet, radio and television, which reaches into every corner of the globe.¹⁶

Traditionally, it was possible to distinguish ICTs in terms of their particular features (text—print; audio—radio; audio visual—TV and film). These can be described as “heritage media”. They are well-established and have been successfully deployed for development activities all over the world for more than five decades. However, with technological advancements since the 1990s, such distinctions between communication media have become blurred as convergence, or the blending of what were essentially discrete media, onto a single platform has become a reality.

With the rapid developments in technology, traditional analogue systems (signals based on continuous variance in both time and amplitude) have given way to digital systems that convert signals into discrete blocks, minimizing noise and distortion. Today, “digital” refers to digital electronic systems; and many previously analogue systems, such as magnetic tapes, have converted to digital technologies. In fact, heritage media have transformed and reinvented themselves with the advent of digital electronics.

ICTs can be further unpacked into technologies, applications, services and content. The development of newer and faster computers and mobile phones with multiple applications, the building of more telecommunication satellites, laying of fibre optic cables across land and seas, wireless towers—all form part of the ICT infrastructure and must be seen as part of technologies.

The development of software applications both in English and in local languages, whether these are proprietary or created from Open Source¹⁷ consist of applications; enabling the development of the content of the applications—whether for business or for e-government. Content forms the substance of the services that is available or made available through the ICTs as carriers. For a user or citizen to benefit, there has to be a link between each of the components of ICTs and the citizen.

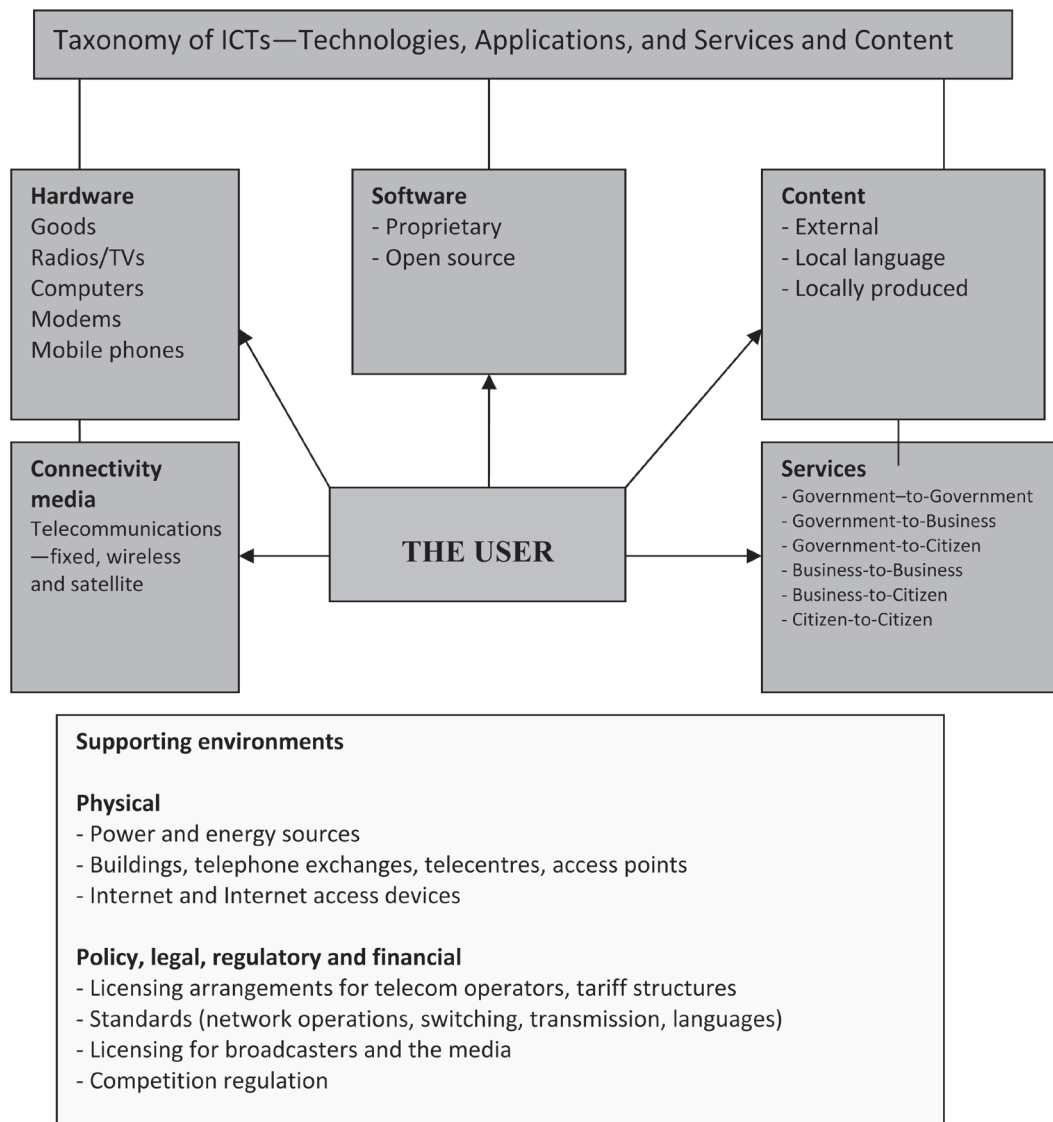
To function successfully, ICTs require supporting physical, policy, legal, regulatory and financial environments. ICT systems require stable electricity, cables and wires, wireless solutions to run on, and buildings to house them. Other enabling environments include laws and implementation norms, whether these are in licensing, competition norms and processes, revenue sharing mechanisms, or intellectual property rights.

Figure 2 describes ICTs in terms of their empirically observable and measurable characteristics.

16 UNDP Evaluation Office, *Information Communications Technology for Development, UNDP Essentials: Synthesis of Lessons Learned* (New York, 2001), p. 2.

17 There are many definitions of Open Source Software. Essentially, open source refers to computer software that is distributed under a licensing arrangement and which allows the computer code to be shared, viewed and modified by other users and organizations. For more definitions, see http://www.google.co.in/#hl=en&q=Open+source+software&tbs=dfn:1&tbo=u&sa=X&ei=qq_dTaGIC4i8vwPRtcW_BQ&ved=0CBgQkQ4&fp=2f48aba968b63bb2&biw=1280&bih=586 (accessed 26 May 2011).

Figure 2: Typology of ICTs¹⁸



Credit: Usha Vyasulu Reddi, 2011

Depending on the way in which an ICT is to be deployed and used, it can be classified as either synchronous or asynchronous. The use of synchronous ICTs requires that providers and producers of content are together with users at the “same time” while allowing for them to be at “different places”. For asynchronous ICTs, the providers and producers of content and the users can be at “different times” and “different places”. This inherent characteristic defines the relationship between providers and users, and has an impact on access, use and impact patterns. Table 2 shows the different ICTs currently in use in the world.

¹⁸ Module 4 of the *Academy of ICT Essentials for Government Leaders* module series provides a detailed description and explanation of different technologies and their features. The module is available at <http://www.unapcict.org/academy>.

Table 2. Classification of ICTs in current use

Synchronous ICTs (requires providers and users to be together at the “same time” while allowing for “different places”)	Asynchronous ICTs (allows for providers and users to be at “different times” and “different places”)
<ul style="list-style-type: none"> • Voice telephony—fixed and mobile • Computer conferencing (synchronous as in VoIP) • Broadcast radio • Broadcast TV-based conferencing • Tele-classrooms 	<ul style="list-style-type: none"> • E-mail • Facsimile • Computer-based learning • Computer conferencing (asynchronous) • Computer file transfer • Electronic bulletin boards • Online and offline multimedia products such as websites and CD-ROMS • Audio- and video-on-demand • Video-cassette, disc • Mobile phones when used for SMS, MMS and browsing

Attributes and Limitations

Both the old and new digital technologies promote individualization of use and can serve multiple needs, functions and user groups. But there are major differences in their capabilities. A wise choice of ICTs depends on an understanding of their strengths and limitations as illustrated in table 3.

Table 3. Attributes and limitations of different ICTs

ICT	Attributes	Limitations
Print technologies	<ul style="list-style-type: none"> • Familiarity • Reusable • Can provide depth • Allow economies of scale • Allow uniform content and standards 	<ul style="list-style-type: none"> • Limited by literacy • Static in time • Updating difficult • Passive, one way technology with little or no interactivity
Broadcast technologies (radio and TV)	<ul style="list-style-type: none"> • Familiarity • Speed of delivery • Provides vicarious experience • Allow economies of scale • Uniform content and standards possible • Rugged, ease of use 	<ul style="list-style-type: none"> • Limited access • Static in time, • Require people to be tuned in at the time of broadcast • Updating difficult • Not problem or location specific • Passive, one way technology with little or no interactivity • One size fits all content for all groups of people • High start up, production and distribution costs

ICT	Attributes	Limitations
Digital (computer and Internet-based) technologies	<ul style="list-style-type: none"> • Interactive • Low per unit cost • Allow economies of scale • Uniform content and standards possible • Can be updated easily • Problem and location specific • User-friendly • Unbundling of content possible • Enable people-to-people contact (social networking) 	<ul style="list-style-type: none"> • Limited access still • High development costs • Dependent on capacity of providers • Computer literacy essential for use • Lack of local content • Impeded by physical constraints such as stable electric power and bandwidth availability
Mobile technologies	<ul style="list-style-type: none"> • Interactive • Low per unit cost • Allow economies of scale • Uniform content and standards possible • Can be updated easily • Problem and location specific • User-friendly • Unbundling of content possible • Local content possible • Computer literacy not essential for use 	<ul style="list-style-type: none"> • Impeded by physical constraints such as signal strength • Limited by social factors inhibiting access to and ownership of instrument

Credit: Usha Vyasulu Reddi, 2011

In earlier decades, the use of the older or heritage technologies (radio and TV) in support of development efforts was extensive. Potential reach and ease of access were the main drivers for using radio and TV, and donor and technical assistance agencies supported the exploitation of these technologies. Examples abound. One of the oldest successful applications in Asia-Pacific is the use of satellite-based radio and TV for education at the University of the South Pacific. Other oft-quoted examples include the Radio Rural Forums in the 1950s, the Satellite Instructional Television Experiment in India in 1975-76, China's Radio and Television University and Mexico's Telesecundaria.

Although the specific goals and strategies adopted were determined by local needs and conditions, these ICT-supported projects followed a familiar pattern. The countries used the latest technology of the day to transcend barriers of distance, poor infrastructure, lack of schools and colleges, and illiteracy. Each country made major investments in the creation of national and international technology grids, enabling the delivery of content. Each made parallel investments in content development, with content specialists, teachers, producers and researchers coming together in interdisciplinary teams to develop educational materials that would be relevant to national priorities and socio-cultural contexts.

While enjoying a measure of success, these programmes faced a number of issues and challenges. These included the challenge of how to reduce the rigidity imposed by a synchronous model (in particular, the built-in inflexibility of TV scheduling); and how to create a pedagogically sound balance between the visual power of televised images, demanding and intellectually stimulating content and activities that require reading and research, and motivating learners to undertake hands-on activities. In addition, these programmes had to address the issues of centralized planning and deployment versus ensuring local relevance and meeting regional needs and demands. All of them had to face the daunting challenges of access, equity and interactivity. Moreover, they had been overtaken by technological developments emerging out of the digital revolution. Even with decreasing costs of technology, upgrading and replacement of obsolete equipment was a constant headache.

Today, all large-scale ICT-supported efforts use digital technologies to enhance access while promoting interactivity at lower costs. As shown by the comparison of attributes and limitations of older and newer digital ICTs (table 3), the latter have a definite comparative edge as information tools. For this reason, their use in efforts to meet development goals should be explored.

Various studies conducted on the use of ICTs in development have documented both successes and failures. The studies reveal the tremendous diversity of experience in policy, planning, design, technology deployment and use in different national contexts. But it is equally obvious from these studies that compared to the older ICTs, the digital ICTs are transformationally different. With the older technologies such as print, radio and TV, the shaping, production and regulation of content and the delivery methodologies remained centralized and one-way. The new digital ICTs are potentially more open and can be owned and operated by an individual or social group—that is, ownership has shifted to the hands of the person handling the remote control, the mouse or the mobile phone. The use of technology is in terms of one's own needs and wants, and in terms of one's own private space. This leads to diversity in both form and content, and the possibility of localization in terms of language, culture, design, content and use.

A major driver propelling the use of digital technologies is convergence. Convergence means the coming together in a seamless way of telecommunications technology with all media, text, audio, graphics, animation and video such that all are delivered on a common platform while also allowing the user to choose any combination of media to interact with. It also means the connectivity and networking of all of these different technologies in such a way that it is sometimes difficult to distinguish one from the other: the same telecommunications tool. For instance, the mobile phone can be the delivery channel for text, audio, video, e-mail, SMS and Internet browsing, from point to point (sender to receiver), from one point of origin to many points of reception, and from multiple points to any number of receivers.

Convergence has enabled content providers to create and supply knowledge products in such a way that there are “multiple outputs from a single process”—information and knowledge can be produced and provided electronically as data, graphics, audio and video, both separately and together. This convergence of technologies simplifies production and diversifies distribution, thereby addressing two of the major weaknesses of old discrete technologies.

To sum up:

- Both old and new ICTs are important tools in development work.
- However, there is increasing use of digital technologies.
- Use of the new digital technologies has the advantage of diffused and dispersed democratic production and ownership enabled by technology convergence.



Something To Do

Form small groups of three or four members each and discuss in your group which combination of ICTs (you can include old and new ICTs) will be most useful for delivering services to, and fostering greater social participation among, the following population groups (choose one group only):

- a. Farmers
- b. Rural women
- c. Children in remote villages
- d. Out-of-school youth

Briefly identify the service or services that you think should be delivered (e.g. health care, education, access to knowledge resources), and explain the reasons for your choice of ICTs to deliver this/these service/s to your chosen population group.

2.3 Bridging the Digital Divide

Before proceeding further, it is essential to take a close look at existing statistics on teledensity and ICT penetration in the Asia-Pacific region.

Table 4. Teledensity in selected least developed countries of the Asia-Pacific region

	Country	HDI ^a rank	Fixed telephone lines (per 100)	Mobile subscribers (per 100)	Internet users (per 100)
		2010	2010	2010	2010
Land-locked LDCs	Afghanistan	155	0.45	41.39	4.00
	Bhutan	N.A.	3.62	54.32	13.60
	Lao People's Democratic Republic	122	1.66	64.56	7.0
	Nepal	138	2.81	30.69	6.78
LDCs that are not land-locked	Bangladesh	129	0.61	46.17	3.70
	Cambodia	124	2.54	57.65	1.26
	Maldives	107	15.20	156.50	28.30
	Myanmar	132	1.26	1.24	N.A.
	Solomon Islands	123	1.56	5.57	5.0
	Timor-Leste	120	0.21	53.42	0.21

	Country	HDI ^a rank	Fixed telephone lines (per 100)	Mobile subscribers (per 100)	Internet users (per 100)
		2010	2010	2010	2010
Land-locked countries that are not LDCs	Armenia	76	19.08	125.01	37.0
	Azerbaijan	67	16.33	99.04	35.99
	Tajikistan	112	5.35	86.37	11.55
	Kazakhstan	66	25.03	123.35	34.0
	Kyrgyzstan	109	9.41	91.86	20.0
	Mongolia	100	7.01	91.09	10.20
	Turkmenistan	87	10.31	63.42	2.20
	Uzbekistan	102	6.79	76.34	20.0

Source: UNDP, *Human Development Report 2010 – 20th Anniversary Edition: The Real Wealth of Nations – Pathways to Human Development* (New York, 2010), <http://hdr.undp.org/en/reports/global/hdr2010>; and ITU, "World Telecommunications/ICT Indicators Database", <http://www.itu.int/ITU-D/ict/statistics>.

The Asia-Pacific region represents a broad spectrum of telecommunications infrastructure development, with teledensity rates (the number of fixed phone lines per 100 people) ranging from a high of 53 per cent in Hong Kong to rates of less than five per cent in several South-East Asian nations (e.g. Bangladesh and Cambodia).

Figures on the penetration of mobile phones are more promising.¹⁹ The region can boast of the fastest growing mobile markets in China and India,²⁰ high penetration rates in most of Central Asia, and pioneering initiatives in Bangladesh. Even Afghanistan and Timor-Leste, which have very low teledensity figures otherwise, have a mobile penetration rate of 41.39 and 53.42 per cent (as of 2010), respectively.

With respect to Internet usage (table 5), Asia, with more than two thirds of the world's population, accounts for a fraction of global usage. Most of this usage is concentrated in the developed countries of Asia, such as Japan, Malaysia, Republic of Korea and Singapore. Oceania's Internet usage is even poorer, at two per cent of global usage, of which Australia and New Zealand account for 96 per cent. Only a few among ESCAP high-priority countries have an Internet penetration in double-digit figures. The implication of these statistics is that there is a critical need to first create infrastructure and provide connectivity at affordable rates if ICT initiatives are to be scaled up and country-wide provision is to be planned and executed.

19 Wikipedia, "List of mobile network operators of the Asia Pacific region", (Wikimedia Foundation, Inc.), http://en.wikipedia.org/wiki/List_of_mobile_network_operators_of_the_Asia_Pacific_region (accessed 5 September 2011).

20 BuddleComm, "2010 Asia – Mobile, Broadband and Digital Economy", (April 2010), <http://www.budde.com.au/Research/2010-Asia-Mobile-Broadband-and-Digital-Economy.html> (accessed 5 September 2011).

Table 5. Internet penetration and usage in the Asia-Pacific region

Country	Population (2011 estimate)	Internet users (2000)	Internet users (latest data as of 31 July 2011)	Internet penetration (% of population)	% of users in Asia or Oceania region	% of user growth (2000-2011)
South Asia						
Bangladesh	158 570 535	100 000	1 735 020	1.1	0.2	1 635.0
Bhutan	708 427	500	53 280	7.5	0.0	10 556.0
India	1 189 172 906	5 000 000	100 000 000	8.4	10.7	1 900.0
Maldives	394 999	6 000	107 460	27.2	0.0	1 691.0
Myanmar	53 999 804	1 000	110 000	0.2	0.0	10 900.0
Nepal	29 391 883	50 000	1 072 900	3.7	0.1	2 045.8
Pakistan	187 342 721	133 900	20 431 000	10.9	2.2	15 158.4
Sri Lanka	21 283 913	121 500	1 776 200	8.3	0.2	1 361.9
South-East Asia						
Brunei Darussalam	401 890	30 000	318 900	79.4	0.0	963.0
Cambodia	14 701 717	6 000	329 680	2.2	0.0	5 395.0
Indonesia	245 613 043	2 000 000	39 600 000	16.1	4.2	1 880.0
Lao PDR	6 477 211	6 000	527 400	8.1	0.1	8 690.0
Malaysia	28 728 607	3 700 000	16 902 600	58.8	1.8	356.8
Philippines	101 833 938	2 000 000	29 700 000	29.2	3.2	1 385.0
Singapore	4 740 737	1 200 000	3 658 400	77.2	0.4	204.9
Thailand	66 720 153	2 300 000	18 310 000	27.4	2.0	696.1
Timor-Leste	1 177 834	0	2 100	0.2	0.0	-
Viet Nam	90 549 390	200 000	29 268 606	32.3	3.1	14 534.3
Central Asia						
Afghanistan	29 835 392	1000	1 000 000	3.4	0.1	99 900.0
Armenia	2 967 975	30 000	1 396 550	47.1	0.1	4 555.2
Azerbaijan	8 372 373	12 000	3 689 000	44.1	0.4	30 641.7
Georgia	4 585 874	20 000	1 300 000	28.3	0.1	6 400.0
Kazakhstan	15 522 373	70 000	5 300 000	34.1	0.6	7 471.4
Kyrgyzstan	5 587 443	51 600	2 194 400	39.3	0.2	4 152.7
Mongolia	3 133 318	30 000	350 000	11.2	0.0	1 066.7
Tajikistan	7 627 200	2 000	700 000	9.2	0.1	34 900.0
Turkmenistan	4 997 503	2 000	80 400	1.6	0.0	3 920.0
Uzbekistan	28 128 600	7 500	7 550 000	26.8	0.8	100 566.7
East Asia						
China	1 336 718 015	22 500 000	485 000 000	36.3	52.0	2 055.6
Hong Kong*	7 122 508	2 283 000	4 878 713	68.5	0.5	113.7
Japan	126 475 664	47 080 000	99 182 000	78.4	10.6	110.7

Country	Population (2011 estimate)	Internet users (2000)	Internet users (latest data as of 31 July 2011)	Internet penetration (% of population)	% of users in Asia or Oceania region	% of user growth (2000-2011)
Korea, DPR of	24 457 492	-	-	-	-	-
Korea, Republic of	48 754 657	19 040 000	39 440 000	80.9	4.2	107.1
Macao*	573 003	60 000	280 900	49.0	0.0	368.2
Taiwan	23 071 779	6 260 000	16 147 000	70.0	1.7	157.9
Pacific Islands and Oceania						
American Samoa	67 242	-	3 040	4.5	0.0	-
Antarctica	1 169	-	-	-	0.0	-
Australia	21 766 711	6 600 000	17 033 826	78.3	80.0	158.1
Australia, Ext. Ter.	1 648	-	-	-	0.0	-
Christmas Island	1 402	464	464	33.1	0.0	0.0
Cocos (Keeling) Is.	596	-	-	-	0.0	-
Cook Islands	11 124	-	6 000	53.9	0.0	-
Fiji	883 125	7 500	120 640	13.7	0.6	1 508.5
French Polynesia	294 935	8 000	120 000	40.7	0.6	1 400.0
Guam	183 286	5 000	90 000	49.1	0.4	1 700.0
Kiribati	100 743	1 000	7 800	1.8	0.0	680.0
Marshall Islands	67 182	500	4 560	6.8	0.0	812.0
Micronesia	106 836	2 000	17 000	15.9	0.1	750.0
Nauru	9 322	300	300	3.2	0.0	0.0
New Caledonia	256 275	24 000	85 000	33.2	0.4	254.2
New Zealand	4 290 347	830 000	3 600 000	83.9	16.9	333.7
Niue	1 311	450	1 100	83.9	0.0	144.4
Norfolk Island	2 169	700	700	32.3	0.0	0.0
Northern Marianas	46 050	15 980	15 980	34.7	0.1	0.0
Palau	20 956	5 400	5 400	25.8	0.0	0.0
Papua New Guinea	6 187 591	135 000	125 000	2.0	0.6	-7.4
Pitcairn Islands	48	-	-	-	0.0	-
Samoa	193 161	500	9 000	4.7	0.0	1 700.0
Smaller Territories (4)	3 902	-	-	-	0.0	-
Solomon Islands	571 890	2 000	16 200	2.8	0.1	710.0
Terres Australes	-	-	-	-	0.0	-
Tokelau	1 384	66	800	57.8	0.0	1 112.1

Country	Population (2011 estimate)	Internet users (2000)	Internet users (latest data as of 31 July 2011)	Internet penetration (% of population)	% of users in Asia or Oceania region	% of user growth (2000-2011)
Tonga	105 916	1 000	8 400	7.9	0.0	740.0
Tuvalu	10 544	4 300	4 300	40.8	0.0	0.0
Vanuatu	224 564	3 000	17 000	7.6	0.1	466.7
Wallis & Futuna	15 398	1 300	1 300	8.4	0.0	0.0

*Not included in China

Source: Extracted and reorganized from Internet World Stats, "Internet Usage Statistics: The Internet Big Picture", Miniwatts Marketing Group, "http://www.internetworldstats.com/stats.htm, last updated on 31 July 2011.

The disparities and gaps caused by the uneven growth of telecommunications and ICTs have led to what is currently known as the digital divide.

The so-called digital divide is actually several gaps in one. There is a technological divide—great gaps in infrastructure. There is a content divide. A lot of web-based information is simply not relevant to the real needs of people. And nearly 70 per cent of the world's websites are in English, at times crowding out local voices and views. There is a gender divide, with women and girls enjoying less access to information technology than men and boys. This can be true of rich and poor countries alike.

United Nations Secretary-General Kofi Annan
Statement to the World Summit on the Information Society,
10 December 2003, Geneva, Switzerland,
<http://www.itu.int/wsis/geneva/coverage/statements/opening/annan.html>.

The term "digital divide" is used to describe the gap between individuals and societies that have the resources to participate in the knowledge economy and knowledge society, and those that do not. Essentially, it is a symptom of more profound inequalities in gender, income, development and literacy. As *The Economist* has pointed out: "Fewer people in poor countries than in rich ones own computers and have access to the Internet simply because they are too poor, are illiterate, or have other more pressing concerns, such as food, health care and security."²¹ At the same time, the digital divide impacts on the persistence of social inequality. According to Chen and Wellman: "People, social groups and nations on the wrong side of the digital divide can be excluded from the knowledge economy. If pre-existing inequalities deter people from using computers and the Internet, these inequalities may increase as the Internet becomes more consequential for getting jobs, seeking information and engaging in civic or entrepreneurial activities."²² Thus, addressing the digital divide is more than simply making ICTs available. It is trying to use ICTs to address and narrow gaps in many sectors towards the achievement of development goals and objectives.

The digital divide will not resolve itself; it cannot be left to technological evolution alone. There has to be an overarching development policy concentrating on strategies for poverty reduction with a clear and enabling national ICTD policy as a precondition to the setting up of infrastructure, institutions and tools that will narrow the digital divide and promote universal access. The strategy

21 The Economist, "The Real Digital Divide", 10 March 2005, http://www.economist.com/displaystory.cfm?story_id=3742817 (accessed 5 September 2011).

22 Wenhong Chen and Barry Wellman, "Charting and Bridging Digital Divides: Comparing Socioeconomic, Gender, Life Stage, and Rural-Urban Internet Access and Use in Eight Countries", 31 October 2003, p. 23, http://homes.chass.utoronto.ca/~wellman/publications/amd_ses/charting-divides_long.pdf.

of investing solely in ICT infrastructure and neglecting other critical developmental priorities may be counterproductive. Many countries need to address more fundamental constraints to economic development, such as improving the basic infrastructure, opening up markets, breaking telecommunications monopolies, putting in place an effective legal and regulatory system, and providing education for all. Countries that ignore these problems in favour of simply computerization and Internet access may end up wasting scarce resources as capacity to take advantage of ICT remains undeveloped. In other words, efforts to bridge the digital divide need to be directed toward promoting universal access while creating opportunities for ICT use at the community level.



Something To Do

Identify at least five factors that, in your opinion, are responsible for the digital divide in your country. For each factor, list a strategy through which the divide can be addressed.

Promoting Universal Access

Given the rapid pace at which ICTs are evolving, governments in poor countries could focus more on channelling their scarce financial and political resources to developing social and human capital, building the basic infrastructure, and creating a level playing field for the private sector. Engaging the private sector can not only speed up infrastructure development but also reduce the heavy burden on the government exchequer, which would help the government concentrate on areas that need public investment the most. In other words, the role of government is to put in place the prerequisites for the ICT sector to flourish.

Investment in both formal and non-formal education is another priority. International evidence suggests that education is necessary for the achievement of all MDG targets and not just those directly related to education. At the minimum, ICT literacy is necessary for all citizens if they wish to access benefits through the ICTs. Access to secondary and higher education enables the development of human resources, which in turn spurs innovation and large-scale growth. In terms of bridging the digital divide, education is important because it provides the skills required for creating, adapting and utilizing ICTs. Indeed, education becomes increasingly important for going beyond basic ICT applications.

A third priority is the creation of physical infrastructure in telecommunications links. Government investment is necessary because connecting the poorest of the poor is not necessarily attractive to the private sector for whom market demand is a key motivator, and the high cost of building rural infrastructure is a disincentive. Even assuming that the private sector is not shy of investing in rural infrastructure, the government has to play the role of regulator, establishing standards, creating a level playing field, and promoting more even growth through deregulation.

Box 2. Creating a Universal Service Obligation Fund

Many countries have in place legislation to provide for a fund that promotes universal access and services in the telecommunications sector. For instance, Chile calls the fund “the Telecommunications Development Fund”, and India calls it the “Universal Service Obligation Fund”. The basic purpose of such a fund is to: promote the availability of quality services at just, reasonable and affordable rates; increase access to advanced telecommunications services throughout the nation; and advance the availability of such services to all consumers, including those in low income, rural, insular and high cost areas, at rates that are reasonably comparable to those charged in urban areas. Revenues for the fund are raised by requiring the telecommunications operators to pay a small share of their revenues into the fund to underwrite the cost of universal access. This is an effort to reduce the digital divide through the provision of access to basic telecommunications services.

At the community level, governments can look at opportunities for creating common service facilities and services that can extend reach and provide local access. There are two parallel paths that need to be pursued in establishing common service facilities. At the provider’s end, there is a need to create portals as dynamic repositories where specific development knowledge is stored and updated. At the user end, creating community telecentres or kiosks can enable easy access to knowledge stored in such portals.

Use of Telecentres

Like its predecessors, the community radio set and the community TV, the telecentre can be a common village resource—that is, a facility that will benefit everyone in the village. Telecentres are strategically located facilities providing public access to ICT-based services and applications. Depending on their size and the extent of the services provided, these centres are usually operated by a manager and a small number of staff who may be part-timers or volunteers.

There are many types of telecentres. In some places, telecentres may provide simple basic services such as phone calls and fax services, photocopying and printing, typing services, and maybe some bookkeeping for very small businesses. These simple telecentres have a lot of potential for successful commercial operations and for evolving into multi-purpose telecentres where a variety of services can be provided.

Some telecentres are cybercafés where a person can go and access the Internet. These also have a very good potential for developing into multi-purpose telecentres providing valuable community service while also being commercially successful.

In other places telecentres may be “info-shops” where a person can go and access information for a price (e.g. agri-clinics for agriculture information). e-Choupal in India is one such effort funded by a private company. Some of these centres are small institutes providing training in computer and word processing while also providing access to the Internet.

Other telecentres provide access to government services, including access to government information such as property records, and payment facilities for taxes and bills. These e-government facilities in villages can save a lot of time, money and energy for villagers while also being commercially viable for the telecentre operator.²³ An example of this type of telecentre is the Internet Information Centre in Mongolia. There are four such centres covering four provinces.

23 Usha Vyasulu Reddi, *Training Commons Modules Introductory Booklet* (Ottawa, IDRC, 2008). See also <http://www.telecentre.org> for a wealth of resources on telecentres around the world.



Internet Information Centres, Mongolia

The project covered four provinces — Erdenet, Khovd, Dornod and Umnugovi in the north, west, east and south of Mongolia, respectively. The telecentres, which were known as Public Internet Centres (PICs), provided the following facilities and services to members and customers: six personal computers (PCs), modems and related equipment; dial-up access with six ports; Internet access; e-mail; fax service; Web hosting and design; and local telephone service. The telecentres in Erdenet and Dornod provinces were connected to the Internet via a very small aperture terminal satellite system at a speed of up to 64Kbps.

As required by the project sponsors, the PICs provided free Internet connection to secondary schools, local government offices and non-governmental organizations. Secondary schools and local government offices are connected through radio modems. Business users were charged for Internet access.

The local library was one of the members of the PIC's Board of Management. The PICs also worked closely with local government offices that provide the PIC premises.

The Internet Information Centres project was one of the earliest ICTD projects addressing digital divide issues. Although this project ended, it faced many problems and concerns similar to efforts elsewhere in developing countries.

Electricity, connectivity, access, language and PC penetration have posed problems, as did issues of sustainability, human resource development, capacity building; and effective business models. Technology advancements, improved telecommunications infrastructure and the increasing impact of mobile telephony penetration have changed the role that such information centres can play as part of an ICTD effort.

Source: Adapted from Roger Harris, "Telecentres in Rural Asia: Towards a Success Model", paper presented at the International Conference on Information Technology, Communications and Development, Kathmandu, Nepal, 29-30 November 2001, <http://unpan1.un.org/intradoc/groups/public/documents/apcity/unpan006304.pdf>.

A word of caution about telecentres: They seem simple but like all things simple, it is only when many aspects come together that they are successful. There are many examples of both success and failure in telecentres. Many of the failed models are in the developing countries. Failure is often due to lack of "know-how" and "do-how" about:

- Financing and sustainability – There is often lack of knowledge and skill in raising resources, marketing and business planning, and pricing.
- Ownership and operating models – There is lack of knowledge and skill in how to set up and operate a telecentre as a useful community resource.
- Human resources – Many telecentre managers and staff are not properly paid for their work. The centres typically rely on volunteers. Both factors lead to difficulties in motivating and retaining staff.
- Training and capacity building – Managers and staff are often untrained in advanced operations. They struggle with the different aspects of managing a telecentre while at the same time learning about entrepreneurship and marketing, community mobilization, and information and communication.²⁴

²⁴ Raul Roman and Royal D. Colle, *Themes and Issues in Telecentre Sustainability*, Development Informatics, Paper no. 10 (Manchester, Institute for Development Policy and Management, University of Manchester, 2002), http://www.sed.manchester.ac.uk/idpm/research/publications/wp/di/di_wp10.htm.

The successful cases, on the other hand, prove that when the conditions that spell the difference between success and failure are taken into account, telecentres and local efforts to build websites and portals may be a viable option for bridging the digital divide. Small community-based telecentres have been successful in both large and small, isolated countries. Australia and Canada, for example, have linked their remote communities to government services through “telecottages” and similar kiosks. For small island, landlocked and mountainous countries with dispersed and remote populations, telecentres could prove to be a suitable strategy for ICT-supported development.



Something To Do

Identify a location in your country for a pilot project to set up a telecentre. Decide what kind of telecentre to establish, what facilities and services the telecentre will provide, and what model should be adopted to make it financially sustainable and relevant for the community.

Using Mobiles to Achieve Universal Access

Statistics presented in tables 4 and 5 detailed teledensity and Internet penetration in Asia-Pacific countries, and point sharply to the rapid growth of mobile phones as a preferred medium of communication. While China and India show the fastest growth in mobile phone access and ownership; in almost all countries, other than Myanmar, mobile phone ownership has outstripped fixed line telephony and Internet access by far.

Strategies that make use of telecentres to achieve universal access have some drawbacks. They have what are known as “last mile connectivity” problems.²⁵ Telecentres require physical infrastructure of buildings, stable electric power supply and broadband connectivity. Telecentres need to be situated in a convenient location; and readily available to rural villagers. Telecentres need to be peopled with trained and competent information literate staff, who can find the information villagers or the poor need. While there has been considerable euphoria about the potential of telecentres, field visits to telecentre locations often reveal that barriers of poverty, illiteracy, lack of time, lack of awareness, and socially determined conditions such as limited mobility, and cultural traditions particularly inhibit effective use.²⁶ Sometimes, even the custodian of the telecentre may be absent. Mobile phones address these specific limitations, as they are cheap, rugged, run on batteries, are small and can be carried anywhere by the user; they are personal—reach the individual or the household directly; are user-friendly; and not confined by time and space.

At the end of 2010, there were 2,649 million mobile subscriptions in the Asia-Pacific, compared with 880 million in the Americas and 741 million in Europe.²⁷ Much of the growth is coming from the world’s most populous nations—China and India, but it is equally visible in other countries. The second aspect of the growth is the willingness of consumers to experiment with new technologies and the various types of content these technologies can deliver. Opportunities

25 Last mile connectivity refers to the final leg of delivering connectivity from a communications provider to customers. This may be considerably more in rural areas and can prove to be an expensive challenge while not delivering the same quality of service that is available in urban locations. As distance grows, speed and bandwidth decline and the user receives a fraction of the speed otherwise promised.

26 Royal D Colle, *Advocacy and Interventions: Readings in Communication and Development* (New York, The Internet-First University Press, 2007), p. 321, <http://ecommons.cornell.edu/handle/1813/7749>.

27 mobiMobiThinking, “What makes Asia Pacific the most exciting mobile market in the world? Interview with Rohit Dadwal, MD Asia Pacific, MMA”, <http://mobithinking.com/mobile-asia-pacific-mma-interview>.

to experiment with different services on mobile phones exist—whether it is m-agriculture, m-banking, m-learning or m-health, among others.

Module 4 in the *Academy of ICT Essentials for Government Leaders* module series deals with ICT trends for government leaders and has explored mobile telephony in detail. Some examples of the use of mobile phones to deliver development-related information will be discussed in section 3.

Achieving Connectivity for Small Island, Land-locked and Mountainous Countries

Small island, landlocked and mountainous countries have some key characteristics in common. The first is that they have small populations and, consequently, small economies, small markets and limited human and technical resources. In some cases, they also have limited natural resources. Second, they all have problems of great distances: the small island states have oceans of water separating islands, while the mountainous countries have impassable mountains. All have remote populations, mostly underserved; and all have transport and communications problems, with poor telecommunications systems. Third, all of these countries are vulnerable to the forces of nature on the one hand, and the winds of globalization, liberalization and privatization sweeping the world on the other. Some of these countries are surrounded by economically and politically powerful neighbours, and few are free from ethnic conflicts that threaten to destroy whatever small gains have been made over many decades of development.

The island states have a greater vulnerability to environmental disasters such as the rising seas; livelihood depletion from resource loss due to rising salinity, water contamination, oil spills and nuclear contamination; imported health hazards such as malaria and the flu; and technological hazards such as satellite and cable failure. Landlocked and mountainous countries also have special problems, among these subsistence agriculture, isolation, earthquakes, landslips and other such disasters.

There is no one solution to the challenges posed by geographic location, and conventional methods may not apply. Out-of-the-box solutions are needed, as are regional partnerships. The Small Island Developing States Network (SIDSnet), which applies the principles of cooperation and convergence of opportunities, interests and technologies, demonstrates this.



Small Island Developing States Network

SIDSnet was established in 1997 as a direct follow-up to the 1994 Barbados Programme of Action (BPoA). Its primary goal is to support the sustainable development of SIDS through enhanced ICT.

SIDSnet responds to several critical challenges faced by small islands, namely: (1) remoteness, isolation and geographic dispersion; (2) poor connectivity and data management; (3) limited human and technological capacity; and (4) the need for greater international recognition and assistance in reducing the economic and environmental vulnerability of SIDS. It does so by using ICTs to link remote and isolated SIDS to facilitate the sharing of technical expertise, education and knowledge for improving welfare and reducing poverty through innovation, expanded national capacity, and better use of scarce resources.

Through the SIDSnet website, affiliated countries can maintain contact with each other to share information on best practices in priority areas such as health, conservation, education, freshwater and sanitation, tourism, and human resource development. The network also seeks to facilitate the virtual exchange of expertise through the SIDS Technical Assistance

Programme, which is an online roster of experts. SIDSNET has also been proposed for use as the portal to and home for the University Consortium of the Small Island States, which was endorsed at the 2005 Mauritius International Meeting.

SIDSNet is a strong advocate for improving Internet awareness and infrastructure. In the area of capacity building, it serves as a medium for South-South and SIDS-SIDS collaboration and technology transfer. In the area of cooperation and knowledge sharing, SIDSnet boosts connectivity and communication by registering users in an in-house e-mail system and chat rooms where information can be exchanged and experts contacted. SIDSnet also provides a calendar of upcoming activities and events, allowing governments to strategically deploy limited personnel. SIDSnet strengthens research and data management by serving as a database for island publications, academic research, United Nations resolutions and decisions, development indicators, and national and regional statistics. Finally, SIDSnet builds awareness of the central challenges encumbering island development, thereby raising the profile of SIDS in the international policy circles that influence the flow of financial resources and technical assistance.

During 2011, SIDSnet underwent a complete redesign and revitalization as part of a project supported by the Government of Spain, entitled “Capacity Development through Education for Sustainable Development and Knowledge Management for Small Island Developing States.” The project will redevelop SIDSnet, creating a much-needed central knowledge management system to facilitate information sharing and collaboration.

The revitalized SIDSnet will serve as the global platform to coordinate and facilitate the activities related to the sustainable development of SIDS in three key areas:

- Track international meetings and inter-governmental processes related to SIDS.
- Contribute to filling the gaps in data availability by collating national data and statistical information towards assessment of vulnerability-resilience country profiles.
- Facilitate and motivate partnerships across the thematic areas of the BPoA.

The BPoA is the United Nations Programme of Action on the Sustainable Development of Small Island Developing States, the only internationally approved programme of action specific to small island developing states.

Source: Adapted from SIDSnet, Division for Sustainable Development of the United Nations, “About SIDSnet”, <http://www.sidsnet.org/5.html> (accessed on 11 September 2011); and SIDSnet, “SIDSnet Revitalization”, <http://www.sidsnet.org/index.html> (accessed on 11 September 2011).



Questions To Think About

Could an initiative like SIDSnet work for the landlocked countries of Central Asia?
What would be the key elements of such a partnership?

To sum up:

- The digital divide is the gap between individuals and societies with access to the resources of the Information Age and those without.
- The digital divide is a reflection of economic and social inequalities, including those around income, gender and literacy.
- Addressing the digital divide requires a broad perspective that goes beyond ICTs.

- It is necessary to promote universal access by creating physical infrastructure as well as common service facilities, or telecentres, at the community level.
- It is also necessary to create portals as dynamic repositories of information and to build national and regional partnerships to share resources.
- Mobile technology is rapidly expanding in terms of the speed of expansion and reach to the unconnected. With the proliferation of mobile phones and related products and services, this trend is mobile phones are contributing significantly to bridging the digital divide.

This section of the module sought to provide a broad perspective of the linkages between ICTs and MDGs, and to establish that ICTs are critical tools in the strategy to achieve the MDGs. The next section focuses on specific applications of ICTs in different sectors relating to the MDGs.



Test Yourself

Do the following in consecutive order.

1. Collect MDG macro statistics on your country from available sources.
2. Collect ICT penetration statistics on your country from available sources.
3. What do the statistics tell you about strengths, weaknesses, opportunities and threats in the application of ICTs as tools in accelerating development? Can ICTs be used to accelerate development? Analyse critically what can be done in terms of national policy.
4. Identify who/which agency or inter-agency group will make the policy for ICT-supported development in your country/region.
5. What will it take to put the policy in place? Set down a set of tasks and time frames.

3. APPLICATIONS OF ICTS IN DEVELOPMENT

This section aims to:

- Describe ICT applications in different sectors particularly those directly concerned with the MDGs; and
- Identify principles of good practice from select case studies of ICT application in priority development sectors.

ICTs, by their very nature, are cross-cutting and their application may be multisectoral and multi-pronged. For instance, while ICT deployment for poverty reduction may focus on providing income-generating opportunities, it can also help bring women into the mainstream of economic activity, thus addressing a parallel development goal. However, for purposes of discussion, this section describes the various applications of ICT with special reference to their role in helping achieve a specific development goal or target. The goals are segmented into sectors of development.

Readers may find that some of the cases presented in this section seem old and well known. There is a reason for this. The intention is to present cases that have been carefully planned and have been sustained, upscaled, and grown especially after the first phase of implementation. Impact evaluations testifying to their successful implementation have been done for many of the cases presented here so that it is possible to identify success factors in the cases.

There are two approaches to the deployment of ICTs—direct and indirect. The direct approach targets the ultimate beneficiaries and uses ICTs to directly link them with the service providers. The indirect approach supports the director approach through the development of policies, infrastructure, support systems and content, which in turn is expected to benefit the ultimate beneficiaries. Both approaches are useful as ways to achieve development goals, but each has a different design at the policy and implementation levels. An effort has been made to look at both types of interventions in the context of the individual MDG sectors.

3.1 ICTs and Economic Growth

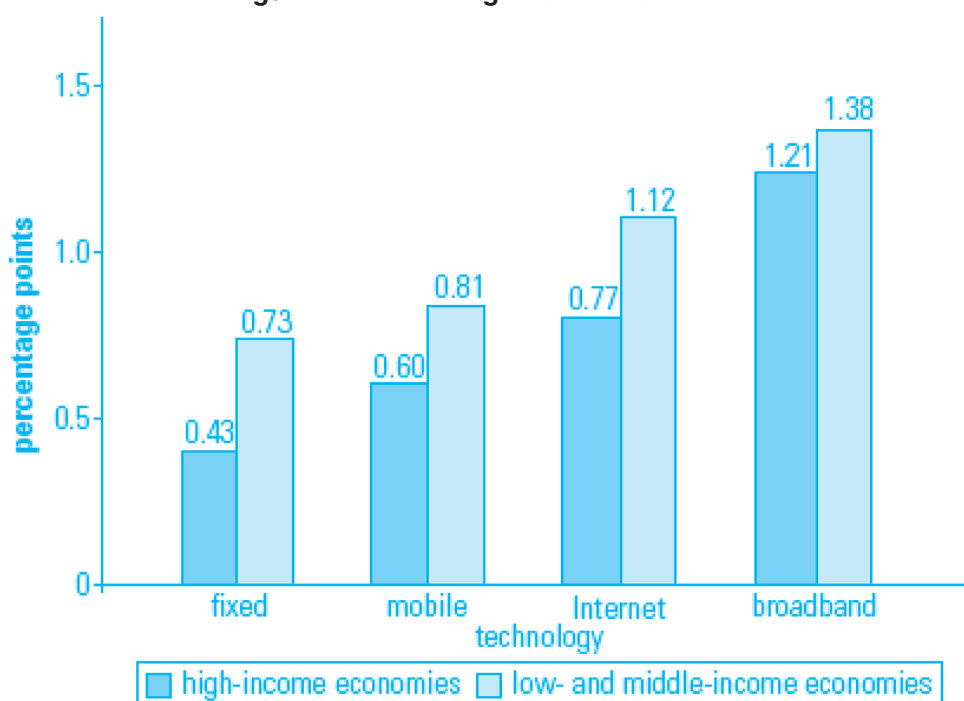
There is sufficient global evidence to show the relationship between ICTs and economic growth. Countries that have high levels of economic development also have high ICT penetration rates. There is evidence that business practices and private sector industry have benefited most from the fruits of the information revolution. There is also evidence that the growth in ICT infrastructure and human resources has catapulted countries like India into high growth rates and made them powerful economies in the information society.

The transforming impact of ICTs has been most visible in the small and medium enterprise (SME) sector. Using ICTs, small businesses have been able to improve the efficiency of internal business operations by reducing costs associated with internal communication (across internal departments) and external communication with clients; explore new markets, develop a global client base and increase volumes of demand; and improve inventory management, reducing wastage and consequently increasing profits.

In the *Information and Communications Development Report 2009* of the World Bank, it is reported that for every 10 percentage points increase in the penetration of broadband services, there is an increase in economic growth of 1.3 percentage points.²⁸ Similar results were found in other studies which showed that an increase in Internet penetration by 10 per cent in emerging economies correlates with an incremental gross domestic product (GDP) increase of 1-2 per cent.²⁹

This growth effect of broadband is significant and stronger in developing countries than in developed economies, and it is higher than that of telephony and Internet. The impact can be even more robust once the penetration reaches a critical mass.

Figure 3: Economic growth effect of ICTs



Note: The axis represents the percentage-point increase in economic growth per 10-percentage-point increase in telecommunications penetration. All results are statistically significant at the 1 per cent level except for those for broadband in developing countries, which are significant at the 10 per cent level.

Source: Mohsen Khalil, Philippe Dongier, and Christine Zhen-Wei Qiang, "Overview", in *Information and Communications for Development 2009: Extending Reach and Increasing Impact* (Washington, D.C., The World Bank, 2009), p. 6, <http://go.worldbank.org/NATLOH7HV0>.

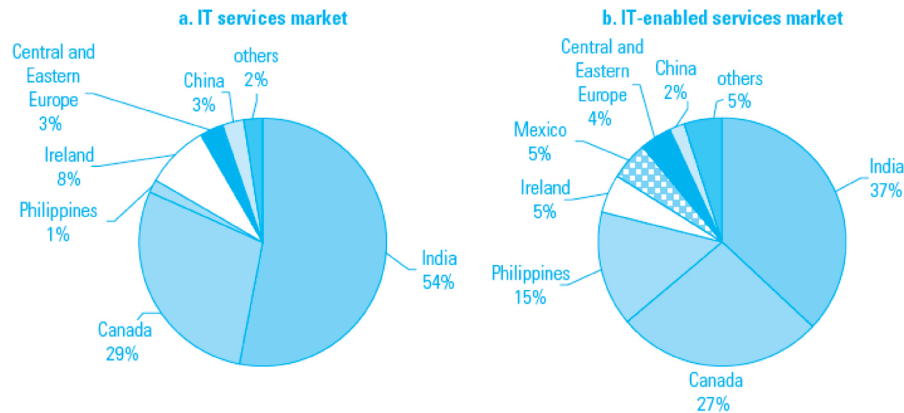
Another way in which ICTs are making an impact on economic growth is in the information technology (IT)³⁰ and information technology enabled services (ITES) sectors. ITES are services (such as call centres and back offices) that can be delivered remotely using telecommunications links. The market for these services is huge and growing, and several developing countries, led by India, have been successful as players in the ITES sector.

28 Christine Zhen-Wei Qiang and Carlo M. Rossotto, "Economic Impacts of Broadband", in *Information and Communications for Development 2009: Extending Reach and Increasing Impact* (Washington, D.C., The World Bank, 2009), pp. 35–50, <http://go.worldbank.org/NATLOH7HV0>.

29 Boston Consulting Group commissioned by Telenor, "Socio-economic Impact of Internet in Emerging and Developing Economies", in *ICT for Economic Growth: A Dynamic Ecosystem Driving the Global Recovery*, (Cologne/Geneva, World Economic Forum, 2009), p. 3, <http://www.weforum.org/pdf/ict/ICT%20for%20Growth.pdf>.

30 The IT sector can be defined as a category of business relating to the research, development and/or distribution of technologically-based goods and services. This sector contains businesses revolving around the manufacturing of electronics, creation of software, computers or products and services relating to information technology.

Figure 4: Global distribution of offshore IT and ITES services



Source: Christine Zhen-Wei Qiang and Carlo M. Rossotto, "Economic Impacts of Broadband", in *Information and Communications for Development 2009: Extending Reach and Increasing Impact* (Washington, D.C., The World Bank, 2009), pp. 35-50, <http://go.worldbank.org/NATLOH7HV0>.

3.2 ICTs and Poverty Reduction

Industry and private sector-led growth supported by ICT has in some cases contributed to poverty reduction. However, the poor have benefited less from this type of development than the non-poor.³¹ Governments need to address poverty directly and not just through interventions in the economy to spur growth that it anticipates will eventually benefit the poor.

The faces of poverty are many. These include lack of basic income; lack of access to land, credit and services; a regular experience of hunger; no access to basic education and/or health care, especially for children and mothers; high mortality and low life expectancy; exposure to HIV/AIDS, malaria and tuberculosis; lack of sustainable livelihoods and access to jobs for young people; and increased vulnerability to natural disasters and conflict. For all these, both direct and indirect ICT intervention—that is, using ICT to deliver services to the poor, and more supportive interventions such as natural resource mapping—are important poverty alleviation strategies.

Thread Net Hunza is an externally funded local initiative in a remote corner of Pakistan to improve access to the global marketplace for local weavers and traders, thereby improving their productivity, income and quality of life. It represents the direct approach where ICTs are used to link the poor to markets.

³¹ OECD, *Good Practice Paper on ICTs for Economic Growth and Poverty Reduction* (Paris, 2005), <http://www.oecd.org/dataoecd/2/46/35284979.pdf>.



Thread Net Hunza, Pakistan

The Karakoram Area Development Organization (KADO) is a not-for-profit local development organization working to improve the socio-economic base and living conditions of the physically and economically isolated rural population of the Hunza valley in Pakistan. KADO has a special focus on women, artisans, small producers, and other disadvantaged groups such as people with special needs. Its work includes:

- Promotion and revival of traditional crafts involving women and other disadvantaged groups;
- Use of IT for poverty reduction and development in rural areas;
- Revival and promotion of festivals, arts and culture;
- Rehabilitation of people with special needs;
- Building the capacity of local institutions; and
- Addressing environmental issues in Hunza.

KADO has supported two village literacy centres that provide training in software applications to rural women. These centres are being run on a cost-recovery basis in partnership with local communities. KADO has also embarked on a handicraft e-commerce initiative in collaboration with the International Development Research Centre (IDRC) Pan Asia Networking to promote local products made by women and disabled artisans. Under its Project on Information and Communication Technology for Development, which is funded by IDRC, KADO also provides Internet services. KADO believes in promoting sustainable livelihoods and eradicating extreme poverty in the remote areas through action research in the application and integration of ICT.

At the time of writing, KADO and its projects have grown and sustained, well beyond the initial project period.

Sources: Adapted from Karakoram Area Development Organization, <http://www.kadohunza.org/>; and Thread Net Hunza, http://www.kadohunza.org/tnh/jewelry_items.html.



Questions To Think About

Thread Net provides an innovative solution to a local problem. However, it faces many of the problems of small-scale digital interventions, such as sustainability and scalability. How do you think this project can be scaled up and made sustainable?

An example of a successful direct ICT intervention for agriculture and poverty reduction is Reuters Market Light, a mobile-based information service for farmers in Maharashtra, India.



Reuters Market Light, India

A farmer in India receives only 20-25 per cent price for their final produce vis-à-vis 40-50 per cent in the developed world. They suffer economic losses because there is a lack of timely and reliable information on prices, weather and other news that affect crop or input prices, government schemes and sources of finance.

Reuters Market Light (RML) is the first mobile phone-based, highly personalized, professional information service that is specially designed for the Indian farmer community. Launched on 1 October 2007, the information provided by RML is personalized to the needs of the individual farmer and includes daily spot prices, localized weather details, crop advisories and commodity news—all dynamically updated.



All this is delivered as per the individual preferences of crops, markets and location of each farmer in his local language. Through sharing, it is estimated in 2010 to have been used by over a million farmers in over 15,000 villages across all handsets and telecom operators. To use this service, a farmer needs to purchase a pre-paid card with a value of INR 260 (USD 5.00) for three months from a variety of rural outlets. The information provided by RML enables farmers to take informed decisions and reduces their production and marketing risks, thereby increasing their incomes.

The biggest change RML has brought about among the farmers is that it has provided them with knowledge that has led to direct financial benefits. The model is both financially and socially sustainable, having become part of the daily routine of farmers.

Sources: <http://www.youtube.com/watch?v=MYZsWWhfO1I>; and author's personal field visit and interviews with farmers in Maharashtra, India in September 2010.

Equally important for tackling the multidimensional aspects of poverty are the creation of effective ICT-based systems for supporting large public programmes addressing poverty issues. An example is Malaysia's SINAR system, a database on the urban poor that has proven useful to governments and donor agencies in their efforts to provide services for this segment of society. Another example is the use of ICT applications by the government of the state of Andhra Pradesh, India in support of a commitment to provide the rural poor with employment for at least 100 days annually under India's National Rural Employment Guarantee Act.

ICTs and India's Mahatma Gandhi National Rural Employment Guarantee Scheme

India's Mahatma Gandhi National Rural Employment Guarantee Act aims to enhance the livelihood security of people in rural areas by guaranteeing 100 days of wage-employment in a financial year to rural households that volunteer for unskilled manual work. The programme, under implementation in many Indian states, has been using ICTs very effectively for providing both the managers and the poor ready access to information.



Innovation through ICT

Successful implementation of MGNREGA seriously depends on the establishment and operationalization of a proper computer based Management Information System (MIS) that interconnects all the Gram Panchayats, Blocks, Districts, States and the Union Ministry through an ICT network.

Ongoing ICT Projects
In view of enormous size of the MGNREGA programme ...
[Read more...](#)

Management Information System
A web enabled MIS
www.nrega.nic... ...
[Read more...](#)

New Initiatives
Department of Rural Development (DRD), Government ...
[Read more...](#)

Geographic Information System (GIS)
The Ministry of Rural Development is planning to ...
[Read more...](#)

RESOURCES

- National Framework : ICT
- ICT Pilot Projects :
 - Concept note
 - Reporting Format
- GIS :
 - Draft Guidelines
 - Sub group report
 - Concept note
- Circulars
- Presentations

Problems in programme implementation of such a massive scheme led to the use of ICTs to provide an end-to-end management information system (MIS) solution that links and interconnects all villages and villagers, and all officials through an ICT backbone. The Web-enabled MIS system makes data transparent and available in the public domain for all the access.

The village level household database has internal checks for ensuring consistency and conformity to normative processes. It includes separate entries for approximately 250,000 gram panchayats (villages/small towns), 6465 blocks, 619 districts, and 34 states and union territories. The portal places complete transaction level data in the public domain, for example— job cards, demand for work and muster rolls that are attendance cum payment sheet for workers.

All critical parameters are monitored in the public domain, including workers' entitlement data and documents, work selection, procurement, execution and payment. Data such as employment demanded and provided, and financial data such as funds available and used are also monitored.

All stakeholders in the programme have access to the data, including the poor village labourers, the local and state level administrators and implementation personnel, public and elected officials, the Ministry of Rural Development and administrators of the Government of India.

The programme had to overcome considerable stumbling blocks of resistance, yet it has been successful in providing up-to-date information for policymakers and implementation personnel. More importantly, it has enabled the poor and the village communities to seek and question the data, as stipulated in India's Right to Information Act. Any poor person, can, with a little help, access the information and seek redressal for grievances, thereby encompassing social accountability of the government mandated under the programme.

Across the board, independent evaluators have testified to the fact that the success of the programme has largely been due to the use of ICTs in managing and administering the programme. There are, of course, opportunities for improvement, and the continuous monitoring feeds into such improvements.

Sources: Ministry of Rural Development, Government of India, "The Mahatma Gandhi National Rural Employment Guarantee Act 2005", <http://nrega.nic.in/netnrega/home.aspx>; and author's personal field visits and discussions with independent evaluators from the Administrative Staff College of India, India.



Questions To Think About

What do you think are the limitations of the Mahatma Gandhi National Rural Employment Guarantee Scheme? How do you think these limitations can be addressed?

There are a variety of initiatives throughout Asia³² that illustrate the use of ICTs to provide vital linkages between rural communities and global markets, and to provide the information necessary to manage poverty alleviation programmes (e.g. poverty mapping using appropriate software). Evidence from these experiments has shown that effective use of ICTs could help small farmers increase their revenues and improve their farming practices by making it possible for them to access information on agricultural know-how and market developments. For example, in Viet Nam, villages such as Bat Trang and Hoi An have created their own websites to market village goods.³³



The Ningxia ICT Project, China (2007-2008)

Ningxia is a province located in Western China, with a rural population of 3.4 million, that is 53 per cent of the total provincial population. The ecological climate of the province is dry and there are water shortages. The economic development of Ningxia is relatively slow and the regional GDP is well below the national average.

The application of ICTs to address rural needs in China is part of national policy. Collaborators in the Ningxia ICT project included the Ningxia Branch of China Telecom, the General Bureau of Ningxia Broadcast and TV, and other related agencies such as the West China Electronic Company. The intervention was supported by the Electronic Networking for Rural Asia/Pacific (ENRAP) ICT for Rural Livelihoods Initiative.³⁴

32 See UNDP, "ICT and Poverty and Hunger: Asian Experiences", World Summit on the Information Society, (Geneva, 11 December 2003), <http://www.apdip.net/projects/rhdr/news/08012004/poverty.pdf>.

33 See UNDP, *Regional Human Development Report – Promoting ICT for Human Development in Asia: Realising the Millennium Development Goals* (New Delhi, UNDP, Elsevier, 2005), p.112, <http://www.apdip.net/elibrary#rhdr>.

34 For more information on ENRAP see case study entitled, "Knowledge Networking for Rural Development in the Asia-Pacific Region".

Through the integration of three platforms (telecommunications, TV and the Internet), a new integrated operational platform was created. The Ningxia ICT project consisted of developing an Internet protocol TV system, a comprehensive information service website for rural Ningxia, a call centre for agricultural farmers in the rural areas and a village information centre to campaign for rural development.

The comprehensive information website provides information on a range of subjects including agriculture, markets, weather, financial instruments and health. Call centres provide voice and video support on aspects such as agricultural technology and processes. The village information centre provides an access point with facilities for the farmers to download and upload information to websites. The call centre is connected to each village information centre using video technology, making face-to-face communication between experts and farmers possible.

An extensive impact assessment of the project was carried out in 2010. Results showed that the use of ICTs varied among various groups according to gender, age, education, occupation and economic level. Education level was a key factor in determining the use of ICTs.

The impact assessment also showed that the ICTs application in Ningxia has had an impact on rural livelihoods, but the potential of the project depends not only on financial resources but also on access to a broad range of social, political and educational resources. Where ICTs have been used well, they have been used as a supplement to, not a substitute for existing information systems and technology extensions.

Source: Nie Fengying and others "Evaluation of a rural information project in Ningxia, China", in *Strengthening Rural Livelihoods: The Impact of Information and Communication Technologies in Asia*, David J. Grimshaw and Shalini Kala, eds. (Ottawa, IDRC, 2011), pp. 109-132, <http://idl-bnc.idrc.ca/dspace/bitstream/10625/45947/1/132419.pdf>.



Questions To Think About

What do you think are the elements of the Ningxia project's success? Could a similar project succeed in your country? Why or why not?

As important as providing direct support to farming communities is the building up of agricultural systems, capacity building in research and extension, and skill and knowledge enhancement for government and agricultural officials working toward the MDGs. The globally available ENRAP is one such single window portal that assists both government and agro-based institutions to build up individual and institutional capacities in agricultural research and extension.



Knowledge Networking for Rural Development in the Asia-Pacific Region

ENRAP was a collaboration between the International Fund for Agricultural Development (IFAD) and IDRC that was designed to bring the benefits of accessing and sharing global information resources to IFAD-supported rural development projects in the Asia-Pacific

region. Its third and final phase ended in 2010. Based on the lessons learned and best practices from ENRAP, IFAD Asia (<http://asia.ifad.org>), a new knowledge sharing portal has been created for IFAD partners, stakeholders and others working to reduce rural poverty.

The ENRAP initiative developed skills in accessing, managing and sharing knowledge relevant to IFAD project objectives and implementation. Users of the knowledge sharing system included project staff and their partners who work directly with rural communities and help make the knowledge available at the grass-roots level. The project sought to foster a culture for knowledge sharing and learning among all of the stakeholders of IFAD projects.

ENRAP investigated strategies, processes, methods and technologies to support rural communication and knowledge networking, and developed recommendations for future activities. It initiated research and development in the area of knowledge networking and Internet applications at the local, national and international levels. Methods and practical solutions fostering participation at the grass-roots level were a special focus. Local electronic newsletters, agricultural market information dissemination and shared electronic libraries were examples of ENRAP-supported activities.

ENRAP included selected groups of projects in the Asia-Pacific region. Other countries not receiving direct assistance from ENRAP were able to benefit from free training materials, documents and databases available on the ENRAP website, as well as technical advice and allocation of working space on the ENRAP website.

A static full copy of the ENRAP website is available at <http://asia.ifad.org/web/956-IDRC>.



Questions To Think About

What other global resources and international organizations exist to help develop national agricultural systems? Are you aware of any such organization serving the interests of your country/region?

To sum up:

- There is enough evidence to show that there is a direct connection between investment in ICTs and economic productivity.
- The use of ICTs by SMEs has been shown to result in improvements in business practices that reduce communication and transaction costs, assist in inventory management, and provide access to global markets, thereby increasing productivity and profits.
- Although economic growth is not a guarantee of poverty reduction, it is essential for sustaining poverty reduction over the longer term.
- Direct ICT interventions that address poverty reduction link the poor to markets and market information.
- Such interventions can be in the form of government programmes, civil society interventions and corporate social responsibility projects of the private sector.



Something To Do

Look for development projects in your country that specifically target: (1) SMEs; and (2) poor communities (e.g. urban poor communities). Identify the role of ICTs, if any, in these projects.

3.3 ICTs in Education

The right to education is well recognized as a fundamental right, not least because education is a vital input in eliminating poverty and other forms of inequality in society. However, social and economic inequities have created a situation where a majority of the world's children are denied this fundamental right. For developing countries, the challenge is how to provide quality education for all in the face of overwhelming scarcity of resources, which in the education sector is manifested in severe shortages of classrooms, textbooks and teachers, among others.

The impact of ICTs on education has been second only to their impact on business practices around the world. A quick broad survey of national efforts will reveal that the use of ICTs is as extensive as it is diverse, ranging from a long history of use of conventional media—radio and TV in countries like China, India and Mexico—to the more recent and very successful use of ICTs in education in Singapore.³⁵

There is often confusion in understanding what the term “ICTs in education” means. In some instances, it has meant “ICT education”, that is the creation of a pool of human resource to cater to the growing knowledge society needs. In other countries, the use of ICTs in education has meant “ICT-supported education” and this has resulted in a large number of distance learning systems providing learning opportunities and consequently increasing access to education. In still some other cases, the term has meant “ICT-enabled education”—essentially meaning the use of ICTs as a primary channel of educational interaction, that is e-learning and m-learning. Very rarely has ICT education been understood as ICTD education or the deployment of ICTs to address development goals.³⁶

Other activities have also come under the rubric of ICTs in education. The trends that are emerging and that involve ICT adoption are specifically in the areas of open learning models (both as distance learning and as knowledge networks); the collaboration and sharing across schools and school systems (Schoolnets); the creation of text and audio visual resources as “learning objects”³⁷ available as open educational resources;³⁸ and the different ways in which teachers are using ICTs to enhance teaching and learning processes in their classrooms. Adding to the array of applications are the sectors in which ICTs are increasingly being deployed—formal, non-formal, distance and teacher education settings, and for broad educational and specifically instructional purposes.

35 In 1997, Singapore launched a Masterplan for IT in Education. This has led to a highly successful and innovative ICT for Education initiative with four specific pillars: curriculum and assessment; learning resources; human resource development; and physical and technological infrastructure.

36 UNESCO has an ICT in Education Programme that focuses on the ICTD aspects, including harnessing the potential of ICTs towards achieving quality education for all, and addressing the digital divide. Projects include “Bridging the Within-Country Digital Divide in Education: Improving Education in Western China through Innovative Use of ICT” and “Establishing effective use of ICT in Education for All in Cambodia”. See <http://www.unescobkk.org/education/ict/>.

37 A learning object is a resource, usually digital and Web-based, that can be used and reused to support learning.

38 Open educational resources are digitized materials offered freely and openly for educators, students and self-learners to use and reuse for teaching. See http://en.wikipedia.org/wiki/Open_educational_resources.

This module examines the use of ICTs in the broad areas of educational settings—the formal, curriculum-based settings of school and distance education; and the more development-oriented non-formal education (NFE). Teacher education efforts will also be examined. While a few large-scale country models will be described, the analysis will focus on the collaborative efforts between island communities and small landlocked states that have very unique and special conditions to consider.

The challenge of access, of providing good quality education to all of a country's children cannot be done by simply following conventional ways of teaching and learning, enrolment, assessment, and certification. The use of technology options is a must to bridge the demand-supply gap in education. ICTs can be and have been used to provide access to education for those who, for reasons of poverty, physical disability, geographic location, gender, conflict, occupational commitments or cultural restrictions, are unable to go to school. For example, radio and TV have been used in countries like China and Mexico to deliver classroom instruction to children and youth in remote communities. In male-dominated societies, technology has proven to be a cost-effective alternative to all-female schools for educating women and girls. Through the open school movement, educational authorities in various countries of the Asia-Pacific region have been experimenting with different ICTs, from the conventional print materials to audio visuals and e-learning, to provide underserved sectors access to primary and secondary education.



Open Schools of the Asia-Pacific

Technology-based open and distance learning provides a means of:

- Overcoming barriers in basic education by enabling access to national qualifications outside formal schools
- Overcoming geographical barriers (such as radio broadcasting in disaster zones, mountainous regions and small island states)
- Training large numbers of teachers in situ (distance education)

It also offers the potential to deliver better value for money, particularly with the economies of scale that can be achieved in high population South Asian countries.

Opportunities for education in open schools include the: (1) provision of alternative schooling systems for the educationally disadvantaged; (2) promotion of successful transition to and performance within formal schools; (3) raising of quality through ready-made educational materials and resources; and (4) provision of training for teachers.

India's National Institute of Open Schooling is by far the largest open school in the world, providing basic and secondary education to more than 1.5 million people. Bangladesh's open school provides similar opportunities for study as do the open schools of Sri Lanka and Pakistan.

The Philippines' eSkwela Project is an initiative of the Commission on ICT. It aims to:

- Provide ICT-enhanced educational opportunities for Filipino out-of-school youth and adults
- Enhance the capacity of these individuals to be successful participants in a global and knowledge-based economy
- Help reduce the digital divide

Under this project, community-based e-Learning Centres or eSkwelas are being established across the country to conduct ICT-enhanced alternative education programmes. These centres serve as venues where out-of-school learners and other community members can learn new skills and competencies, review for the Accreditation and Equivalency Exam of the Bureau of Alternative Learning System, and/or help prepare learners to rejoin the formal school system, if so desired.

The eSkwela Project utilizes an ICT-enabled, inquiry-based, interdisciplinary, and thematic approach to learning and teaching. At the heart of the eSkwela Project is its instructional design. It is a blended type of learner-centred instruction where students will have one hour of computer-aided learning via interactive e-learning modules, one hour of teacher-led instruction (based on the current needs of the learners), and one hour of collaborative group activities and projects. The project currently has 123 of the 283 targeted e-learning modules certified by the Bureau of Alternative Learning System of the Department of Education.

From a pilot run of four sites in 2006-2007, there are now 95 sites (as of 30 June 2011). Most of the centres are community-led shared facilities, meaning the communities were the ones that sourced the infrastructure, the connectivity, the personnel, and sustainability costs. The Commission on ICT provided the awareness raising, training, systems and content, and monitoring of activities. There are centres on top of public markets, inside container vans, in existing community e-centres (or publicly owned Internet cafes), and even one that is transported from village to village on board a motorbike.

Having served an estimated 6,300 learners since 2007, the eSkwela centres around the country are living testimonials to the potentials of ICTs in education.

In 2011, the Commission on ICT officially handed over the project to the country's Department of Education. Funded initially by the APEC Education Foundation, it currently receives its funding from the e-Government Fund provided by the National Government.

Sources: eSkwela, <http://eskwela-apc-nstp.wikispaces.com/about+the+project>.
eSkwela, "The eSkwela Project: The Establishment of Community e-Learning Centers for the Out-of-School Youth and Adults", <http://alseskwela.ning.com/page/the-eskwela-project-1>.
Jasmine Mohammadsali, "eSkwela transfers from CICT to Department of Education", telecentre.org, http://community.telecentre.org/profiles/blogs/eskwela-transfers-from-cict-to?xg_source=activity.
National Institute of Open Schooling, <http://www.nios.ac.in>.
UNICEF and Cambridge Distance Education Consultancy, *Open Distance Learning for Basic Education in South Asia* (Kathmandu, UNICEF, 2009), [http://www.unicef.org/rosa/ODL_Report_\(Final_version\)___10_Dec_09.pdf](http://www.unicef.org/rosa/ODL_Report_(Final_version)___10_Dec_09.pdf).



Something To Do

Search the Web for initiatives, in your country or elsewhere, that are similar to the examples given in the case described. What do these initiatives have in common? What are their differences? How do each address issues of educational quality?

SchoolNets represent an ICT-supported approach that specifically aims to improve the quality of educational provision in schools. SchoolNets are groups of schools that use ICTs to work together or collaborate to enhance teaching and learning. SchoolNets have been set up in Africa, where collaboration between schools has been both necessary and effective, and in South-East Asia, where the system is actively being supported by international agencies. The emergence of SchoolNets in the Pacific region highlights both the potential and the possible pitfalls that such efforts can have.



A SchoolNet and Community Access Model for the South Pacific

The Samoa SchoolNet and Community Access Project is an initiative of the Government of Samoa, with funding support from the Asian Development Bank, to pilot an appropriate model for introducing ICT in schools and their respective communities.

The project involves establishing in the school a Learning Centre equipped with computers, photocopier, camera, DVD, printer, Internet connection, fax and multimedia projector, among others. Students and teachers use the Learning Centre during school hours. The same facility functions after hours as a business venture catering to community members. This scheme provides financial support to the Learning Centre. Collaboration between the school staff and respective school committees has also been strengthened through this project.

Vaitele Uta Primary School was the first school in Samoa and in the entire South Pacific to be connected as a SchoolNet school. Then Vaimauga College and Lepa/Lotofaga College joined the network. The team has since connected Amoa College and Mataaevave College on Savaii.

The connectivity model is a hybrid design using wireless broadband and dial-up connecting through a data centre. The timely introduction of the new ICT legislation by the Government of Samoa to regulate the communications sector and the issuance of new 3G licenses will only improve ICT services and connectivity. The expansion of the wireless connectivity is particularly significant, as it is relatively inexpensive to install, easily expanded to other parts of the country, and very well suited to the geography of Samoa.

Source: Adapted from Asian Development Bank, "Samoa SchoolNet", <http://www.adb.org/Projects/project.asp?id=36513>.



Questions To Think About

What do you think are the benefits of connecting schools to each other, and of connecting schools to the community? How can this strategy help improve access to education, as well as the quality of education provision, in your country?

Because the use of ICTs implies a minimum level of computer literacy, it was initially promoted in the educational sector as a tool to support higher education. Consequently, the most extensive use of ICTs in education has been in higher education, especially with the establishment of open and distance learning institutions. Today's distance education programmes are delivered online, in a mode called e-learning.

One of the oldest and most successful models of ICT application in formal education with a history of technology application dating more than three decades, especially in the Asia-Pacific region, is the University of the South Pacific.³⁹ Based on its enormous success, and the possibility that the consortium model⁴⁰ followed by the University of the South Pacific could be used to address

³⁹ See http://www.usp.ac.fj/index.php?id=usp_introduction.

⁴⁰ A consortium is a partnership of a group of institutions and/or countries who come together for achieving a common objective. Each partner, while remaining independent, brings its own expertise and capabilities to enhance the skills of the whole. Consortia are based on agreements between partners that specify the rights and responsibilities of each partner in the development and use of shared resources and outputs. The University of the South Pacific, like the University of the West Indies, is a consortium or partnership between 11 countries of the South Pacific that have agreed to set up a common university to serve their needs.

the digital divide in education, the small states of the Commonwealth, especially those from the Pacific region, have formed an alliance with landlocked states to make a plea for a virtual university that would specifically address their needs while making the best use of technology options. The result is the Virtual University for Small States of the Commonwealth (VUSCC).



A Virtual University for Small States of the Commonwealth

The VUSCC was established in 2005 on the recommendation of the Commonwealth Education Ministers. Thirty countries are part of the VUSCC initiative, with the Commonwealth of Learning, an international agency based in Vancouver, Canada, coordinating activities. Currently, it is led by an independent Management Committee.

The VUSCC focuses on creating post-secondary, skills-related courses in areas such as tourism, entrepreneurship, professional development, disaster management and a range of technical and vocational subjects. Non-proprietary, electronically held course materials that can be readily adapted to the specific context of each country are used in the offering of credit-bearing qualifications in the post-secondary institutions of the VUSCC countries. This has strengthened their educational capacity and outreach.

A major project is the creation of Open Educational Resources using existing course content to be made available via the Internet.

The extent of VUSCC's success has yet to be measured. However, even at this stage, it may be said that the VUSCC is helping to bridge the digital divide and showing that small states can become active contributors to global development and leaders in educational reform through the innovative use of ICTs.

Sources: Adapted from Commonwealth of Learning, "A Virtual University for Small States of the Commonwealth (VUSCC)", <http://www.vuscc.info>; and Commonwealth of Learning, "COL in the Caribbean", <http://www.col.org/progServ/report/region/Pages/caribbean.aspx>.



Questions To Think About

The VUSCC is a long-term initiative that involves extensive cooperation and collaboration among its partners. Such collaborations have the potential to succeed, but they also face various risks that can lead to failure. What do you think are the factors for success? And what do you think are the risks that could lead to failure if not properly addressed?

Another area of educational provision where ICTs may be leveraged is NFE. Today, NFE is an integral part of the concept of lifelong learning through which young people and adults are expected to acquire and maintain skills and abilities needed to adapt to a continuously changing environment. In developing countries, basic literacy programmes are a major component of NFE and most of these continue to be delivered face-to-face. But there is evidence that this is changing.⁴¹

⁴¹ See, for example, Tata Group, "Tata Computer-based Functional Literacy Programme" (Tata Sons Ltd.), <http://www.tataliteracy.com>; and Glen Farrell, *ICT and Literacy: Who benefits? Experience from Zambia and India* (Vancouver, Commonwealth of Learning, 2004), <http://www.col.org/resources/publications/Pages/detail.aspx?PID=38>.



People First Network, Solomon Islands

A project of the University of the South Pacific used People First Network (PFnet), an existing communications network, to demonstrate the application of ICT in delivering non-formal and continuing education to remote communities.

In this project, the University of the South Pacific established a PFnet gateway base station in the rural community of Sasamungga, Choiseul along with a solar-powered computer centre at the community school. Members of the community were taught pre-tertiary English and English for All Purposes at the computer centre.

Participants considered the project a success. Staff and administrators at Sasamunga Community High and Primary School were given access to computers. More importantly, organizational and attitude changes were observed as village leaders realized the importance of using ICTs in their communities.

Source: Adapted from Rural Development Volunteers Association, "Pipol Fastaem", UNDP and UNOPS.

A key application of ICTs in education in developing countries is in teacher professional development. ICTs are an important means of training the large numbers of teachers that are needed to meet the challenge of providing education for all. And because they are the key to the effective use of ICTs in the classroom, teachers need to develop both the technical and pedagogical skills necessary for ICT-supported teaching and learning. This is particularly important in the new knowledge economy where the goal of education has shifted from developing mastery of a fixed body of knowledge and skills to developing "21st century skills"—critical thinking, information literacy, problem solving, collaborative learning, and the ability to learn new knowledge and apply that knowledge to new situations.⁴²

The success of Singapore's ICT in education effort was largely based on the successful training of teachers to work in an ICT-enhanced environment even before computers were placed in schools. Bhutan entered into a partnership with the Singapore International Foundation to systematically introduce teachers to ICTs through several training programmes in their colleges of education. The effort was synchronized with the deployment of hardware in schools for the teachers to use in ICT-supported lessons. After the first round of teacher training, the second phase saw the integration of ICTs into the curriculum as a requirement in the Bachelor of Education programme.⁴³ In Bangladesh and Nepal teachers are likewise being trained in a range of technologies, from computers to digital cameras. Similar initiatives are underway in countries as different as Mongolia and Samoa.⁴⁴ Despite the differences, there is a common recognition that without effective teacher training in ICT and curriculum integration, a major component of educational reform would be left out.

It is important to understand that ICTs are not the cure-all for all of the problems plaguing education systems. Furthermore, the potential benefits of ICTs are more likely to be realized when ICTs are introduced in the context of system wide reform in educational policies and practices. Real learning gains and the improvement of an education system will take place only when all of the elements of educational change, from policies and practices, to teachers, learners and other stakeholders, come together.

42 Wadi D. Haddad and Alexandra Draxler, eds., *Technologies for Education: Potentials, Parameters, and Prospects* (Paris, UNESCO and Washington, D.C., AED, 2002), p. 7, <http://unesdoc.unesco.org/images/0011/001191/119129e.pdf>.

43 Philip Wong, "Bhutan 'Support for Teacher Education' Project", in *ICT in Teacher Education: Case Studies from the Asia-Pacific Region*, Ellie Meleisea, ed. (Bangkok, UNESCO, 2007), pp. 3-9, <http://www.unescobkk.org/index.php?id=7035>.

44 Case studies on the use of ICTs in teacher education in different countries of the Asia-Pacific can be found in: Ellie Meleisea, ed., *ICT in Teacher Education: Case Studies from the Asia-Pacific Region* (Bangkok, UNESCO, 2007), <http://www.unescobkk.org/index.php?id=7035>.

To sum up:

- ICTs can be used to provide access to schooling and to continuing education, and to improve the quality of education in the classroom.
- ICTs can enable networking and collaboration among students and teachers in different schools, which makes learning engaging and challenging.
- Teacher education is one of the key applications of ICTs in education.
- There is extensive use of ICTs for NFE especially for literacy and general knowledge about health, nutrition and the environment, leading to a better quality of life.



Something To Do

From existing case studies, it seems clear that ICTs can be used to expand access to education and enable collaborative networks such as SchoolNets to improve the quality of education. However, can ICTs be used in the absence of minimum literacy levels among the poor? Try to locate and discuss any experiment or project where this has been attempted, either in your own country or elsewhere in the world.

3.4 ICTs and Gender Equality

Contrary to biological sex, gender refers to the socially constructed relations between women and men in a particular society. Therefore, gender perspectives and the roles of men or women are culture bound and may differ from one society to another and from time to time.

Gender is a critically important development issue. Global data point to the great gender disparities and discriminations that exist in many parts of the world. There is also a recognition that the problems of national development (i.e. poverty, education and health), cannot be addressed and development goals achieved unless women and girls are part of the mainstream of society.

There is global and official recognition of this fact, as evidenced by the inclusion of gender equality in the MDGs. However, there is lack of clarity at all levels of decision-making and implementation. Many development policies and programmes remain gender-blind, none more so than those involving ICT integration. According to a study by the Swedish International Development Agency,⁴⁵ although there are a number of areas where ICTs have helped to alleviate poverty, most ICT projects have focused on the “poor” as a general category without necessarily paying attention to women’s issues.⁴⁶ As a consequence, the projects have not benefited women. This is a problem because ICTs are increasingly becoming a major tool of social participation and economic productivity, and failure to equip women with ICT skills will marginalize them further.

ICTs can benefit women directly when women exploit ICTs to improve their own status, and indirectly when ICTs are used to improve delivery of information and services to women. ICTs offer possibilities for women to directly engage in e-commerce, and access education and e-government, bypassing the socio-cultural barriers that have hindered access to economic advancement. Among women’s groups, the use of ICTs has enabled women to organize advocacy

45 Alan Greenberg, *ICTs for Poverty Alleviation: Basic Tool and Enabling Sector* (Stockholm, Swedish International Development Agency, 2005), <http://www.sida.se/sida/jsp/sida.jsp?d=118&a=3607&language=en>.

46 Anita Dighe and Usha Vyasulu Reddi, *Women’s Literacy and Information and Communication Technologies: Lessons that Experience has Taught Us* (New Delhi, Commonwealth Educational Media Centre for Asia and Commonwealth of Learning, 2006), p. 33, http://www.cemca.org/CEMCA_Womens_Literacy.pdf.

campaigns for women's rights and participation by providing a new communication forum for the expression of their views and for raising awareness of women's issues.

Data on the gender divide in the use of ICTs does not exist for most of the Asia-Pacific region. But what is known is that most of the barriers women face in accessing ICTs are the same ones they face when accessing education or economic opportunity of any kind—illiteracy, lack of awareness, poverty, lack of time, low confidence and self-esteem, and socio-cultural norms that restrict mobility. Other barriers to women's access to ICTs can be summed up in three major categories: content relevance, availability and usage. Women's use of ICTs is hampered when the content is not directly relevant to their livelihood and other concerns, and when it does not value their knowledge, wisdom and experience. Studies show that unless the content delivered by ICT has a direct impact on women's lives, women will not perceive the need and benefits of ICTs.⁴⁷

The best known example of a direct ICT intervention that has helped women obtain and sustain a livelihood is the Grameen Phone project in Bangladesh.



Grameen Phone, Bangladesh

Village Phone (VP) is a unique idea that provides modern telecommunications services to poor people in Bangladesh. Grameen Bank, world famous for providing collateral-free loans to the poor in rural Bangladesh, plays a vital role in Grameen Telecom's VP programme, specifically by providing organizational support to Grameen Telecom in the selection of members, collection of bills, handling of day-to-day problems, and the like.

The programme aims to:

- Provide easy access to telephone services all over rural Bangladesh;
- Initiate a new income-generating option for the villagers;
- Gradually bring the benefits of the Information Revolution to the doorsteps of villagers (i.e. bring IT to the poor); and
- Use telephones as a tool against poverty.

A Grameen Bank member who has a good record of loan repayment and who is literate or who has children or a relative who can read and write, is entitled to have a VP. Most of the VP operators are women, and are often called the Village Phone Lady.

The VP operator's income is derived from the difference between the air time charges paid by the customers and the billed amount that the VP operator must pay, along with a flat service charge that each customer pays.

The programme has worked because Bangladesh is flat, poor and densely populated, and mobile phone signals reach far and, in comparison to landlines, require much less infrastructure. For VP operators and the various organizations involved, the economics are persuasive: The telecom generates a profit, the microfinance institution makes money on its repaid loans, the VP operators generate an income, and villagers can now make calls at discounted rates when they could not do so before. Moreover, evaluation findings show that this modern technology has increased the social standing of the Village Phone Lady, and it has substantially empowered women from rural households who can now access

⁴⁷ Sophia Huyer and Swasti Mitter, *ICTs, Globalisation and Poverty Reduction: Gender Dimensions of the Knowledge Society - Part I. Poverty Reduction, Gender Equality and the Knowledge Society: Digital Exclusion or Digital Opportunity?* (New York, Gender Advisory Board, 2005), p. 19, <http://gab.wigsat.org/policy.htm>.

services provided by governmental and non-governmental organizations through a simple telephone call from their village.

When the initiative was launched, it was unique because of the poor teledensity in Bangladesh. It was also unique in that it provided not only economic upliftment, but also empowerment to socially and culturally disadvantaged women. The initiative has been replicated in several other countries, often with similar results.

At the time of writing, mobile penetration is more than 40 per cent and may soon touch 50 per cent in Bangladesh. It remains to be seen how the VP experiment addresses the challenge of the new telecommunications environment in Bangladesh.

Sources: Adapted from Grameen Telecom, "The Concept of Village Phones", <http://www.grameentelecom.net.bd/vp.html>; and Grameen Foundation, "Village Phone: Connecting Technology and Innovation", <http://www.grameenfoundation.org>.



Questions To Think About

The Grameen Phone programme has been emulated in other parts of the developing world. But in light of the rapidly decreasing costs of mobile technology, which means that even poor people might one day be able to acquire their own mobile phones, do you think that the VP will continue to have relevance? What are the prospects for the programme's sustainability? What is required for the programme's survival and expansion?

That ICTs have created new economic opportunities for women is evidenced by the large number of women, especially in countries like India and the Philippines, where they have entered the workforce in IT-enabled services such as call centres and helplines. Telework and e-commerce enable women to work from home. These ICT-enabled economic opportunities are much more successful when designed, operated and managed by women, as in the case of eHomemakers, Malaysia.



Salaam Wanita, Malaysia

Salaam Wanita is an initiative of the pioneering eHomemakers network of Malaysia, an online community of women "that promotes working from home, teleworking and the running of SOHO (Small Office Home Office) businesses through the use of information and communications technology."

Initially, eHomemakers addressed the needs of Malaysian women from middle- to low-income groups wanting or needing to stay at home to look after their children while also being economically self-sufficient. Much of the project planning, design and execution was done by women volunteers who had similar needs. In just a few years, eHomemakers enjoyed financial success and social recognition.

With a government grant, eHomemakers launched Salaam Wanita to address the needs of disadvantaged women, among them the abused, disabled and chronically ill, as well as single mothers and widows. In 2002, about 200 Salaam Wanita members received basic training on the use of computers and the Internet. Secondhand computers were then

procured for some of them so that they could use their new skills to generate an income and become self-reliant. Salaam Wanita also conducted workshops where women learned to weave eco-baskets. The women received business management training that included costing their products and handling finances.

Besides economic empowerment, eHomemakers provides information and support on key issues affecting women like social prejudice and self-defeating mindsets. Indeed, networking through eHomemakers has turned around the lives of members who were on the brink of despair and even verging on suicide.

Challenging the traditional view that only the young and educated can use IT, eHomemakers has made their portal a democratic space through which members have been introduced to concepts like choice, costs of working, technology use and taking better control of their lives.

Sources: Adapted from eHomemakers, "About Us: Empowering Homemakers to Become Homepreneurs: eHomemakers Malaysia", April 2006, <http://www.ehomemakers.net/en/aboutus.php?id=48>; and JustMarketing, "JustMarketing: Salaam Wanita Project", Corpcom Services Sdn. Bhd., <http://www.justmarketing.info>.



Questions To Think About

What factors do you think account for the success of programmes like eHomemakers and Salaam Wanita? Can such programmes be replicated in your country? In the ESCAP high-priority countries?

ICTs can also facilitate women's participation in government and political affairs by providing a communications platform to exchange opinions, to articulate and aggregate interests, and to engage political leaders in women's issues. Women's advocacy groups can effectively use ICTs to network and connect with each other, and to mobilize public opinion. For example, the Centre for Women's Research,⁴⁸ which monitors the use of ICTs by women's groups in Sri Lanka, has reported that enhanced networking has been one of the most useful and practical results of increased access to ICTs. Increasingly, women's groups in Sri Lanka have become better connected with women's groups and activists around the world. Similarly, Shirkat Gah, one of Pakistan's most respected women's rights groups, has used the Internet to support their networking, information and communication needs and in the process, strategically link local women's concerns with the global women's movement.⁴⁹

But there are challenges. Social and cultural attitudes are deep-rooted, and with the majority of women in rural areas deprived of education and livelihood skills, it is difficult to imagine how they can harness the full potential of ICTs. Lack of content and software in local languages remains a barrier, assuming that lack of access to expensive ICT hardware is addressed. Unless key players in national ICT policymaking and implementation integrate gender into every aspect of their plans and target women as a specific group, women's participation in ICT-enabled development will not be realized.

To sum up:

- The barriers that women face when accessing education and ICTs are similar—poverty, illiteracy, lack of time and lack of relevant content.

⁴⁸ See <http://www.cenwor.lk>.

⁴⁹ W. Harcourt, "World Wide Women and the Web", in *Web Studies: Rewiring Media Studies for the Digital Age*, David Gauntlett, ed. (Rome, Society for International Development, 2000).

- However, when technology is placed in their hands, women are able to improve their economic and social status in the community.
- Women use technology not just to learn and to generate an income, but also to create women-friendly spaces on the Internet for building up networks to voice and share their concerns, and to lobby for gender equality.



Something To Do

Design an ICT-supported project to develop self-confidence and economic self-sufficiency among the marginalized women in your country. Start by identifying a specific group of women (e.g. elderly women, women in urban poor communities, adolescent girls in rural communities, or even a group of women in a *particular community*). Describe their situation and social and economic needs, then articulate the project objectives, target outcomes and project strategy/ies. You might also specify a timeline for achieving the target outcomes.

3.5 ICTs and Health

ICTs have facilitated two-way exchanges in health care between rural and isolated communities and urban areas, enabled effective health monitoring systems, provided access to the latest findings from medical research, and provided for a system of continuing professional education for health professionals. From these initiatives, it may be deduced that there are two main categories of key stakeholders in the health sector who can benefit from ICT support. The first category consists of ordinary people who need health care, especially those people whose access to health services and/or health-related information is limited. In short, the first category of ICT-supported health care beneficiaries includes those for whom health services are intended. The second category of stakeholders includes health care providers; medical professionals such as doctors, nurses and caregivers at the primary health care level; researchers and health managers; and even policymakers in the area of health care. For the first group, ICT interventions can be direct, linking patients to expert medical services. For the second group of stakeholders, ICT interventions can be indirect and supportive through the creation of health monitoring systems or continuing professional education. Both types of ICT interventions are discussed below.

e-Health is the umbrella term that includes all aspects of ICT use in health care. e-Health includes telemedicine, where medical advice or consultation is provided over long distances via Internet, radio, telephone or other communication technologies. Telemedicine is often used to connect patients in rural and remote communities to medical specialists in the city. One form of telemedicine is interactive video conferencing where geographically separated doctors and patients can have a consultation. A camera in an examining room enables a doctor to present the patient to the specialist based elsewhere, thereby significantly reducing the costs of bringing the patient to the specialist or the cost of travel by the specialist to remote locations. This also broadens access to health care even when there is an acute shortage of medical practitioners.

India is one of several countries that have been using telemedicine extensively. Currently more than 78 hospitals in eight states have linked up to the Indian Space Research Organization's network, thus extending specialized and advanced consultation to the remote Northeast and the

Andaman and Nicobar islands.⁵⁰ Pakistan has been running, since 1998,⁵¹ a “store and forward” telemedicine system where a patient’s medical information is collected locally (stored) and then sent to a qualified doctor (forward) in any part of the world who is then expected to respond with a diagnosis and treatment recommendation within 24 to 48 hours. Thailand⁵² is among other Asia- Pacific countries to have also developed telemedicine systems. The Trans-Eurasian Information Network 2 (TEIN2) links hospitals across a region that spans Australia, China, Indonesia, Japan, Malaysia, the Philippines, Republic of Korea, Singapore, Thailand and Viet Nam, and supports a global community of over 30 million users.⁵³ In Afghanistan, an innovative public-private partnership (PPP) is delivering telemedicine services to remote locations. A report that includes descriptions of various telemedicine projects in several Asia-Pacific countries shows that there are initiatives such as HealthNet in Nepal, a mobile telemedicine system with multi-communication links for urban and rural areas in Indonesia, and more.⁵⁴

A case study from Pakistan illustrates the power and the capacity of Web-based telemedicine initiatives to address rural health needs.

Telemedicine in Pakistan

In Pakistan where medical services for the poor are insufficient, the TelmedPak initiative seeks to use ICTs to bridge the gap between doctors and patients through two distinct ways. The first method is called Store and Forward Telemedicine (described above). The other technique is known as Real Time Telemedicine: the patient’s data becomes available to the specialist as soon as the local doctor receives the information. This method uses video conferencing technology and live data transmission.



The screenshot shows the TelmedPak website interface. At the top, there is a search bar and navigation links for Home, Health, Telemedicine, Medical Education, and About Us. The main content area features a news article titled "TeleMedicine in Pakistan". The article text reads: "Imagine being ill or in physical pain and knowing that there's a remedy out there some where - but you have no access to it- that's where we the TELMEDPAK team come in. In the past few years the alphabet 'e' has been attached to almost everything - e-mail, e-learning, e-commerce, e-banking, e-retail and e-services to name a few. Yet the concept of 'e-health' is still a new and emerging one. Gunther Eisenbach the 'virtual doctor' describes e-health as an 'emerging field in the intersection of medical informatics, public health and business, referring to health services and information delivered or enhanced through the Internet and related technologies.' This article dives into just one aspect of the e-health pool - Telemedicine. In its simplest form, Telemedicine is the use of telecommunications technology to provide medical information and services. It involves the transfer of electronic medical data (i.e. high resolution images, sounds, live video and patient records) from one location to another. This transfer of medical data utilizes a variety of telecommunication technology, including telephone lines, the internet, CD-ROMs and voice response systems. Telemedicine is utilized by health providers in a growing number of medical specialties including dermatology, oncology, radiology, surgery, cardiology, psychiatry, gynaecology and home health care. Telemedicine works in two ways. The first method is regarded as **Store and Forward Telemedicine** whereby the patient's medical information is collected locally (stored) and then transferred to a qualified doctor (forward) in any part of the world, a response can usually take about 24 to 48 hours. The other technique is known as **Real Time Telemedicine** where the patient's data is available to the specialist as soon as the local doctor receives the information, this method uses video conferencing technology and live data transmission.

Through its initiatives in Taxilla, Gilgit and Upper Punjab, the system provides a telecommunications link between doctors and patients for a variety of health related issues. The system also provides vital health services during disasters especially in the upper reaches of the Himalayas where villages are otherwise inaccessible.

Sources: Adapted from TelmedPak, "Telemedicine in Pakistan", <http://www.telmedpak.com>; and <http://www.telmedpak.com/Telemedicine>.

- 50 R.L.N. Murthy and L.S. Satyamurthy, "Indian Telemedicine Program: Marching Toward Transforming National Healthcare Delivery System", (Indian Space Research Organization), http://www2.telemed.no/ttec2007/presentations/session08_tuesday/s08_tue_1315_Abdul_OK.ppt.
- 51 See TelmedPak, "Telemedicine in Pakistan", <http://www.telmedpak.com>.
- 52 See PubMed, "The Ministry of Public Health Telemedicine Network of Thailand", (National Center for Biotechnology Information), <http://www.ncbi.nlm.nih.gov/pubmed/11311665>.
- 53 See DANTE Ltd., "TEIN2", <http://www.tein2.net>.
- 54 See Michael Dougherty, *Exploring New Modalities: Experiences with Information and Communications Technology Interventions in the Asia-Pacific Region - A Review and Analysis of the Pan-Asia ICT R&D Grants Programme* (Bangkok, UNDP-APDIP, 2006), pp. 121-140, <http://www.unapcict.org/ecohub/resources/exploring-new-modalities>.



Questions To Think About

The Pakistan project demonstrates both direct ICT interventions to provide health services to the poor and to remote populations and an indirect ICT-supported intervention in the form of capacity building for health professionals. What accounts for its relative success so far? What do you think will ensure the project's sustainability? Is it a project that can be replicated in other countries, including your own?

Go to the project website for more information to support your answers.

Using ICTs to link doctors to poor patients in rural areas has a direct and significant impact on the quality and reach of a country's health services. Two Indian initiatives in the field of improving access for the rural poor to health care (Emergency Management and Research Institute [EMRI] 108 and Aarogyasri) are fast proving to be game changers in the way health care is managed.⁵⁵

Using ICTs to improve the quality of health care education and administration is equally important as they impact upon the provision of health services. In many developing countries there is a lack of a critical mass of health care professionals, including doctor educators for teaching hospitals. Access to important medical literature is limited for both medical students and health workers who must keep abreast of the latest developments through continuing medical education and training. ICTs have a key role to play in meeting these needs. For example, an initiative started by a young doctor in India is providing medical content in multimedia format both online and offline to a large clientele of medical students, aspiring doctors and practising health professionals.⁵⁶ Global networks are providing access to medical journals and to vast online libraries either for free or at a substantially reduced subscription fee. The World Health Organization (WHO)-supported Web portal called the Health InterNetwork Access to Research Initiative (HINARI) is a global effort to provide support to health professionals and policymakers worldwide.



The Health InterNetwork Access to Research Initiative

HINARI was established by WHO in collaboration with major publishers to give developing countries access to one of the world's largest collections of biomedical and health literature. Over 3,750 journal titles are now available to health institutions in 113 countries, benefiting many thousands of health workers and researchers and in turn contributing to improved world health.

Launched by the United Nations Secretary-General in 2000, the network has brought together public and private partners to provide equitable access to health information, and it is being effectively used by health professionals, researchers and policymakers alike.

Source: Adapted from WHO, "HINARI Access to Research Initiative", <http://www.who.int/hinari>.

55 Both the EMRI ambulance scheme and the Aarogyasri Health Insurance scheme target poor populations and provide vital support to the provision of health care in Andhra Pradesh and elsewhere in India. See <http://www.emri.in> and <https://www.aarogyasri.org/ASRI/index.jsp> for more details. See also http://mohfw.nic.in/NRHM/Documents/dfid_directory_of_innovations_march.pdf.

56 See MEDRC EduTech Ltd., "SmarTeach", <http://www.smartteach.com>.



Questions To Think About

Look up the HINARI website and other news reports to see how this kind of support system has been useful in tracking and tackling recent epidemics such as Severe Acute Respiratory Syndrome (SARS) and the avian flu. Do your country's health officials use this system? Why or why not?

Efforts to modernize hospital and health administration have led to the development of a large number of health administration software. These MIS enable the recording and reporting of patient data of individual departments that are then linked in an intranet system for effective administration. Given the resource requirements of these kinds of projects, it is not surprising that private corporate hospitals are taking the lead in this area.

Another critical application of ICT in health is the deployment of ICT-based surveillance systems for the prevention, reporting and monitoring of diseases such as HIV/AIDS, malaria, tuberculosis and leprosy.⁵⁷ The availability of such systems has enabled both international agencies and national governments to monitor outbreaks of diseases across international borders. For instance, addressing protection against and treatment of quickly spreading diseases such as SARS and the avian flu has been possible only because of ICT-based health surveillance systems.

However, in Asia a number of countries still lack the basic infrastructure to support the use of ICTs. As a consequence, the diffusion and use of ICTs in health is still at a nascent or primary stage. Until and unless investments in ICT infrastructure and access are made to underpin the health support system, maximizing the potential of ICTs in health care may remain a distant dream.

To sum up:

- Major stakeholders in the health sector include people needing health services, especially those with limited access to health care such as rural and marginalized people, as well as health care professionals.
- Telemedicine is the most common application of ICTs in health. Telemedicine has been used extensively in many countries of Asia-Pacific.
- There are several global efforts such as HINARI to support the knowledge needs of health professionals.
- Global surveillance systems have enabled countries to contain the threat of cross-border diseases such as SARS and the avian flu.



Something To Do

Identify one major health need among the poor and one health service in your country that is capable of meeting such a need. Discuss what kind of ICT application might be useful to effectively connect the need and the service.

⁵⁷ UNDP, *Regional Human Development Report – Promoting ICT for Human Development in Asia: Realising the Millennium Development Goals* (New Delhi: UNDP, Elsevier, 2005), pp.147-160, <http://www.apdip.net/elibrary/#hdr>.

3.6 ICTs and Environment, Climate Change and Green Growth

Inequitable distribution of resources and unbridled exploitation of natural resources have created a global crisis of monumental proportions. Global climate changes, including global warming and extreme climate events, are increasingly being felt in various parts of the world. Island states are particularly vulnerable to the effects of global warming and rising sea levels while landlocked and mountainous states are vulnerable to the melting of glaciers, soil erosion and avalanches. The most vulnerable victims of climate change are the poor, wherever they are located, since the scale of global degradation results in the loss of their livelihoods. The large-scale suicides of farmers as a result of droughts in India are evidence of this.

Module 10 of the *Academy of ICT Essentials for Government Leaders* module series examines the relationship between environment, climate change, and green ICTs extensively. For this reason, this section will only introduce the role that ICTs can play in promoting developmental goals in a sustainable manner.

ICTs have a major role to play in addressing environmental issues, whether through the use of geographic information systems (GIS) for the mapping of natural resources or as a means of drawing sharp attention to the consequences of deforestation. For island and other remote areas, integrated planning and management systems using ICTs could be very useful. The Tikiwiki example described below is one such initiative.



Tikiwiki GeoCMS, Pacific Island Countries

The Tikiwiki Geospatial Content Management System (GeoCMS) project of the Pacific Islands Applied Geoscience Commission (SOPAC)⁵⁸ aims to reduce the vulnerability of the Pacific Island Countries to the adverse effects of climate change through the development of an integrated planning and management system.

ICT development and related capacity building are very important to the project, a key component of which is the GeoCMS that facilitates the collection and sharing of geographical data among project stakeholders. As there was no suitable software available for a GeoCMS when the project started, a new GeoCMS application was developed from two existing Free and Open Source Software (FOSS) applications, MapServer and Tikiwiki. The GeoCMS system has made it possible for the Pacific Island Countries to publish their geographical data for access and sharing over the Internet. Data contributions from other parts of the world are accepted. All this helps in reducing the vulnerability of these nations as governments can access important information that can now be made available in a “just in time” manner.

See MapServers around the Pacific at <http://map.sopac.org/maps>.

Source: Adapted from Nah Soo Hoe, *Breaking Barriers: The Potential of Free and Open Source Software for Sustainable Human Development - A Compilation of Case Studies from Across the World* (Bangkok, UNDP, 2006), <http://www.unapcict.org/ecohub/resources/breaking-barriers/> and <http://www.iosn.net/pacific-islands/case-studies/tikiwikigeocms/>.

⁵⁸ On 1 January 2011, SOPAC became a division of the Secretariat of the Pacific Community (SPC), and has been renamed the SPC Applied Geoscience and Technology Division (SOPAC).

FOSS applications enable countries and regions to develop dynamic platforms that can be rapidly used by people as they are liberally licensed to grant the right of users to use, copy, change and improve the software through the availability of its source code. Refer to Module 4 of the *Academy of ICT Essentials for Government Leaders* module series for more information about FOSS.



Questions To Think About

What remote sensing and GIS data are available in your region for use by policymakers? How are they being used?

Similar ICT-based knowledge resources exist at national levels. In China the Mobile Interactive Geographic Information System (MIGIS) is used in conjunction with Participatory Rural Appraisal “to bring the best of indigenous knowledge and scientific information together to optimize planning” and use of natural resources at a community level. MIGIS converts to digital format graphic information gathered through participatory learning and action exercises.⁵⁹

The rehabilitation of the Loess Plateau in China⁶⁰ is a sustained effort of several stakeholders to reverse the damage caused by long-term exploitation. The project uses various ICTs to document environmental damage, gather data, and raise awareness of what can be done to reverse the damage. According to John Liu, Director of the Environment Education Media Project:

The success of the Loess Plateau Rehabilitation Project has resulted in profound changes for the local people; their economy, incomes and quality of life have improved tremendously. The seemingly hopeless cycle of poverty and ecologic[al] destruction has been broken... millions of people have been lifted out of poverty.⁶¹

The film “Earth’s Hope” made by the project partners visually documents the change that has taken place over the last 10 years.

The challenges posed by climate change and the development of strategies to address these challenges have quickly risen to the top of the international agenda. The urgency to tackle climate change has been fuelled by findings of the United Nations International Panel on Climate Change establishing scientific consensus that climate change is both real and directly linked to human activity. Evidence has also shown that climate change is already undermining the international community’s efforts to reduce poverty and achieve the MDGs.

The United Nations Framework Convention on Climate Change (UNFCCC) defines climate change as: “A change of climate which is attributed directly or indirectly to human activity that alters the composition of the global atmosphere and which is in addition to natural climate variability observed over comparable time periods.”⁶² The change may be limited to a region or may cover the entire Earth. Addressing the negative impacts of climate change requires efforts that either reduce or eliminate these impacts on people and the natural environment.

59 Barbara Fillip, “Information and Communication Technologies for Development Self-Paced Learning Materials – Module 6: ICTs and Agriculture (Notes)”, http://ictlogy.net/lo/01001/ict4d_course_barbara_fillip_at_courses.ictlogy.net.pdf.

60 John D. Liu, Environmental Education Media Project, *Environment Challenges Facing China: Rehabilitation of the Loess Plateau* (2005), http://www.unep.org/pcmu/project_reference/docs/BB_170707Large_scale_ecosystem_restoration_JPMorgan_Essay_2005.pdf.

61 Ibid., p. 6.

62 UNFCCC, “Full Text of the Convention”, http://unfccc.int/essential_background/convention/background/items/1349.php.

This process is called “abating climate change”, and is an essential part of ensuring sustainable development efforts in developing countries.

Sustainable development efforts are increasingly focussing on “green growth”. Green Growth is a policy focus for the Asia-Pacific region that emphasizes environmentally sustainable economic progress to foster low-carbon, socially inclusive development.⁶³

ICTs have an essential role to play in addressing issues of climate change and green growth. The use of ICTs, hardware, tools and applications can go a long way in reducing the carbon footprint⁶⁴ of many development and government sectors by enhancing their energy and material use efficiency. In addition, by using “green and cool ICTs”,⁶⁵ countries can reduce the carbon emissions of the ICTs, and thus contribute to climate change abatement.

ICTs can contribute to green growth through the process of digitization (changing manual processes to digital ones) and dematerialization (replacing human activities or even goods and services with electronic equivalents). Examples include using the Internet or mobile telephony for banking and commerce, and using video conferencing to replace attendance at meetings and conferences. In these processes, the use of ICTs can reduce wastage of paper and other materials, as well as reduce the costs and carbon emissions caused by extensive travel.

ICTs, as industries and activities contribute to environmental degradation and climate change. According to some estimates, the ICT sector was responsible for 2 per cent of total global carbon emissions in 2007.⁶⁶ Replacing heavy energy dependent systems with energy efficient ones, such as the replacement of PCs (personal computers) with laptops, and the extensive use of the mobile phone as a communication tool for delivering services, can contribute positively to reducing the carbon emissions of ICTs themselves, while also contributing to the dematerialization of other sectors currently heavily dependent on manual processes.

To sum up:

- ICTs have a major role to play in addressing environmental issues, through the use of GIS and to draw sharp attention to the consequences of deforestation.
- ICTs have an essential role to play in addressing issues of climate change and green growth. through digitization of manual processes, and dematerialization or the replacement of human activities by electronic equivalents.
- Using energy efficient ICTs such as laptop computers and mobile phones can also contribute to reducing the carbon emission of ICTs themselves.

3.7 ICTs and Disaster Risk Management

In the global development agenda, disaster risk management is not treated as an isolated sector. Disaster risk management is important for equitable sustainable development to take place. To some extent, the use of ICTs to map natural resources is closely linked to the role of ICTs for disaster management, whether preventive, relief or rehabilitation. The same GIS systems can

63 UNESCAP, “Green Growth”, <http://www.greengrowth.org>.

64 A carbon footprint is “the total set of greenhouse gas emissions caused by an organization, event, product or person.” See http://en.wikipedia.org/wiki/Carbon_footprint.

65 The use of ICTs produces comparatively low levels of carbon emissions. ICTs also have the potential to exponentially reduce emissions in other areas by catalyzing technological, institutional and behavioural change, while bringing forth socio-economic benefits.

66 See Preminda Fernando and Atsuko Okuda, “Green ICT: A “Cool” Factor in the Wake of Multiple Meltdowns”, ESCAP Technical Paper IDD/TP-09-10, December (2009), p. 16, http://www.unescap.org/idd/working%20papers/IDD_TP_09_10_of_WP_7_2_907.pdf.

be used to predict disasters and to provide critical networks during times of crisis. Even before a disaster strikes, GIS systems and remote sensing data can help identify high-risk areas so that early warning can be made to communities in danger. Radio and TV, cellular and satellite phones, ham radio sets, short message service (SMS) systems, e-mail and the Internet all have a role to play in alerting communities to impending disaster. During the crisis, communication systems not built on terrestrial wired communications can prove invaluable, especially when land-based systems are destroyed.

Wattegama⁶⁷ has undertaken an extensive inventory of ICTs in early warning systems and in relief and rehabilitation efforts in the Asia-Pacific region. Many of these are still in the development stage. But efforts after the Asian Tsunami in 2004 to develop ICT-based systems to provide early warning and to assist in relief operations are worth mentioning (see the case study below). Gunawardena and Noronha's book, *Communicating Disasters*,⁶⁸ is also a useful resource to understand the complexities of using ICTs for disaster relief and rehabilitation.



A Tsunami Early Warning System for South-East Asia

The Tsunami Early Warning System (TEWS) is a collaborative effort by several countries of South-East Asia to establish “early warning arrangement that would cover the technological and societal components of warning (end-to-end) and integrate early warning with preparedness, prevention, mitigation, and response (comprehensive) within a multi-hazard framework.” The countries involved are Cambodia, China, Lao PDR, Myanmar, the Philippines, Thailand and Viet Nam.

What is significant about TEWS is that it is the small countries of Asia that have come together to cooperate on this initiative, which is funded by international donor agencies such as UNDP, the Danish International Development Agency (DANIDA) and the United States Agency for International Development (USAID). The Asian Disaster Preparedness Center (ADPC), a non-profit organization supporting the advancement of safer communities and sustainable development throughout the Asian region, serves as the regional centre or focal point for the project.

ADPC develops and implements disaster risk management programmes and projects by providing technical and professional services in formulating national disaster management policies, capacity building for disaster management institutions, programme design for comprehensive disaster risk management, post-disaster assessment, public health and emergency management, land-use planning, disaster-resistant construction and the planning of immediate relief response and subsequent rehabilitation activities.

Source: Adapted from Chanuka Wattegama, *ICT for Disaster Management* (Bangkok, UNDP and Incheon, UN-APCICT, 2007), pp. 18-20, <http://www.unapcict.org/ecohub/resources/ict-for-disaster-management>.

Further reading: Asian Disaster Preparedness Centre, “Early Warning System”, <http://www.adpc.net/v2007/Programs/EWS/Default.asp>; and United Nations International Strategy for Disaster Reduction, “Platform for the Promotion of Early Warning”, <http://www.unisdr.org/ppew/tsunami/project-overview/dp-introduction.htm>.

67 Chanuka Wattegama, *ICT for Disaster Management* (Bangkok, UNDP and Incheon, UN-APCICT, 2007), <http://www.unapcict.org/ecohub/resources/ict-for-disaster-management>.

68 Nalaka Gunawardene and Frederick Noronha, eds., *Communicating Disasters: An Asia Pacific Resource Book* (Bangkok, UNDP and Nugegoda, TVE Asia Pacific, 2007), <http://www.apdip.net/publications/CommunicatingDisasters.pdf>.



Something To Do

What agencies in your country or region use ICTs to manage disaster risks? Briefly describe what the agency/agencies does/do.

Disaster warning systems need not necessarily be for one country alone. Natural disasters such as typhoons, earthquakes and tsunamis often affect several countries within the same geographic area. The same is true of environment disasters such as oil spills and nuclear contamination (especially in the South Pacific), as well as health disasters such as the avian flu. Thus, cooperation is the key in coping with such disasters, and collaborative efforts such as TEWS have the potential to be highly effective. Sentinel Asia⁶⁹ is a disaster management support group in the Asia-Pacific region that brings together 54 organizations from 22 countries and nine international organizations in a “voluntary and best-efforts-basis initiative by participating organizations” for sharing information on a digital platform.

There are other efforts that use ICTs to address the consequences of disasters. However, much depends not on the technologies but on the use they are put to, especially the human element that can make the difference between successful use and dismal failure.

For more information on the use of ICTs for Disaster Risk Management see Module 9 of the *Academy of ICT Essentials for Government Leaders* module series. See also APCICT's *ICTD Case Study 2 on ICT for Disaster Risk Reduction*.⁷⁰

To sum up:

- Disaster risk management is important for equitable sustainable development to take place.
- ICT-based remote sensing and disaster warning systems have changed the way we understand and respond to weather and climate.
- It is important to address issues affecting the vulnerable and marginalized. Disaster risk management must be part of a comprehensive development programmes with strong support among the poor.



Something To Do

Identify one ICT-based natural resource or disaster management system that your country subscribes to or has developed. Describe it in detail and determine how it takes the interests of the poor into account. If it does not do so, what modifications would you make to ensure that it meets the needs of the poor?

69 Masahiko Honzawa, “Sentinel Asia: Asia Branch Activities”, Japan Aerospace Exploration Agency, <http://unpan1.un.org/intradoc/groups/public/documents/APCITY/UNPAN025931.pdf>.

70 APCICT, *ICT for Disaster Risk Reduction*, ICTD Case Study 2 (Incheon, UN-APCICT/ESCAP, 2010), <http://www.unapcict.org/ecohub/ict-for-disaster-risk-reduction-1>.

3.8 ICTs and the Preservation of Cultural Diversity and Resources

Throughout history, societies have expressed concern for the preservation and promotion of their cultures, historical monuments and documents. In an age in which globalization has created a networked world, there remains an uneasy balance between the forces of globalization and the preservation of indigenous cultures in many parts of the world. The concern is twofold: (1) the fear that a culture could face extinction globally; and (2) the loss of national cultural heritage could take place among the younger segments of society. The perception that existing cultural diversity and heritage can be easily swamped or destroyed by ICTs is very real. In recent decades, there has been great concern that the liberalization process has led to a questioning of and a shaking loose of cultural values long held dear and protected by individual societies as their cultural inheritance. The impact of such a liberalization process is most evident in the flow of information and knowledge products from the more developed countries to the less developed.

The Tokyo Declaration⁷¹ on Asia-Pacific Perspectives to the World Summit on the Information Society (WSIS) drew attention to the rich cultural diversity and heritage of this region and called on the WSIS to ensure its preservation. In turn, the WSIS Commitment and Agenda for Action recognized that: “In the evolution of the Information Society, particular attention must be given to the special situation of indigenous peoples, as well as to the preservation of their heritage and their cultural legacy.”⁷²

A carefully planned strategy in the use of ICTs to preserve culture would include:

- Digitization – The documentation, in digital form of existing cultural resources and the creation of digital products—videos, animations, tutorials, booklets and interactive websites that outline the histories and cultures.
- Distribution – The use of emerging technologies and contemporary cultural modes of expression, including Web 2.0 applications to promote the cultures across the world.

The benefits of digitization are numerous. Digitization enhances access to many, faster and easier, both on location and through the World Wide Web. Hidden and difficult to access materials, archeological sites and documents can be digitized and made publicly available, allowing access to many viewers at the same time. Digitized materials serve as surrogates to the originals; and digitization can enhance preservation efforts by reducing the handling of original documents. Reduced access to the originals helps to protect them from loss or damage. The digital copy may serve also as backup in case of disasters, such as fire and flooding. Digitization is cheaper than photocopying in terms of low-cost distribution of huge data. It also provides reduced long-term storage costs and greatly reduces document storage space by 80 per cent.⁷³

Following digitization, the use of ICTs to promote cultures and for rural tourism is another way of preserving and promoting local cultures while at the same time providing economic boosts to rural economies. From booking accommodation and tours electronically through websites, to reviewing digital archives of photographs and other digital materials locally created and displayed would have the effect of promoting rural destinations without causing much environmental or ecological damage. Digital sound and light shows that showcase local history and culture are ways of both promoting and preserving culture. Evidence from research into a telecentre in Barrio,

71 World Summit on the Information Society Asia-Pacific Regional Conference, “The Tokyo Declaration: The Asia-Pacific Perspective to the WSIS”, http://www.unescap.org/idd/documents/tokyo_declaration.pdf.

72 World Summit on the Information Society, Tunis Commitment, WSIS-05/TUNIS/DOC/7-E, 18 November 2005, <http://www.itu.int/wsis/docs2/tunis/off/7.html>.

73 Fe Angela M. Verzosa, “Digital Initiatives in Archival Preservation”, paper presented at the International Conference on Challenges in Preserving and Managing Cultural Heritage Resources, Quezon City, Philippines, 19-21 October 2005, http://paarl.wikispaces.com/file/view/Digital_Initiatives_in_Archival_Preservation.pdf.

Sarawak, Malaysia highlighted how the use of ICTs to create a website led to the development of rural tourism as a major economic opportunity for the community.⁷⁴

Web 2.0 applications provide new opportunities for protection and promotion of local cultures. For instance, blogs and tweets (on blog sites or on Twitter) about the experience of travelling in a country or destination help others in making travel decisions, as well as help them to understand local cultures better through “a second-hand view or experience”. In earlier times, people’s understanding of cultures was determined either by first-hand experience of travel or through media such as newspapers and TV. With Web 2.0 applications, which enable and encourage “user generated content”, the experience of understanding cultures and contexts becomes richer.

By using digital technologies, the field of cultural history has begun to transform the process of re-creating and understanding the past. Integrating the traditional expertise of heritage management, museology, history, and archaeology with the powerful new tools of digital information technologies, has enabled countries to protect, preserve and even promote their own cultures as venues for tourism, an important economic activity in many Asia-Pacific countries.



Digital Preservation of Indian Cultural Heritage at IGNCA

The Indira Gandhi National Centre for the Arts (IGNCA) in India has been intensively engaged in the digitization of materials, post digitization, editing, high capacity storage, retrieval and dissemination of its extensive archives on Indian culture and heritage. The technology used for this development is based on open standards using Unicode, a multilingual standard for fonts that is accepted worldwide. Search is available both in English and Hindi (Devanagari), and users have the option to search or browse materials from a specific type of collection (e.g. books, manuscripts, slides, audio and video) or from the entire collection.

IGNCA is coordinating the Annual Bibliography of Indian Archaeology (ABIA) project, a global network of scholars cooperating on an annotated bibliographic database for publishers covering South and South-East Asian art and archaeology. Countries participating in ABIA include Bangladesh, Bhutan, Cambodia, India, Indonesia, Malaysia, Nepal, the Netherlands, Pakistan, Sri Lanka and Thailand.

Sources: Ramesh C. Gaur, “Digitization and Digital Preservation of Indian Cultural Heritage: Multimedia Digital Library Initiatives at IGNCA, New Delhi”, presentation slides, http://www.ignca.nic.in/PDF_data/kn_digital001_pdf_data/T4d_Digital_Preservation.pdf; The ABIA Project, <http://www.abia.net>; and personal visit to IGNCA by author in 2009.

74 Roger Harris, “Tourism in Bario, Sarawak, Malaysia: A Case Study of Pro-Poor Community Based Tourism Integrated into Community Development”, Asian Encounters, 25 November 2009, <http://asianencounters.spruz.com/pt/Tourism-in-Bario-Sarawak-Malaysia-A-Case-Study-of-Pro-Poor-Community-Based-Tourism-Integrated-into-Community-Development/blog.htm..>

Bhutan is one country where the preservation of cultural heritage is part of its national development policy, best illustrated through its commitment to Gross National Happiness,⁷⁵ rather than Gross National Product as an indicator of development. Bhutan is a participant in the ABIA project described in the case study.

There are other efforts in the Asia-Pacific region, undertaken nationally in different countries and also across the Asia-Pacific region. Among these initiatives are Mabbim, the umbrella body for the Malay language in South-East Asia, which is planning to set up an official website for the Malay language, along with the publication of an online version of an encyclopedia on the Malay race. The Tamil-speaking diaspora have launched an initiative to boost Tamil language content and online tools on the Internet; a similar initiative was launched by the Speak Mandarin campaign in Singapore. Local language Web content initiatives have also been launched for developing country languages like Marathi. Dozens of websites promote local music in countries like India, Brazil and South Africa.⁷⁶

There are six main areas in which ICT can, if appropriately and effectively utilized, make a contribution to the enhancement of cultural heritage for both professionals and the general public: they include the areas of:

1. Intellectual and physical access
2. Documentation and site recording
3. Multiple interpretive contexts
4. Preservation of authenticity
5. Balancing visitors with conservation
6. Facilitating public participation⁷⁷

There are a variety of software options that can form the basis of choice to address these issues. However, software decisions would have to be made on what addresses the specific goals and objectives of a project in the preservation of cultural resources; the types of media (text, pictures, sound and video) that are involved; how much is to be captured and stored new; how much is to be digitized and restored; costs and affordability; data security; and sharing and dissemination.

To sum up:

- The Tokyo Declaration and the WSIS Agenda for Action have recognized that particular attention must be given to the preservation of heritage and cultural legacies.
- Two ways in which ICTs can be used to preserve and promote cultural heritage and diversity include digitization and distribution.
- There are many areas in which ICTs, if effectively utilized, can contribute to the preservation and promotion of cultural identity.
- Promoting rural tourism through the ICTs can go a long way in promoting local cultures and improving the economic opportunities for local communities.
- There are many available software options that countries can choose from to digitize and distribute their culture products. Web 2.0 applications are examples of such available options.

75 Alejandro Adler Braun, "Gross National Happiness in Bhutan: A Living Example of an Alternative Approach to Progress", Wharton International Research Experience, 24 September 2009, <http://www.grossnationalhappiness.com/OtherArticles/GNHPaperbyAlejandro.pdf>.

76 Madanmohan Rao, "Nature of the Information Society: A Developing World Perspective", paper prepared for the ITU Visions of the Information Society Project (n.d.), pp. 7-8, <http://www.itu.int/osg/spu/visions/papers/developingpaper.pdf>.

77 Halina Gottlieb, ed., *Basic Guidelines for Cultural Heritage Professionals in the Use of Information Technologies: How can ICT support cultural heritage?* (Tamara Brizard, Willem Derde, Neil Silberman & The Interactive Institute AB, 2007), <http://www.enamcenter.org/files/documents/Know-how%20book%20on%20Cultural%20Heritage%20and%20ICT.pdf>.

3.9 ICTs, Government and Governance

Module 3 of the *Academy of ICT Essentials for Government Leaders* module series describes e-government applications extensively, while Module 2 focuses on policy and the governance of ICT infrastructure and services. Therefore, this module will simply provide readers with a bird's eye view of government and governance and the role of ICTs in facilitating both.

Government consists of a superstructure that makes rules, and takes and implements decisions that become visible as outputs. The processes of government include many internal transactions between individual officials and government agencies long before the outputs of consequent decisions come to public knowledge and impact upon the system at large. Governance concerns the transactions between the government and the citizenry, and is therefore a process with many pathways. Governance consists of functionalities, processes, goals, performance and coordination, and it is visible as participatory processes between government and citizenry.

A number of studies have proven the positive correlation between governance and growth. Kaufmann and Kraay⁷⁸ show how “per capita incomes and the quality of governance are strongly positively correlated across countries.” Most major international donors and developing country governments now recognize that stable, democratic government and well-managed public institutions are essential for the improvement of the living conditions of the poor and for combating poverty. There is ample cross-country evidence of a strong association between good governance and improved investment, growth rates, better economic performance, improved adult literacy, a reduction in state corruption and improved service delivery. There is also growing recognition of the idea that a well functioning and capable state alone is insufficient to ensure quality public service delivery to citizens that meets citizens' needs and aspirations, and that the state also needs to be accountable and responsive to its citizens.

Government-to-government, government-to-business and government-to-citizen linkages form the backbone of the application of ICTs in government and governance. The intention is to make governments both efficient and effective in delivering services (e-government) while making them more transparent, accountable and responsive to citizen participation in democratic processes (e-governance). The terms “e-government” and “e-governance” are often used interchangeably and consequently lead to some confusion. Governance is a broader topic dealing with a wide range of relationships between government and the citizenry, while government deals with the day-to-day functioning of government in the provision of services to the public in areas such as education, health, taxation, land administration, and the like. If government is the formal apparatus for administering the system effectively, governance is the outcome as experienced by those on the receiving end. e-Government can be a more effective application of government in general, if well implemented and managed, while e-governance can evolve into participatory governance if it is well supported with the appropriate principles, objectives, programmes and architectures.⁷⁹

The early United Nations e-readiness indexes and e-government surveys from 2003⁸⁰ onwards have been benchmarking infrastructure, human capital and e-connectivity, and ranking e-readiness across countries, based on six pillars of e-readiness: connectivity and technology infrastructure, business environment, social and cultural environment, legal environment, government policy and vision, and consumer and business adoption.

78 Daniel Kaufmann and Aart Kraay, *Governance and Growth: Causality which way? - Evidence for the World, in brief* (Washington, D.C., World Bank Institute, 2003), p. 1, http://www.worldbank.org/wbi/governance/pdf/growthgov_synth.pdf.

79 Thomas B. Riley, *E-Government vs. E-Governance: Examining the Differences in a Changing Public Sector Climate*, International Tracking Survey Report '03, no. 4 (London, Commonwealth Secretariat, 2003), <http://unpan1.un.org/intradoc/groups/public/documents/APCITY/UNPAN015437.pdf>.

80 United Nations Public Administration Network, “UN e-Government Surveys”, http://www.unpan.org/egovkb/global_reports/08report.htm.

However, the latest *United Nations e-Government Survey 2010* shows that governments are “ready” for e-government, and has replaced the e-readiness index with an e-government development index. The *United Nations e-Government Survey 2010* states that: “More countries than ever before are adopting national e-government strategies and multi-year action plans. From the most to the least developed, countries can be seen responding to expectations that governments both participate in and enable the information society by communicating and interacting more effectively with increasingly technology-savvy citizens. They are ready, and it is their level of development in this regard that must be assessed.”⁸¹

Similarly, the Economist Intelligence Unit, the business information arm of The Economist Group that publishes an annual assessment of the world’s economies in terms of their use of ICTs, has since 2010 replaced its e-readiness rankings with the “digital economy rankings” as they assess the quality of a country’s ICT infrastructure and the ability of its consumers, businesses and governments to use ICT to their benefit.⁸²

Table 6. Digital economy rankings and scores, 2010

2010 rank (of 70)	2009 rank	Country	2010 score (of 10)	2009 score	2010 rank (of 70)	2009 rank	Country	2010 score (of 10)	2009 score
1	2	Sweden	8.49	8.67	36	38	Malaysia	5.93	5.87
2	1	Denmark	8.41	8.87	37	37	Latvia	5.79	5.97
3	5	United States	8.41	8.60	38	36	Slovakia	5.78	6.02
4	10	Finland	8.36	8.30	39	39	Poland	5.70	5.80
5	3	Netherlands	8.36	8.64	40	41	South Africa	5.61	5.68
6	4	Norway	8.24	8.62	41	40	Mexico	5.53	5.73
7	8	Hong Kong	8.22	8.33	42	42	Brazil	5.27	5.42
8	7	Singapore	8.22	8.35	43	43	Turkey	5.24	5.34
9	6	Australia	8.21	8.45	44	44	Jamaica	5.21	5.33
10	11	New Zealand	8.07	8.21	45	47	Bulgaria	5.05	5.11
11	9	Canada	8.05	8.33	46	45	Argentina	5.04	5.25
12	16	Taiwan	7.99	7.86	47	48	Romania	5.04	5.07
13	19	South Korea	7.94	7.81	48	46	Trinidad & Tobago	4.98	5.14
14	13	United Kingdom	7.89	8.14	49	49	Thailand	4.86	5.00
15	14	Austria	7.88	8.02	50	52	Colombia	4.81	4.84
16	22	Japan	7.85	7.69	51	50	Jordan	4.76	4.92
17	18	Ireland	7.82	7.84	52	51	Saudi Arabia	4.75	4.88
18	17	Germany	7.80	7.85	53	53	Peru	4.66	4.75
19	12	Switzerland	7.72	8.15	54	54	Philippines	4.47	4.58
20	15	France	7.67	7.89	55	55	Venezuela	4.34	4.40
21	20	Belgium	7.52	7.71	56	56	China	4.28	4.33
22	21	Bermuda	7.47	7.71	57	57	Egypt	4.21	4.33
23	23	Malta	7.32	7.46	58	58	India	4.11	4.17
24	25	Spain	7.31	7.24	59	59	Russia	3.97	3.98
25	24	Estonia	7.06	7.28	60	60	Ecuador	3.90	3.97
26	27	Israel	6.96	7.09	61	61	Nigeria	3.88	3.89
27	26	Italy	6.92	7.09	62	64	Vietnam	3.87	3.80
28	28	Portugal	6.90	6.86	63	63	Sri Lanka	3.81	3.85
29	29	Slovenia	6.81	6.63	64	62	Ukraine	3.66	3.85
30	30	Chile	6.39	6.49	65	65	Indonesia	3.60	3.51
31	31	Czech Republic	6.29	6.46	66	66	Pakistan	3.55	3.50
32	34	United Arab Emirates	6.25	6.12	67	69	Kazakhstan	3.44	3.31
33	33	Greece	6.20	6.33	68	67	Algeria	3.31	3.46
34	32	Lithuania	6.14	6.34	69	68	Iran	3.24	3.43
35	35	Hungary	6.06	6.04	70	70	Azerbaijan	3.00	2.97

Note: A four-decimal score is used to determine each country's rank.

Source: Economist Intelligence Unit, *Digital Economy Rankings 2010: Beyond e-Readiness* (2010), p. 4, http://graphics.eiu.com/upload/EIU_Digital_economy_rankings_2010_FINAL_WEB.pdf.

81 United Nations Department of Economic and Social Affairs, *United Nations e-Government Survey 2010: Leveraging e-Government at a Time of Financial and Economic Crisis* (New York, 2010), p. 3, http://www2.unpan.org/egovkb/documents/2010/E_Gov_2010_Complete.pdf.

82 Economist Intelligence Unit, *Digital Economy Rankings 2010: Beyond e-Readiness* (2010), http://graphics.eiu.com/upload/EIU_Digital_economy_rankings_2010_FINAL_WEB.pdf.

Some countries in the Asia-Pacific region, such as Hong Kong, Japan, Republic of Korea and Singapore rank very highly on the digital economy rankings and already have sophisticated e-government mechanisms. Much of the business of government in these countries is carried out electronically. However, the ranking of most of the other countries in the region is low and only a few government services are computerized.

Bhatnagar in his review of 20 case studies of e-governance from the Asia-Pacific region states:

The focus of most of the applications is on internal efficiency rather than service delivery. The few projects that focus on service delivery are confined to licenses and taxes. Choice of application is mostly urban focused. The needs of poor have not been specifically targeted.

Countries like India where some states have made considerable progress in electronic delivery of services to urban populations face the following challenges in implementing pro-poor e-Governance: a) to bring clarity to the objectives of pro-poor targeting, b) to ensure delivery of public services in rural areas, c) to balance standardization and localization, d) to leverage the private sector and build PPPs to serve rural areas, [and] e) to make independent impact assessment of what has worked. Moreover, there is a lack [of] internal capacity in e-Governance project conceptualization and implementation.⁸³

The popular model for delivery of e-government services is through a portal, but even a cursory glance at many such portals will show that there is a one-way transmission of information with little or no interaction. Few countries other than India have created common service centres in urban areas where operators working with computer terminals deliver online services to clients. In some of India's services, even the rural poor are able to access and benefit from such applications. The best known of these services include the Computer-Aided Administration of Registration Department, Bhoomi's on-line delivery and management of land records, and e-Seva project to provide integrated government-to-citizen services. In another part of developing Asia, the Mongolian government has made advances in the use of ICTs for simplifying procedures for citizens to pay their taxes.



Mongolian Taxation Authority Online

The website of the Mongolian Taxation Authority (<http://www.mta.mn>) contains not only information about the Authority but also an extensive list of services for citizens and organizations. Among them are downloadable tax forms previously only available in printed form to be acquired at a cost from tax agents. Businesses or individuals can download the forms from the website, fill them out and submit them at the "one-point service". This is a big step in the use of ICT in tax administration in Mongolia.

83 Subhash Bhatnagar, *Paving the Road towards Pro-poor e-Governance: Findings and Observations from Asia-Pacific Case Studies* (Bangkok, UNDP, 2006), p. 2, <http://www.apdip.net/projects/e-government/capblg/casestudies/Overview.pdf>.

However, only those with access to Internet services can access the website and benefit from its use. A 2003 survey showed that there were only 50,000 Internet users in Mongolia, representing around 4 per cent of the population. While the project has achieved most of its goals, there are still problems regarding how to reach marginalized groups, how to improve the interface with beneficiaries and ensure community participation, and how to retrain the workforce and change organizational attitudes.

Source: Mongolian Taxation Authority, <http://www.mta.mn>.

e-Government systems such as the Mongolian Tax Authority can reduce transaction costs for both government and for the citizens, thereby raising tax collections and increasing transparency in government operations. However, the case of the Mongolian Tax Authority also illustrates the challenges of bringing e-government to the poor. These challenges include lack of infrastructure and connectivity, language differences and illiteracy, lack of human capacity within governments to perform different tasks, weak demand, top-down planning and administration, and lack of effective monitoring and evaluation frameworks.



Something To Do

Examine two government portals (including that of your own country), identify potential weak or problem areas, and suggest solutions for the problems identified.

Other e-government applications in the Asia-Pacific region are in various stages of planning and implementation. In Cambodia, the Government Administration Information System was established to improve land and vehicle registration, put in place an electronic approval system, improve administrative services and generate revenue for the government.

Both China and Thailand⁸⁴ have taken steps to develop e-government programmes that address the needs of the vulnerable and the poor, but with varying results. An initiative called One Tambon⁸⁵ One Product or OTOP for promoting e-commerce in Thailand's rural areas has not been very successful in the absence of other inputs such as facilities to move products to markets. This example shows that supporting interventions are needed to reap the potential benefit of ICTs. In China, video conference technology to interview migrant workers is an innovative idea that saves costs for the poor. The Chinese application puts the social problem rather than the technology ahead, which explains its success.

The e-government applications briefly described above are examples of government-to-citizen services, which focus on the supply side. e-Governance focuses on the demand side. It is important to note this particular characteristic as we begin to explore the concept of e-governance.

e-Governance is one of the most effective ways of combating corruption. Electronic voting, for example, can curb election-related anomalies. When all government procedures and processes are available for public scrutiny online, the media, citizen groups and civil society organizations can monitor government action or inaction.

⁸⁴ Ibid.

⁸⁵ Tambon is translated as subdistrict in English. Tambon is a local government unit in Thailand. Below district (amphoe) and province (changwat), they form the third administrative subdivision level. See <http://en.wikipedia.org/wiki/Tambon>.

e-Procurement is another example of how ICTs can help improve governance. The introduction of automated procurement systems standardizes the tender process, increases efficiency, reduces bureaucratic intervention, ensures objectivity, and makes the procurement process transparent. Removing supplier and buyer interaction during pre-bidding and post-bidding stages ensures objectivity in receipt and evaluation of tenders, and significantly curbs opportunities for bribery. To ensure transparency, tender documents containing all details are hosted on a website and can be downloaded by interested suppliers free of cost. At any time in the tender process, a bidder has access to all necessary information, including names and details of competing suppliers, price quotations, evaluation results and action taken by the concerned government agency. e-Procurement is used extensively and successfully in India and the Philippines.⁸⁶

e-Governance makes possible other forms of public engagement with government. Government websites and portals can include citizen charters for citizens to be aware of their rights with reference to specific services. The websites can promote online discussions and online voting on specific issues, making decision-making more participatory. The websites can also help concerned agencies track public grievances and respond to citizen complaints and issues more effectively. Citizens, in turn, can interact with government officials, draw attention to public issues, receive quick responses and action for their requests for information or for redress of grievances, and even develop citizen report cards and other measures of social audit of how efficiently and effectively government is functioning. All of these can be done at a lower cost and with greater efficiency than previously possible. Using appropriate access infrastructure at affordable prices (e.g. community telecentres), governments can ensure that even the poor can reap these benefits of e-governance.

The efficient, effective and stable functioning of government in an atmosphere of peace and with civil engagement is what will enable countries to meet the MDG targets more effectively.

To sum up:

- Government consists of a formal superstructure while governance is concerned with outcomes of government functioning.
- The purpose of ICT interventions in government is to optimize efficiency while providing citizen-friendly services that encourage greater citizen participation in governance and public affairs.
- ICT interventions in government significantly reduce the levels of corruption by making procedures transparent and minimizing opportunities for irregularities in transactions with government personnel (e.g. bribery).



Something To Do

1. Visit the website <http://www.esevaonline.com> and explore how this award-winning e-government service of India's Andhra Pradesh government can be replicated in your country context.
2. Pick an example of an e-government initiative from your own country and discuss what you consider to be its strengths as well as its weaknesses, if any. Where you identify any weaknesses, suggest how these can be addressed.

⁸⁶ See <http://www.eprocurement.gov.in/default.asp> and <http://www.philgeps.net>.

3.10 ICTs and Peace

There can be no development without peace. It is as simple as that. Development and prosperity can only be achieved if the local situation is peaceful and stable. Regions experiencing conflicts invariably have low levels of development. Decades of excellent development work by countries and international organizations can be destroyed by conflict in a matter of weeks. The returns on investing in conflict prevention, or in building lasting peace, are definitely larger than the investments that are required to reconstruct countries and build peace after conflict.

ICT for Peace includes the different types of ICT-supported activity that are carried out in conflict prevention and management, peace operations, humanitarian relief and disaster assistance, and post-conflict peace-building and reconstruction.⁸⁷ Some examples are briefly described below.

ReliefWeb,⁸⁸ a service of the United Nations Office for the Coordination of Humanitarian Affairs (OCHA), is a hub for humanitarian information. The website offers a “Web feed” service to deliver customized content to partners’ websites, and users can create password-protected profiles to manage material of particular interest to them. It posts some 150 maps and documents daily from over 2,000 sources, and has offices in three time zones to ensure that news items are updated round the clock.

Alertnet⁸⁹ is a project of the Reuters Foundation that focuses on rapidly developing humanitarian emergencies and on early warning about future emergencies. For instance, through their service of breaking stories, photographic coverage of disasters, and aid agency news feed, they provide timely, reliable and relevant information for aid agencies to act upon.

In post-conflict reconstruction, ICTs can be used to disseminate the terms of a ceasefire agreement to warring factions and local communities, and in the process clarify the situation and build support. It can also be used to raise awareness of war crimes tribunals or truth commissions, increasing common understanding of the processes necessary to support the rule of law.

Peace is not created with a one-time act: the cease-fire, accord or reconciliation are milestones towards peace. True peace is built over time by helping people communicate, view information, make decisions, and understand each other better.

Forgotten Diaries⁹⁰ is an online platform that brings together youths from “forgotten” conflict zones to share their experiences and develop projects. Forgotten Diaries enlisted young bloggers from 10 conflict zones that have been neglected by mainstream media to share their stories and challenges with the world through the blogging platform. Forgotten Diaries then empowered these bloggers by providing online training and then supporting them with small grants to develop and implement small community peace building and development projects.

ICT-supported campaigns to promote reconciliation can influence political leaders and promote information exchange and dialogue between local communities. In the final analysis, it is the creation of a space for dialogue and discussion on a people-to-people basis that goes a long way in creating an atmosphere of good will that will propel the peace-building process forward.

87 This section is drawn from the publication: Daniel Stauffacher and others, *Information and Communication Technology for Peace: The Role of ICT in Preventing, Responding to and Recovering from Conflict* (New York, United Nations ICT Task Force, 2005), <http://www.unapcict.org/ecohub/resources/information-and-communication-technology-for-peace-the-role-of-ict-in-preventing-responding-to-and-recovering-from-conflict>.

88 See OCHA, “ReliefWeb”, <http://www.reliefweb.int>.

89 See Thomson Reuters Foundation, “Alertnet”, <http://www.trust.org/alertnet/>.

90 See Forgotten Diaries, <http://www.forgottendiaries.org>.

To sum up:

- ICT for Peace includes any types of ICT-supported activity that are carried out in conflict prevention and management, peace operations, humanitarian relief and disaster assistance, and post-conflict peace-building and reconstruction.
- ICT interventions can be used for building peace, beginning with preventing conflict and later mitigating the effects of large- and small-scale conflicts.
- ICT for Peace interventions are carried out by multilateral agencies, such as the United Nations, the private sector efforts such as by Reuters, and even non-governmental organizations such as Youth Action for Change.



Something To Do

1. Go over the OCHA website (<http://www.unocha.org>) and determine who its target audiences are. What does the website aim to achieve? How effective do you think is the website in peace-building?
2. Look for information about armed conflict in your country or elsewhere in the world. Describe the conflict (What is it about? When and how did it start? Who is involved? What is the impact?). And then come up with specific recommendations on how ICTs can be used to resolve the conflict or to mitigate some of its effects. Be as specific as possible when describing the ICT intervention you are recommending (i.e. Which technology or combination of technologies? How is the technology to be used? Who should be involved in the effort? Who are the targets? What are the target outcomes?).

In this section, various possible applications of ICTs to meet the needs of specific development sectors in the Asia-Pacific region have been described. Although the discussion has been organized in terms of sectors, it should be noted that the use of ICTs for meeting the country's development goals provides opportunities to adopt a more integrated approach to development. Such an approach is necessary because in development, failure in one sector will have an adverse effect on another (for example, failure to provide education for all will mean that poverty alleviation efforts will meet with little or no success). However, while some countries are able to effectively harness ICTs for development, there are many countries where putting ICTs in the service of development remains a daunting challenge. The next section discusses ways of addressing this challenge.



Test Yourself

Choose a sector of development in your country and propose how ICTs can be used to improve, optimize and accelerate progress toward the MDG targets in this sector. Describe the sector and how it relates to other development sectors.

Write your answer in such a way as to justify the use of ICTs in the chosen sector to the finance ministry of your country.

4. KEY FACTORS IN THE USE OF ICTS IN DEVELOPMENT

This section aims to:

- Discuss key issues determining success or failure of ICTD programmes and projects;
- Conclude the discussion of macro issues in the relationship between ICTs and development; and
- Establish key linkages between this module and other modules *in the Academy of ICT Essentials for Government Leaders*.

One of the most damaging statistics in public sector ICTD is to look at the number of failed ICTD projects. According to some sources, over 70 per cent of ICT projects fail.⁹¹ Determining the causes of project failure and learning from them is very tough because of all the variables involved. Why do projects succeed or fail? While there are few systematic assessments of success or failure, what seems to be a clear consensus among experts is that often issues are not of technology but managerial in nature. These factors could relate to lack of vision and strategy, poor project management, poor change management, dominance of politics and self-interest, lack of requisite competencies, and technological incompatibilities.⁹² Whatever the causes, it is important to recognize that in ICTD, there are even more issues—many relating to the understanding of ICTD and the use, specifically, of using ICTs as key tools in the achievement of development goals.

4.1 ICTD Policy

There is invariably a debate about what comes first—ICT policy or the ICT application. This is a chicken or egg question. In some situations, applications have led the way to the development of policy; in others, policy and regulatory frameworks have determined the application of ICTs. It is not the objective of this module to enter into the debate but to make the case that both policy frameworks and applications are needed and that there is a need for clarity at the policy, planning and implementation levels. For countries in the Asia-Pacific region, a clear-cut enabling policy is the first stage at which governmental decision-making is critical. Since Module 2 of the *Academy of ICT Essentials for Government Leaders* module series discusses the ICT policy process extensively and Module 7 focuses on ICT project planning, the purpose here is simply to describe the broad issues and concerns in deciding both the nature and extent of use of ICTs in development policies and programmes.

91 Tim Rainey, "Why do so many public sector ICT projects fail?" [publicservice.co.uk](http://www.publicservice.co.uk), 25 April 2007, http://www.publicservice.co.uk/feature_story.asp?id=7622. See also Richard Heeks, "Success and Failure Rates of eGovernment in Developing/Transitional Countries: Overview", e-Government for Development, Institute for Development Policy and Management, University of Management, 19 October 2008, <http://www.egov4dev.org/success/sfrates.shtml>.

92 Richard Heeks, "eGovernment for Development: Success and Failure in eGovernment Projects – Evaluation", Institute for Development Policy and Management, University of Manchester, <http://www.egov4dev.org/success/evaluation/factormodel.shtml>.

In most developing countries, ICTD policy is the domain of IT and telecommunications departments.⁹³ These departments tend to focus more on business and technology issues, and be excessively pro-market and not sufficiently development-oriented. Even where some IT and telecommunications sectors do concern themselves with development, the approach is generally from the technology rather than the development perspective, with emphasis on connectivity and infrastructure, e-government, e-delivery and growth, rather than on needs-based and people-centric improvement of “quality of life”. The development departments, on the other hand, tend not to have a good ICTD orientation and even if they do, they are not able to significantly influence ICTD policy partly because they are not able to engage with IT departments. While the situation is gradually beginning to change, what needs to be understood is that new policies for ICTD involving both the technology and the development departments have to be developed if the unprecedented opportunities for development arising from strategic use of ICT are not to go to waste.

An ICTD policy is very different from an IT policy. It requires the fusion of disciplines as different as engineering and rural sociology. In fact, the use of ICTs for sustainable and inclusive social and economic development is a multidisciplinary undertaking, requiring team effort. Partnerships and collaboration are essential in ICTD policymaking, planning and implementation.

In section 2.2 of this module, reference was made to technology convergence as a major driving factor for the increasing use of ICTs. It bears mention here that convergence of ICTs means more than just technology coming together. Today, convergence also means a merger of many disciplines, a convergence of the exact sciences (control theory, statistics and systems theory), technology (computer science and electrical engineering), and the social and behavioural sciences (economics, management theory, psycholinguistics and sociology). Accordingly, the introduction of ICTs in any development effort requires significant social and cultural changes within organizations that have been structured to separate functions and responsibilities. In fact, the introduction of ICTD implies a major reform of the way in which governments and civil society organizations currently operate.

A parallel convergence or national alliance that includes government, the private sector and civil society is required to maximize the opportunities provided by the new ICT-driven environment for national development. Government can create favourable policy and regulatory environments, provide a common fund for the development of underserved locations, commit to e-government, and strengthen national capacity toward greater acceptance and use of ICTs for national development. The private sector in turn can provide the ICT infrastructure and invest in services.

PPPs, which are extensively discussed in Module 8, can be of many types—from simple participation in the development of IT applications as part of corporate social responsibility to a complete project taken on a turnkey basis, built, owned and operated by the private sector. The benefit of such partnerships is that the huge financial and technical infrastructure, which poor governments can ill afford, is shifted to the private sector. Other advantages that governments can derive from PPPs include increased efficiency in the execution of projects, reduced risk for the public sector and the stimulation of innovation in the provision of public services.

Civil society can mobilize communities and create relevant content for poverty reduction and e-inclusion through participatory processes. Ownership or operation becomes community-driven and community-owned, giving a sense of pride in achievement and the return on investment that becomes visible very quickly. In this kind of multi-stakeholder partnership, each partner in the national alliance, in conjunction with the communities that they work with, evolves its own ethos and model that it finds most suitable at the grass-roots level where the ultimate beneficiaries are the poor.

93 Anita Gurumurthy and Parminder Jeet Singh, *Political Economy of the Information Society: A Southern View* (Montevideo, Instituto del Tercer Mundo, 2005), p. 18, http://wsisipapers.choike.org/papers/eng/itfc_political_economy_is.pdf.

The hype surrounding ICTs, with world leaders, politicians, entrepreneurs and development professionals all jumping on the ICT bandwagon, places upon ICT and development professionals alike a greater responsibility and accountability for both successes and failures. More importantly, ICT has a pervasive influence on society, with changes taking place in all parts of an organization or community and often with unpredictable results. This results in an uncertainty about outcomes and impacts.

It is important to recognize that ICT-based interventions are inherently different from conventional ones. In several countries in Asia-Pacific, regulatory and pricing mechanisms control what technologies can be used, and what content is delivered over these technologies. Policy frameworks also tend toward greater centralization and control over the technologies. Such regulatory practices are in conflict with the potential of ICTs. Technologies are not merely hardware but a set of management and operational practices. Thus, policies governing their use need to remain open, flexible, innovative and responsive. Frequent reviews are needed to ensure that the special needs of ICT-based programmes and projects are addressed.⁹⁴ Module 2 argues for this kind of coherence in ICTD policy formation and practice.

Initiatives designed and implemented by conventional governments as part of a broad development agenda tend to reflect the “conventionalism” of existing institutions: they combine hierarchical and bureaucratic systems of administration. But models of project management where projects or initiatives are centrally implemented fail to adequately take local needs into consideration. There is a need to enable the development of local solutions that actively involve the communities for whom they are intended. Module 3 discusses the design and development of ICT applications involving both government and the citizenry.

The conventional approach to project management using ICTs often assumes that infrastructure is needed first and therefore, investment in hardware, buildings, equipment and hiring of staff, is given priority. The bulk of investment generally goes to these overhead costs and few resources are left for project activities. A parallel investment in people, in good quality social research, project management, and community mobilization and involvement, rarely takes place. Thus, it is not surprising to find that the technology aspect of a particular ICTD effort has worked but there was little change in the lives of people. Module 7 focuses on ICTD project management while Module 8 looks at funding models that can help guide investment in ICTD programmes and projects.

Maximizing the use of ICTs for developing countries will require an understanding not only of the opportunities that ICTs present, but also of the limitations and the likely trade-offs. It is important to know when, where and whether to incorporate (or not) ICTs as a key element in the project cycle. And once such a decision to use ICTs has been made, it is then necessary to examine how ICTs are integrated into a project cycle. There are a number of concerns to be addressed here and these are discussed in the next section.

To sum up:

- ICTD policy requires new systems of planning, management and project implementation characterized by the engagement and active participation of different sectors of the economy and the community.
- Maximizing the use of ICTs requires an understanding of both its potentials and limitations.
- Convergence means more than just technology coming together. It means a merger of many disciplines, in particular the engineering sciences and the social and behavioural sciences.
- Convergence also means a multi-stakeholder partnership where government can implement favourable policy, regulation, funding and capacity building; the private sector can build infrastructure and invest in services; civil society can work with communities; and communities can own and drive initiatives.

⁹⁴ Usha Vyasulu Reddi and Rukmini Vemraju, “Using ICTs to bridge the digital divide”, in Anita Gurumurthy and others, eds., *Gender in the Information Society* (UNDP-APDIP and Elsevier, 2006), <http://www.apdip.net/publications/ict4d/GenderIS.pdf>.



Something To Do

Identify the department tasked with ICT policymaking in your country. Does the department have an inter-ministerial or inter-agency consulting or advisory group where both provider and user ministries are included? If yes, review its composition and decide whether all who should be included, are included.

If there is no such consulting or advisory group and you were to draft a proposal for its constitution, what argument would you use to justify its creation and composition (specify which agencies should be represented in the group)?

4.2 Planning ICTD Interventions

Module 7 explores ICTD Project Management extensively. The purpose here is to introduce some elements of planning that are unique to ICTD programmes and projects. When considering an ICTD intervention, the first decision to be made is whether the intervention should be ICT-driven or ICT-supported. Both approaches are important, and in practice there is great variation in the ways in which ICTs have been used in development programmes and projects. The ICT-driven approach is based on the assumption that access to timely and relevant information through ICTs will promote economic growth as it provides opportunities to generate income. For example, initiatives such as telecentres offering access to e-mail and the use of a website as a marketing tool are favoured because they offer the opportunity to promote goods and to improve sales. Moreover, the ICT-driven approach to development is more likely to emphasize communication as a good outcome in itself. The ICT-supported approach first clarifies the development goal that the project seeks to address; works out the information and communication needs; and then looks at cost-effective ways of using ICTs to address the goals and the needs.

Whichever approach is taken, careful project planning is essential to avoid gaps between design and reality—in contexts, in approaches to planning and implementation, and in perceptions and philosophies between the different stakeholders. Without planning, the consequence is often a mismatch between priorities, investments, deliverables and outcomes.

The Australian Agency for International Development (AusAID) has developed a framework and checklist for the design of ICTD projects that will bring clarity to the planning process (see box 3).

Box 3. Good practice guide for use of ICTD

1	Why?	Is the use of ICT-based project aimed clearly at achieving a specific poverty reduction goal?
2	Who?	Is there a clearly specified target group for poverty alleviation?
3	How?	Is the form of ICT to be deployed appropriate in terms of cost, support, maintenance and compatibility with existing information flows?

4	How?	Is the form of ICT to be deployed scalable to enable it to be replicated and expanded?
5	How?	Are appropriate intermediaries being used?
6	How?	What scope is there for public-private partnerships?
7	What?	Is the content transmitted by the ICT relevant to the audience and is it in a language easily understood by the target audience?
8	How long?	Is the project self-sustaining over what period?
9	How well?	What performance measurement, monitoring and evaluation processes are in place?
10	What risks?	What unexpected events or situations might arise? What should be done to manage these?

Source: Richard Curtain, *Information and Communications Technologies and Development: Help or Hindrance?* (Canberra, AusAID, 2004), p. 29, <http://www.developmentgateway.com.au/jahia/webdav/site/adg/shared/CurtainICT4DJan04.pdf>.

Addressing the questions in box 3 in consultation with all partners and stakeholders should help project planners and implementers avoid the pitfalls that have led to the failure of so many ICTD projects. Lessons learned from various ICT interventions⁹⁵ confirm that these components of good practice are in fact critical factors in ICTD planning.

First, ICTD initiatives should be explicit about their development goals and expected outcomes. In an analysis undertaken for the AusAID—Virtual Colombo Plan, Curtain⁹⁶ has argued that ICT project goals should have a sharp focus and be clearly linked to specific MDG goals. The value of creating clear-cut links is that it makes it possible to exclude projects that cannot demonstrate their likely impact in terms of specific development objectives. It would also help in determining whether the project should be ICT-driven or ICT-supported. Technology choices then become simpler. Such an exercise would go a long way in reducing the possibility of project failure.

Second, ICTD interventions should be demand- rather than supply-driven, and the demand should come from the community itself. This implies the need to build partnerships with the community and to foster a sense of ownership by the community.

Third, ICT solutions should be sensitive to local conditions and limitations, including those related to infrastructure, access, relevance and language, and they should be designed to last and be sustainable. The choice of access technologies to provide connectivity; computer hardware and software elements; security systems to protect both the systems and the data from hacking, viruses and other security breaches are critical. Module 4, Module 5 and Module 6 discuss these issues in more detail.

Fourth, a strong political commitment from the government is required. Such a commitment must be backed by a budgetary allocation that is adequate both in quantity and in the nature of its distribution. Where resources are limited, multi-stakeholder partnerships can lessen the burden of everyone involved. By ensuring multi-stakeholder partnerships, the government can reduce its own role to that of facilitating the creation and equitable diffusion of infrastructure, and the adaptation and scaling up of successful pilot projects. Private sector and civil society organizations can provide funding assistance in the development of content, and facilitate and enable community participation. Strategic international and regional partnerships can also be

95 Accenture, Markle Foundation and UNDP, *Creating a Development Dynamic: Final Report of the Digital Opportunity Initiative* (2001), <http://www.markle.org/publications/243-creating-development-dynamic-final-report-digital-opportunity-initiative>.

96 Richard Curtain, *Information and Communications Technologies and Development: Help or Hindrance?* (Canberra, AusAID, 2004), p. 29, <http://www.developmentgateway.com.au/jahia/webdav/site/adg/shared/CurtainICT4DJan04.pdf>.

explored. By pooling scarce resources, universal systems can be created for the benefit of all. Collaboration at this level takes time to build, but the results are definitely likely to create a win-win situation for all.

Fifth, it is necessary to ensure that ICT projects are process-oriented and not duration-specific or merely target-driven. Most development projects, especially if they are donor-funded, operate with fixed targets and fixed time frames. While these are planning constraints, it also has to be recognized that using ICTs effectively as development tools requires their long-term and sustained use. This is because the use of ICTs requires both attitudinal and systemic changes in organizations and communities, and it is necessary to provide a sufficient lead time for ICTs to be embedded in the social fabric of the community. There are also time lags associated with the decision to use, the deployment of appropriate technologies, capacity building and use. These processes, although ideally parallel, are often done in a sequential and linear manner, necessitating more time than originally planned.⁹⁷ For this reason, sometimes by the time the project starts to show dividends, the fixed time frame is over, donor support is withdrawn and the project flounders.

4.3 Technology Issues and Challenges

How technology choices are made is also an important area of concern. Reddi and Dighe list the following questions for making technology choices:

- Is the technology easily available? Are the physical conditions appropriate for the chosen technology (e.g. electricity)?
- What steps are being taken to ensure access? Where is the technology centre located? Is the location physically and socially suitable and safe for target groups, especially women, to come and go without much effort and without disruption to their many responsibilities?
- Who owns and controls access to the technology?
- What is the cost of the technology being deployed in terms of funding and effort for the agency and for the user? What are the opportunity costs?
- How easy or complex is the technology to use?
- Is the technology interactive? How is interactivity built in?
- Is the technology portable? Can it be used any time, anywhere, or is it fixed in time and space, like TV for instance?
- How easy is it to install, maintain, correct, modify and update the technology? Whose responsibility is it to undertake these tasks?⁹⁸

As Reddi has pointed out:

Often the choice of location of the technology is determined by questions of 'safety', not accessibility. Where the technology is placed in a community setting also determines the social issues that underpin access. If the technology is located in a local government office or school, what opportunities do the poor, who live at the fringes of the community, have to access it? Can women and girls visit the venue at any time convenient to them? If there is a

97 Glen Farrell, *ICT and Literacy: Who benefits? Experience from Zambia and India* (Vancouver, Commonwealth of Learning, 2004), <http://www.col.org/resources/publications/Pages/detail.aspx?PID=38>.

98 Anita Dighe and Usha Vyasulu Reddi, *Women's Literacy and Information and Communication Technologies: Lessons that Experience has Taught Us* (New Delhi, Commonwealth Educational Media Centre for Asia and Commonwealth of Learning, 2006), p. 43, http://www.cemca.org/CEMCA_Womens_Literacy.pdf.

custodian or facilitator identified to manage the location and use of the technology, what power roles does the custodian play? If control and operation is placed in the hands of a government employee or school teacher, how will that affect access to the marginalized?⁹⁹

The cost of using the technology is also a key dimension of accessibility. Countries can capitalize on the opportunities provided by convergence to look for low-cost solutions. The telecentre is one such solution that has been proven to be useful. As discussed in section 2, a telecentre is a small kiosk or info shop in a village community with a volunteer or village entrepreneur providing the vital link between the village and the world. The telecentre can have multiple functions, including serving as a community space not only for accessing information but also for village conversations, discussions and activities.

Another possible solution can involve the use of mobile phone-based applications. With penetration of mobile phones growing rapidly, it is possible to reach the individuals through voice on mobile phones, and thus directly in a voice based application overcoming language, literacy, and ICT literacy barriers while remaining personal and intimate.

4.4 Content Issues and Challenges

Content is the most important part of any ICTD effort. Infrastructure can be in place, access can be provided, websites and portals can be designed, but if there is no content, particularly relevant content, the initiative will probably not be adopted by users. Content is part of the user experience that often determines the success or failure of any ICTD effort.

Moreover, ICTD content development poses the greatest of challenges, both for the developer and for the user. Content development is a critical area that is often overlooked or given less importance in ICTD interventions. However, it is the most important. Common concerns raised by ICTD specialists in developing country contexts and projects often points to the fact that the content is lacking; what there is, is often protected by copyrights and intellectual property laws, and is not freely available. In addition, the content lacks local relevance.

There are many challenges that need to be addressed in the areas of language and content within the Asia-Pacific context, where English language proficiency is not high, especially outside metropolitan areas. Even in countries such as India and the Philippines, which have optimized the benefit derived from a large pool of English speaking software and content development specialists, language and literacy issues pose a major challenge for socially disadvantaged populations, cultural minorities and women in particular.

The first of the challenges is the issue of localization of content, that is, the translation, customization or original creation of content in a local language. An inherent feature of FOSS is its flexibility and the freedom it provides to users and developers to adapt and improve the software to meet their own particular needs, including language requirement. The FOSS application can be customized to suit local requirements by linking set language templates to the software, without disturbing the underlying software code. Such use of FOSS for localization builds technical expertise in the local community, while reducing dependence on expensive imported proprietary software.

⁹⁹ Usha Vyasulu Reddi, "Using ICTs to Remove Barriers in Education", paper presented at the SEAMEO - UNESCO Education Congress and Expo: Adapting to Changing Times and Needs, Bangkok, Thailand, 27-29 May 2004.

Similarly, the Open Content movement advocates for any kind of creative work or content (including music, movie, literature, learning materials, etc.) to be published under an open content license that explicitly allows copying and modifying of its information. A number of educational institutions offer open educational resources that are digital materials made available through open licenses, which can be reused, modified and localized for teaching, learning, research and more.¹⁰⁰

The Creative Commons,¹⁰¹ a non-profit organization, has released several copyright licenses, known as Creative Commons licenses, free of charge to the public. These licenses allow creators to communicate which rights they reserve, and which rights they waive for the benefit of recipients or other creators. Creative Commons was invented to create a more flexible copyright model, replacing “all rights reserved” with “some rights reserved”—to make content more compatible with the full potential of the Internet (that enables innovation and problem-solving by interconnecting with others at a global level, sharing knowledge and building upon creative works). All the training modules in APCICT’s *Academy of ICT Essentials for Government Leaders* are released under the Creative Commons Attribution 3.0 License. Wikipedia also uses its licenses.

Web 2.0 applications that allow individuals to create their own content, whether in the form of blogs and wikis, offer opportunities for local content development. So do social networks available on the Internet today.

Questions concerning content that need to be addressed when planning ICT-driven and ICT-supported interventions include the following:

- Who are the users and what are their needs—i.e. what is the user profile, including their learning needs, levels and styles? Who is the content suited for?
- What biases—social, cultural, economic, religious, linguistic and gender-related—does the content address?
- Is the content relevant to the community? For instance, is it relevant in terms of the women’s experiences? Is it locally developed? What is the community’s involvement in content development?
- How is the content organized?
- Is the content accurate and up-to-date?
- How has the technology been modified to make it easy for the users to use, hear and understand the content?
- Are both individual and group learning built in and encouraged?
- Does the content encourage, promote and facilitate interactivity and feedback?
- What support systems, such as ground-level facilitators and learning materials, have been included and made available?
- What mechanisms are in place for correction and modification of the content?¹⁰²

100 Wikipedia, ““Open educational resources””, http://en.wikipedia.org/wiki/Open_educational_resources.

101 Creative Commons, <http://creativecommons.org>.

102 Dighe and Reddi, *Women’s Literacy and Information and Communication Technologies*, p. 43.

4.5 Some Other Challenges in ICTD

ICT projects run into difficulties for many reasons. Divergence between the project goals of the managers and those of the target groups is a common cause of failure. Gaps between design and reality caused by different contexts and conditions that are operating are also a frequent cause of project failure. While this may be true for many development interventions, it is particularly so for ICTD interventions, since issues of available data, technology infrastructure, work processes, cultural attitudes and motivations, staffing and skills, project time frames, management structures, inadequate budgetary provisions, and gaps between planning and implementation lead to mismatches.¹⁰³ Many of these issues are discussed in Module 7 of this series.

The challenge of scale. ICTD interventions in developing countries face the challenges of scale. Countries that have invested in large-scale systems have had to address the issues of centralized planning and deployment versus local relevance and regional needs and demands. All of them have had to face issues of access, equity and interactivity and have been, to some extent, overtaken by technological developments emerging out of the digital revolution. In contrast, digital ICT interventions tend to be small initiatives, locally friendly, responsive to the community, and problem-sensitive. This has been their strength. However, many have remained as “pilots” and have not been mainstreamed. As a result, when donor funding has ended, these pilots end as well. When they have been successful, efforts have been made to replicate them or to scale them up but sometimes without taking into account the differing contexts and conditions, and thereby negating the very features that made them successful. As the Asia-Pacific Development Information Programme (APDIP) of UNDP has pointed out, “localized adaptations to the opportunities offered by ICTs are fairly easy to achieve...adjustments at national levels require wholesale institutional reform and change management practices that can be expected to encounter entrenched resistance, scepticism, and interests that are vested in the status quo.”¹⁰⁴

ICTD human capacity building. Human capacity building is an essential element for effective use of ICTD. The ICTD skills required for different sets or groups of people may be different; but without building up of ICTD capacities, the full potential and benefits of the technologies cannot be availed of. A major group of people in need of capacity building include the following:

- Policymakers and decision makers – People with power to mobilize top-level support and commitment.
- Planners and project designers – Middle level functionaries, who design, cost and implement initiatives. Such functionaries include academics, IT specialists, technology designers, content experts and developers, among others.
- Champions – Key individuals who drive the process, volunteer to be test cases, and sell ideas to peers. They are often capacity builders themselves.
- Trainers of trainers – Key individuals responsible for the training of field level personnel and workers. These trainers must themselves be champions and are deeply committed to the cause. They need to have a good understanding of both ICTs and the contexts and conditions in which these are to be deployed and used. These will be the key persons who are trained as part of a national capacity building activity.

¹⁰³ Richard Heeks, *Failure, Success and Improvisation of Information Systems Projects in Developing Countries*, Development Informatics Working Paper Series, Paper no. 11 (Manchester, Institute for Development Policy and Management, University of Manchester, 2002), http://www.sed.manchester.ac.uk/idpm/research/publications/wp/di/di_wp11.htm.

¹⁰⁴ Roger Harris and Rajesh Rajora, “ICTs for Governance and Poverty Alleviation in India”, (UNDP-APDIP, Elsevier, 2006), <http://www.apdip.net/projects/2003/in>.

Capacity building for these groups of people needs a sustained, institutional building approach to build the core competencies in ICTD. A combination of need assessment, institutional partnerships, training materials developed by carefully selected regional resource persons, testing and use of the materials in training programmes on site and off site, and critical evaluation is required. The experience of APCICT in developing the *Academy of ICT Essentials for Government Leaders* Programme is a good example of systematic human capacity building in ICTD.

Partnership building. A recurrent theme in this module has been the importance of the involvement of different stakeholders and players in ICTD interventions. This theme has stood out in discussions of convergence as a grand alliance of ICT technologies, academic disciplines, and varied partners from government, private sector and civil society, and the users, citizens and beneficiaries of development.

Nowhere is this more important than in the ICTD sector. This is because different sets of knowledge, skills and competencies rest with different groups of stakeholders and players. Governments and aid agencies do not have the expertise to deal with the delivery of ICTs on the ground. ICT specialists, who come with specialist technical skills, are not necessarily knowledgeable on social and change processes that development requires. Neither government nor ICT specialists have the ability to connect with poor communities the way that civil society organizations do. And project management skills in an ICTD setting are even harder to find.

Systematically, findings from research and impact studies into ICTD projects have revealed the absence of community engagement, involvement and active participation, limiting the success of ICTD projects. Issues that have emerged from research include:

- Skill factors, where different partners tend to have unrealistic expectations of local skills and knowledge on a variety of topics including IT and management.
- Input-output factors – Difficulties that may arise as a result of unequal investments by partners, and/or unequal gains by partners. Partners are not always explicitly aware of their mutual interest and potential mutual gains and risks in projects.
- Socio-cultural factors – Differences in the working ethos and working styles of different partners.
- Systems factors – Integrating the different partners and activities into a common vision and mission of the project.
- Trust factors – The absence of trust between partners and promising more than can be delivered.¹⁰⁵

Key lessons learned from an extensive survey of partnerships in ICTD for poverty reduction revealed that partnership building needs: clear focus in terms of shared goals and alignment of objectives; formal structure of partnership agreements and clearly defined roles and responsibilities; accountability; ownership; and ethical frameworks. Partnership implementation involves a willingness to adapt to changing conditions, leadership, team building, mutual understanding and respect. A deep understanding of the project conditions and local contexts—political, social and technological, is also essential.¹⁰⁶

105 A.J.Gilbert Silvius, Anand Sheombar and Jakobus Smit, "The Partnership Health of ICT Projects in Developing Countries", in Pacific Asia Conference Information System (PACIS): PACIS 2009 Proceedings (2009), http://mmu.academia.edu/AnandSheombar/Papers/327670/The_Partnership_Health_of_ICT_Projects_In_Developing_Countries.

106 Marije Geldof and others, *What are the key lessons of ICT4D partnerships for poverty reduction? Systematic Review Report*, (2011), http://www.gg.rhul.ac.uk/ict4d/workingpapers/DFID_ICT_SR_Final_Report.pdf.

4.6 ICTD Project Evaluation

There have been several analyses of success or failure of ICTD projects done by scholars and global agencies.¹⁰⁷ Clarity of objectives, target groups, intermediaries, policy environments, institutional arrangements, key linkages, processes, capacity building efforts, technology choices and funding models—these are all factors that have been found to make the difference between success and failure.

Across all sections of this module, one theme has underlined the discussion—that development is a people focused concept; and the use of ICTs in development must remain synchronized with people related contexts and problems for which solutions are to be found. Therefore, there is a great need to gather real and accurate information that will enable the design and implementation of ICTD projects. This will help reduce the high level of failures in ICTD programmes and project reported in an earlier section of the module; and will also help the meaningful and appropriate use of ICTD solutions to address problem and location specific situations.

The search for accurate and reliable information, the use of such information as an input in the project cycle (i.e. in planning, design and implementation), and the assessment of the impact of a given programme or project within a development framework is commonly called development monitoring and evaluation.

Development evaluation is a broad and multifaceted concept. It is as complex a process as the development it seeks to evaluate. Evaluation of ICTD projects brings an additional dimension to the complexity. What does one evaluate—the overall programme in which the technology is embedded; the technology or the technology solution per se; the user, or the benefit for the user? Is it financial sustainability or social sustainability? What do the two terms mean? Does one look at short-term impact or long-term effects? Does one look at effects or effectiveness and what is the difference between the two? What kinds of designs are suitable for evaluating ICTD programmes and projects? These and many other questions come to mind adding to the confusion about the impact of ICTD programmes and projects in a given social context and condition.

Evaluating ICTD projects is not about academic research. Neither is it for pushing the frontiers of knowledge nor for writing a book. ICTD evaluation is designed to address and solve real world problems and provide solutions to those problems. ICTD evaluation is important because:

- In very simple terms, evaluation is necessary to know if an ICTD solution succeeded or failed to achieve its objectives.
- As a planning tool, evaluation is needed to determine whether the ICTD solution is likely to meet the needs of all stakeholders, the donors and funding agencies, the implementing agencies, and the beneficiaries.
- Evaluation is necessary to establish that an ICTD solution is financially and socially sustainable in the long run.
- Evaluation is needed to establish whether investment in an ICTD solution is worth the expenditure.

¹⁰⁷ See Karen Eggleston, Robert Jensen, and Richard Zeckhauser, "Information and Communication Technologies, Markets, and Economic Development", in *The Global Information Technology Report 2001-2002: Readiness for the Networked World*, Geoffrey Kirkman and others, eds. (New York, Oxford University Press, 2002), http://cyber.law.harvard.edu/publications/2002/The_Global_Information_Technology_Report_2001-2002; and S. Batchelor and S. Sugden, *An Analysis of infoDev Case Studies: Lessons Learned* (Reading, Gamos Ltd. and Big World and Washington, D.C., infoDev, 2003), <http://gamos.org.uk/sustainableicts/execsumm.htm>. For case studies from the region, see UNDP-APDIP, "ICTD Case Studies", <http://www.apdip.net/resources/case>. For case studies from India, see Avik Ghosh, *Communication Technology and Human Development: Recent Experiences in the Indian Social Sector* (New Delhi, Sage Publications, 2006).

There are various stages of evaluation. Broadly, these fall into three categories: formative, process, and summative.

Formative evaluation is conducted before or at the beginning of a programme or project. Data collection at this stage helps to formulate general and specific objectives and strategies, develop protocol materials, and improve upon the project. Feed forward studies, pilot or prototype testing, and resource mapping are some of the elements of formative evaluation.

Process evaluation is critical. It is also called monitoring or concurrent evaluation. Monitoring or concurrent evaluation is usually taken to mean ongoing, current and frequent assessment of planned work. In development programmes and projects, monitoring is done to assess the performance of a project. It is also done to ensure that the project is on track, and that intended changes are taking place. If they are not, corrective measures may be necessary.

Summative evaluation is carried out after a programme or project is completed and in the context of development work, is defined as “mostly a more thorough examination than monitoring, at specific points in time, of programmes, projects or organization, usually with an emphasis on impact on the people and commonly also relevance, effectiveness, efficiency, sustainability, and replicability.”¹⁰⁸

At a result of summative research, it should be possible to analyse causes of success and failure, identify strengths and weaknesses, and make definite recommendations for the future, both for individual programmes and for the system as a whole. For this reason, summative evaluation studies “impact” and addresses issues such as financial and social sustainability, scaling up, or closing down.

Box 4. Gender Evaluation Methodology

Gender Evaluation Methodology (GEM) is a guide to integrating a gender analysis into evaluations of initiatives that use ICTs for social change. Pioneered by the Association for Progressive Communications (APC), Philippines, and used extensively all over the world, GEM provides a sound methodology framework not just for integrating gender analysis into evaluation of ICTD initiatives, but also a framework that can be used in ICTD projects that target marginalized and poor communities

The tool is for APC Women’s Network Support Program (WNSP) members as well as other practitioners who share a common commitment to gender equality and women’s empowerment in ICTs, including:

- ICT initiatives for social change
- Project managers and project staff using ICT in projects without a specific gender or women’s focus
- Evaluators working in the IT field
- Donors and development agency staff working in the IT field
- Gender focal points that support women’s and IT issues
- Policymakers
- ICT planners
- Consultants in the area of gender and ICTs

Source: GEM, <http://www.apcwomen.org/gem>; and author’s own use of GEM in evaluation of ICTD projects.

108 Reidar Dale, *Evaluating Development Programmes and Projects*, 2nd edition (New Delhi, Sage Publications, 2004), p. 50.

Evaluation of ICTD programmes and projects is, by definition, different from stand alone development project evaluation. While the same methods used for other development projects may be applied, the kind of information that an ICTD evaluation has to yield goes beyond traditional evaluation techniques.

To evaluate the ICTD intervention, it is necessary to ask a variety of questions that will explain different parts of the process. For example, evaluation questions for the technology component can be related to: costs, language and relevance, user friendliness and usability, the presentation and packaging, organizational change and project management.

It is only by building up a body of information that others engaged in similar efforts learn from peer experience and save valuable time and effort. There should also be a record of different kinds of activities carried out. For instance, management criteria for proposals, reports of stakeholder consultations, contracts, study plans, documentation, mapping, budgets and cost accounting, logistics, project decision points, sampling plans, staff training and evaluation, field control methods, material preparation and pre-testing, data processing and management, project monitoring and report preparation—all form important historical documentation that could describe success or identify causes of failure. And these are areas where there is very little information; and which must be collected and preserved.

To sum up:

- A people-centric rather than ICT-centric approach is critical for ICTD programmes and projects to succeed.
- The factors that spell the difference between success and failure of an ICTD project include clarity of objectives, target groups, intermediaries, policy and institutional arrangements, capacity building efforts, technology choices and funding models.
- A successful small-scale initiative requires more than just replication in a different context to succeed. Scaling up an ICTD effort requires wholesale institutional reform and change management.
- Evaluation is an ongoing process and a very important part of all development projects, including those that have ICTs as part of the project.



Something To Do

Select any one ICTD programme in your country, and analyse it in terms of policy, planning and implementation. In looking at the policy angle, determine what ICTD policy or policies complement or support the programme. In looking at the planning and implementation aspects, use the good practice guide for ICTD projects (box 3) to evaluate the programme. Finally, on the basis of what you determine to be the programme's limitations, suggest ways of improving the programme.



Test Yourself

Using the basic log frame provided below:

1. Identify a specific ICT-supported programme you will develop and describe the overall programme aims and specific objectives.
2. Define the performance indicators for the programme in specific terms. What mechanisms will you set up to achieve the programme objectives and target? What framework or systems will you set up? How will they work?
3. What methods will help you to assess performance? At what stages will you assess performance? What will be your indicators of impact? How will you feed that into your next programme?

**ICTs and MDG—Planning Framework for Policymakers/
Programme Implementation Managers
Data Collection Framework for Each Task, Activity and Impact**

Overall Programme Goals and Objectives	Performance Indicators for the programme	What systems, procedures will be set up	How will you assess progress, output, impact

SUMMARY

This first module in the *Academy of ICT Essentials for Government Leaders* module series addresses the broad issues of development and argues for the meaningful application of appropriate ICTs toward accelerating the pace of development in developing countries of Asia-Pacific.

The first section of the module introduces readers to the broad contours of the MDGs and the progress of the Asia-Pacific region toward the achievement of these goals. The section also introduces readers, in particular those with limited or no background in technology, to ICTs and the characteristics that make them strategic tools for development.

The second section of the module explores the use of ICTs in specific MDG sectors. Using selected case studies to describe the diversity of ICT use, the section highlights both the strengths and the weaknesses one might find in ICT applications in key sectors of development.

The final section of the module describes, in broad terms, challenges in the application of ICTs for development. It underscores the need for ICTD programmes and projects to be “of the people, by the people, and for the people”. People-centric, rather than technology-centric, approaches are always more successful.

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Web Resources

Australian Development Gateway
<http://www.developmentgateway.com.au/jahia/Jahia/lang/en/pid/247>

Builder AU: ICT news and resources
<http://www.builderau.com.au>

Business Transformation Enablement Program, Government of Canada
<http://www.tbs-sct.gc.ca/btep-pto/documents/2004/templates-gabarits/readiness-etatprep/readiness-etatpreptbe.asp>

Change Management Tutorial Series
<http://www.change-management.com/tutorial-defining-change-management.htm>

CVR IT Consulting: Project management templates
http://www.cvr-it.com/Confirm_NonProfit.php

Definition of "change management"
<http://www.change-management-coach.com/definition-of-change-management.html>

Ethical Guidelines for Social Science Research in Health <http://www.cehat.org/publications/ethical.html>

EWET Education with Enterprise Trust
<http://www.ewet.org.za>

IDEA International Development Ethics Association
http://www.development-ethics.org/what_is

Markkula Center for Applied Ethics
<http://www.scu.edu/ethics/>

Online Ethics Center
<http://www.onlineethics.org/>

Project in a Box: Software for project management
<http://www.projectinabox.org.uk/community.asp>

Ten Big Myths about Copyright Explained
<http://www.templetons.com/brad/copymyths.html>

Understanding Copyrights and Related Issues
http://www.wipo.int/freepublications/en/intproperty/909/wipo_pub_909.html

What is Intellectual Property?
<http://www.wipo.int/about-ip/en>

Glossary

Analogue	Measuring or representing data by means of one or more physical properties that can express any value along a continuous scale. For example, the position of the hands of a clock is an analogue representation of time.
Asynchronous	Not synchronized or coordinated in time.
Audio-graphics	Computer-based technology that enables simultaneous transmission of voice, data and graphic images across local telephone lines.
Broadband	A general term used to describe a high-speed connection to the Internet. Broadband is defined as Internet access with a minimum capacity of greater or equal to 256 kbps in one or both directions. Fixed broadband is implemented through technologies such as digital subscriber line (DSL), cable modem, fibre to the home (FTTH), metro Ethernet, wireless local area networks (WLAN). Mobile broadband is implemented through technologies such as wideband CDMA, HSDPA, CDMA 1xEV-DO.
Broadcast	Transmission of a radio or TV programme or signal for public use.
Cable television	A system for delivery of TV video and audio content via a wired network, employing either copper or fibre optic cables.
Collaborative learning	Learning through the exchange and sharing of information and opinions among a peer group. Computers can be used to mediate collaborative learning for geographically dispersed groups.
Common service facilities	A common location in a community where multiple services are offered to community members.
Computer-based learning	The use of computers as a key component of the educational environment. While this can refer to the use of computers in a classroom, the term more broadly refers to a structured environment in which computers are used for teaching purposes. The concept is generally seen as being distinct from the use of computers in ways where learning is a peripheral element of the experience (e.g. computer games and Web browsing).
Conference conferencing (asynchronous)	A computer-based conference where the different participants, who are at different locations, need not be online at the same time.
Conference conferencing (synchronous)	A computer-based conference where the different participants, who are at different locations, must be online at the same time.
Computer file transfer	The movement of one or more files from one location to another. A collection of electronically stored files can be transferred by physically moving the electronic storage medium, such as a hard disk, compact disk or thumb drive, from one place to another, or by sending the files over a telecommunications medium. On the Internet, the File Transfer Protocol (FTP) is a common way to transfer a single file or a relatively small number of files from one computer to another.
Convergence	A term used to describe emerging telecommunications technologies and network architecture used to migrate multiple communication services into a single network. Specifically this involves the coming together in a seamless way of previously distinct media such as telephony and data communication into common interfaces on single devices. The same telecommunications tool—i.e. the mobile phone—can be the delivery channel for text, audio, video, e-mail, SMS and Internet browsing.

Correspondence materials	Materials for a distance education course, where the course of study is conducted by post, and the learning materials and student assignments are also conducted by post.
Corporate social responsibility	Also called corporate responsibility, corporate citizenship and responsible business, it is a concept whereby organizations consider the interests of society by taking responsibility for the impact of their activities on customers, suppliers, employees, shareholders, communities and other stakeholders, as well as the environment.
Cybercafé	A shop that offers computing facilities such as Internet access and e-mail.
Digital	Electronic technology that generates, stores and processes data in terms of two states: positive and non-positive. Positive is expressed or represented by the number 1 and non-positive by the number 0. Thus, data transmitted or stored with digital technology is expressed as a string of 0s and 1s.
Digital divide	Refers to the inequalities both in the physical access to technology, and the resources and skills needed to effectively participate as a digital citizen. The digital divide separates people in several ways: (1) it can mean separation between those who have access to technology versus those who do not; (2) it separates those who have access to information versus those who do not; and (3) it creates a separation between those who are able to successfully use ICTs versus those who are not able to.
Economies of scale	Reduction in cost per unit resulting from increased production, realized through operational efficiencies. Economies of scale can be accomplished because as production increases, the cost of producing each additional unit falls.
Electronic blackboard	A device that looks like an ordinary blackboard or whiteboard, but can be interfaced with a computer.
Electronic bulletin board	A computer that is running software that allows users to leave messages and access information of general interest.
e-Commerce	Refers to the buying and selling of products or services over electronic systems such as the Internet and other computer networks. It also includes the entire online process of developing, marketing, selling, delivering, servicing and paying for products and services.
e-Learning	An umbrella term for all forms of electronically supported learning and teaching. It encompasses learning at all levels, both formal and non-formal, the information and communication systems, whether networked learning or not, serve as specific media to implement the learning process.
E-mail	A store-and-forward method of composing, sending, storing and receiving messages.
Facsimile	An exact copy or reproduction transmitted electronically.
First-generation learners	The first generation in a family to benefit from formal schooling.
Information literacy	The ability to recognize the need for information, and find, evaluate and use that information in whatever format (print index, online database, Internet, etc.) it appears.
Interactivity	In computers, interactivity is the dialogue that occurs between a human being (or possibly another live creature) and a computer program.

Multimedia	The use of computers to present text, graphics, video, animation and sound in an integrated way. The term is also used to describe systems that support the interactive use of text, audio, still images, video and graphics. Each of these elements must be converted in some way from analogue form to digital form before they can be used in a computer application.
Non-formal education	Any organized, systematic, educational activity conducted outside the framework of the formal school system to provide selected types of learning to particular subgroups in the population, adults as well as children.
SMS	A service available on most digital mobile phones that permits the sending of short messages (also known as text messages, messages or, more colloquially, "SMSes", texts or even txts) between mobile phones, other handheld devices and even landline telephones.
SchoolNets	Networks of schools. SchoolNets promote the development of knowledge societies by connecting schools to the Internet; building connections among students, teachers and schools; sharing information and resources; and supporting e-learning in online, networked environments.
Synchronous Radio	Synchronous means coordinated in time, if not in place. For radio, this means that transmission and listeners must tune in to the radio station at the same time although they may be in different locations.
Tele-classrooms	A system of creating a virtual classroom with students.
Teleconferencing	Interactive electronic communication between two or more people at two or more sites by making use of voice, video and/or data transmission
Tele-density	A term commonly used to describe the number of telephone lines per some unit of the population (often per 100 people).

Notes for Trainers

The module has been written within a particular perspective and with a special focus. The purpose of these “Notes for Trainers” is to try to align the author’s perceptions of the module content with those of national and regional training institutions and individuals who will take the modules forward in their own individual settings.

As noted in the section entitled “About The Module Series”, this module is designed to have value for different sets of audiences and in varied and changing national conditions. It is also designed to be presented, in whole or in part, in different modes, on- and off-line. Case and country studies may change from region to region and from country to country and therefore, the module may require customization to suit local settings. What will be presented and how it will be presented should depend on the situation at hand. The module may be studied by individuals and by groups in training institutions as well as within government offices. The duration of the training sessions will determine the extent of detail in the presentation of content.

These “Notes” offer trainers some ideas and suggestions for presenting the module content more effectively. Trainers may adopt, adapt or create afresh the training plans presented here.

General Notes on Effective Training Techniques

The module is designed for self-study as well as for “classroom” delivery. Thus, each section of the module begins with a statement of learning objectives and ends with a summary of key points. Readers may use the objectives and summary of key points as a basis for assessing their progress through the module. Each section also contains discussion questions and practical exercises that may be accomplished by individual readers or used by trainers.

Case studies form a significant part of the module content. These are intended for discussion and analysis, particularly in terms of the extent to which the key concepts and principles presented in the module work in real-world programmes and projects. It is important for readers to appreciate the need to adapt ICT-based and ICT-supported approaches and models to suit local conditions.

The module is written according to the principles of adult learning. For example, it is recognized that adults learn best when they are free from stress and information overload, and they are able to decide for themselves what is important to be learned. The self-study questions and practical exercises are designed to enable readers to draw on their own experience to benchmark the content and to think reflectively on the issues presented. The aim is to make the content as closely relevant to their work experience as possible, and to enable them to link the knowledge gained to their own experience in order to solve problems. It is recognized that the readers of this module could themselves serve as knowledgeable resource persons. Trainers should keep this in mind when using the module as a training resource in different settings and with different groups of audiences. For example, trainers may encourage participants to cite other cases and examples from their own experience to substantiate the content of the module.

Structuring the Sessions

Depending on the audience, time available, and local settings and conditions, the content of the module could be presented in different structured time capsules. What could be covered in sessions of different durations is outlined below. Trainers are invited to modify the session structure based on their own intimate understanding of the country and audience.

For a 90-minute session

For senior policymakers: A broad summary of section 2 of the module for a general understanding of ICT applications in development, including a detailed explanation of any one example from the case studies cited.

For project implementation staff: Any one sector out of section 3, including a detailed explanation of any one example from the relevant sector for the given target audience.

For programme and/or project management staff: section 4, which looks into challenges to the use of ICT in development, along with a detailed presentation of any one case study from section 3.

For a three-hour session

For an audience of policymakers: A broad summary of sections 2 and 4, and a detailed explanation of any one case study followed by a practical session of 90 minutes.

For an audience of programme and/or project management staff: A broad summary of the relevant development sector from section 3 and a detailed presentation of section 4, followed by a practical exercise in project design and implementation planning.

Generally, a three-hour session could be divided into two 90-minute sessions containing a summary of a relevant section and a case study followed by a practical group exercise.

For a full day session (6 hours duration)

Use four 90-minute sessions and design the content progressively starting with section 1 and progressing to section 4. Use the same pedagogical approach described above.

For a three-day session

About half a day could be spent on section 2 of the module.

A day and a half could be spent on section 3 of the module, with a field visit on the second day to a nearby ICTD application.

Lessons learned from the field visit could be used to bolster the discussion of section 4 of the module on the third day. Participants could be invited to link the different challenges to the use of ICTs with the case study/field visit and to the content of the module being presented, so that they take away from the three-day programme a sound understanding of the critical importance of proper planning, design and implementation.

For a five-day session

A five-day session would be ideal for people involved in programme and project implementation. The emphasis in the module should be on the key sections 3 and 4, and the in-class sessions should be interspersed with field visits to case study locations nearby.

Day 1 could consist of an extensive exploration of section 2 of the module. Half a day could be spent on exploring progress on the MDGs, and on establishing the inter-sectoral linkages. For instance, a poverty alleviation initiative is likely to have spin-offs in health care and in education. Such linkages should be explored as they are vital to programme design and implementation. The second half of Day 1 could be spent on exploring the different ICTs, with a focus on looking at convergence and digital divide issues. A visit to a nearby telecentre, if possible, could round off the day's activities.

Days 2 and 3 could focus on the applications of ICTs for meeting different MDGs (i.e. section 3), with at least half a day devoted to a field visit. Case studies can be explored in detail. The field visit should be followed by an exercise applying to a planned intervention key principles and design features observed during the field visit.

Days 4 and 5 could continue with the exercise. The materials in section 4 of the module could be presented in an instructor-led session in the morning, followed by extensive practical work by individuals and groups in the afternoon. The fifth day would close with presentations of the exercise followed by peer review.

Trainers are encouraged to adapt for use the training slide presentations available at APCICT's website (<http://www.unapcict.org/academy>).

Trainers are also encouraged to structure each session to include both a lecture cum discussion, and individual or group exercises.

Ideally, there should be no more than 25 participants in a training session.

Trainers should use the references listed, and look up the original documents and websites cited. Trainers may also use other relevant case studies. However, they should remember to cite all references and sources in the presentation.

About the Author

Usha Rani Vyasulu Reddi is an independent ICTD consultant based in Hyderabad, India. She was formerly Professor of Education and Director of the Centre for Human Development at the Administrative Staff College of India in Hyderabad. From 1998 to 2006, she was Director of the Commonwealth Educational Media Centre for Asia based in New Delhi, India. Her work covered all of the Commonwealth countries of Asia and was focused on providing technical assistance and advice on the application of ICT in education, both formal and non-formal. Until 1998 she was Professor and Director of the Audio Visual Research Centre at Osmania University in Hyderabad. She has published widely in various academic, international and peer-reviewed publications.

UN-APCICT/ESCAP

The United Nations Asian and Pacific Training Centre for Information and Communication Technology for Development (UN-APCICT/ESCAP) is a subsidiary body of the United Nations Economic and Social Commission for Asia and the Pacific (ESCAP). UN-APCICT/ESCAP aims to strengthen the efforts of the member countries of ESCAP to use ICT in their socio-economic development through human and institutional capacity-building. UN-APCICT/ESCAP's work is focused on three pillars:

1. Training. To enhance the ICT knowledge and skills of policymakers and ICT professionals, and strengthen the capacity of ICT trainers and ICT training institutions;
2. Research. To undertake analytical studies related to human resource development in ICT; and
3. Advisory. To provide advisory services on human resource development programmes to ESCAP member and associate members.

UN-APCICT/ESCAP is located at Incheon, Republic of Korea.

<http://www.unapcict.org>

ESCAP

ESCAP is the regional development arm of the United Nations and serves as the main economic and social development centre for the United Nations in Asia and the Pacific. Its mandate is to foster cooperation between its 53 members and nine associate members. ESCAP provides the strategic link between global and country-level programmes and issues. It supports governments of countries in the region in consolidating regional positions and advocates regional approaches to meeting the region's unique socio-economic challenges in a globalizing world. The ESCAP office is located at Bangkok, Thailand.

<http://www.unescap.org>

The Academy of ICT Essentials for Government Leaders (Academy)

<http://www.unapcict.org/academy>

The *Academy* is a comprehensive ICT for development training curriculum with currently ten modules that aims to equip policymakers with the essential knowledge and skills to fully leverage opportunities presented by ICTs to achieve national development goals and bridge the digital divide. Below are the short descriptions of the ten modules of the *Academy*.

Module 1 - The Linkage between ICT Applications and Meaningful Development

Highlights key issues and decision points, from policy to implementation, in the use of ICTs for achieving the MDGs.

Module 2 - ICT for Development Policy, Process and Governance

Focuses on ICTD policymaking and governance, and provides critical information about aspects of national policies, strategies and frameworks that promote ICTD.

Module 3 - e-Government Applications

Examines e-government concepts, principles and types of applications. It also discusses how an e-government system is built and identifies design considerations.

Module 4 - ICT Trends for Government Leaders

Provides insights into current trends in ICT and its future directions. It also looks at key technical and policy considerations when making decisions for ICTD.

Module 5 - Internet Governance

Discusses the ongoing development of international policies and procedures that govern the use and operation of the Internet.

Module 6 - Information Security and Privacy

Presents information on security issues and trends, and the process of formulating an information security strategy.

Module 7 - ICT Project Management in Theory and Practice

Introduces project management concepts that are relevant to ICTD projects, including the methods, processes and project management disciplines commonly used.

Module 8 - Options for Funding ICT for Development

Explores funding options for ICTD and e-government projects. Public-private partnerships are highlighted as a particularly useful funding option in developing countries.

Module 9 - ICT for Disaster Risk Management

Provides an overview of disaster risk management and its information needs while identifying the technology available to reduce disaster risks and respond to disasters.

Module 10 - ICT, Climate Change and Green Growth

Presents the role that ICTs play in observing and monitoring the environment, sharing information, mobilizing action, promoting environmental sustainability and abating climate change.

These modules are being customized with local case studies by national *Academy* partners to ensure that the modules are relevant and meet the needs of policymakers in different countries. The modules are also been translated into different languages. To ensure that the programme stays relevant and addresses emerging trends in the ICTD, APCICT regularly revises the modules and develops new modules.

APCICT Virtual Academy (<http://e-learning.unapcict.org>)

The APCICT Virtual Academy is part of the multi-channel delivery mechanism that APCICT employs in the implementation of its flagship ICTD capacity building programme, the *Academy of ICT Essentials for Government Leaders*

The APCICT Virtual Academy allows learners to access online courses designed to enhance their knowledge in a number of key areas of ICTD including utilizing the potential of ICTs for reaching out to remote communities, increasing access to information, improving delivery of services, promoting lifelong learning, and ultimately, bridging the digital divide and achieving the MDGs.

All APCICT Virtual Academy courses are characterized by easy-to-follow virtual lectures and quizzes, and users are rewarded with APCICT's certificate of participation upon successful completion of the courses. All *Academy* modules in English and localized versions in Bahasa and Russian are available via the Internet. In addition, plans for more content development and further localization are underway.

e-Collaborative Hub (<http://www.unapcict.org/ecohub>)

The e-Collaborative Hub (e-Co Hub) is APCICT's dedicated online platform for knowledge sharing on ICTD. It aims to enhance the learning and training experience by providing easy access to relevant resources, and by making available an interactive space for sharing best practices and lessons on ICTD. e-Co Hub provides:

- A resources portal and knowledge sharing network for ICTD
- Easy access to resources by module
- Opportunities to engage in online discussions and become part of the e-Co Hub's online community of practice that serves to share and expand the knowledge base of ICTD