



The Primer Series on **ICTD for Youth**

Primer 1: An Introduction to ICT for Development



UNITED NATIONS
APCICT-ESCAP

Primer Series on ICTD for Youth

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*A learning resource on ICT for development
for institutions of higher education*

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FOREWORD

The importance of youth and its role in helping to build our future society cannot be understated. Every generation comes to a point where it must invest in its youth to lead society into the future. The United Nations clearly understands that only through the enthusiasm and energy of youth will the accomplishments of our generation be sustained and furthered in the next.

The global community, through its shared commitment to sustainable development, has accomplished much over the past decades. Though much work is still to be done to fully meet the Millennium Development Goals (MDGs) by 2015, there are many accomplishments to be acknowledged, achieved through common purpose.

Our world today is moved by the rapid development of information and communications technologies (ICTs). Technologies, best understood as a means of better communication, improved processing and exchange of information, now impact every aspect of our lives, constantly revolutionizing the way we communicate with each other, comprehend our environments, and interact with government.

ICTs have played an important role in fostering improved connectivity as well as socio-economic development throughout the world, including the Asia and Pacific region. ICTs have provided the region's population with new opportunities and resources; e-Government extends the reach of public services, social media provides voices to those social groups most often marginalized, e-Health brings medical practitioners to rural communities and online learning provides access to education for those outside traditional hubs of learning.

However, considerable inequalities in terms of ICT infrastructure, connectivity and know-how still exist and inhibit the potential benefits of ICTs from being adequately leveraged. Access to ICTs is not uniform across regions, countries and communities, with many significant discrepancies existing between neighboring regions and the social groups within them. Indeed, 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 countries within 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 fully bridge the digital divide and realize the full potential of ICTs, a requisite level of human resources and institutional capacity must first exist. Towards this end, the Asia 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 for 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."

Since inception, APCICT has strived tirelessly to develop the requisite set of ICT knowledge and skills among government officials and senior development stakeholders through numerous thematic and programmatic initiatives. APCICT has also identified the need to build ICT capacity in the next generation of government officials and development stakeholders, if the Asia-Pacific region's development achievements are to be sustained.

However, a gap currently exists in terms of a well designed, instructional sound package for the capacity building of today's youth—the leaders of tomorrow. Understanding the need to bridge this gap, APCICT has developed the *“Turning Today's Youth into Tomorrow's Leaders”* programme, which aims to develop requisite ICT capacity among the leaders and workforce of the next generation.

ESCAP welcomes APCICT's efforts to empower the youth of the Asia-Pacific region and build their ICT for development capacity through the various elements of the programme, and in particular “The Primer Series on ICTD for Youth”; a core curriculum for university students that will provide Twenty-First Century skills for the knowledge society, where ICTs are an intrinsic part of everyday life. With over 56 million students enrolled in institutions of higher learning in Asia and the Pacific alone, the Primer Series is indeed a timely resource, and will support the spirit of the WSIS Declaration of Principles which recognizes that “young people are the future workforce and leading creators and earliest adopters of ICTs. They must therefore be empowered as learners, developers, contributors, entrepreneurs and decision-makers.”

Noeleen Heyzer, Ph.D.
Under-Secretary-General of the United Nations
and Executive Secretary of ESCAP

PREFACE

In the twenty-first century, information and communication technologies (ICTs) have become vital tools for developing innovative solutions to development challenges. However, in order to foster meaningful development it is essential that people understand both how to use ICTs and the benefits that ICTs can provide to their country and region.

As the youth of today go on to occupy leadership positions in society in the coming years, and assume the roles of policymakers and key decision makers in government, academia, private sector and civil society, their ability to recognize and leverage the link between ICTs and developmental goals will prove crucial. From this perspective, creating a critical mass of future leaders and decision makers with a comprehensive understanding of the potential of ICT for development (ICTD) and having the essential skills to tap the opportunities presented by ICTs is a pressing requirement. Yet, extensive research and assessment by APCICT reveal that there is a gap between this urgent need and the actual provision of opportunities for young people to gain knowledge and experience in the area of ICTD.

To fill the gap, this “Primer Series on ICTD for Youth” (Primer Series) aims to impart to university and college students an understanding of how ICTs can be effectively used to improve the lives of people across the Asia-Pacific region.

This Primer Series is part of a wider programme of APCICT—“*Turing Today’s Youth into Tomorrow’s Leaders*”—that is focused on building the ICTD capacity of the next generation of leaders. This programme is strongly endorsed by member States of the United Nations Economic and Social Commission for Asia and the Pacific (UN/ESCAP).

To equip member States with the requisite tools and knowledge to leverage technology for promoting socio-economic development, APCICT has been implementing its flagship programme—the *Academy of ICT Essentials for Government Leaders (Academy)*. Launched on 16 June 2008 at the OECD Ministerial Meeting in Seoul, the *Academy* is based on a comprehensive 10-module curriculum, covering various ICTD topics. Each module has been conceptualized, developed and implemented through a participatory and inclusive approach. Through the *Academy* programme, government officers and decision makers are able to learn more about how their country can harness the benefits of ICTs to achieve national development goals.

Together, the *Academy* and the Primer Series on ICTD for Youth aim to raise awareness, impart know-how, and develop a common understanding among change agents across different countries and generations, thus contributing to coordinated and collective efforts towards a more sustainable and inclusive society.

APCICT is focused on empowering young people because they are among society’s most valuable assets and can make a vital contribution to development efforts. ICTs are providing unprecedented opportunities to today’s youth to effect positive change in society. As global “Netizens”, they now have the power to connect, innovate and participate more effectively in decision-making processes. It is our hope that by using the Primer Series as a learning resource, students will not only gain valuable knowledge and insights, but also the inspiration to harness their own creativity and energy along with the power of ICTs to change this world for the better.

The road to developing the Primer Series has involved a comprehensive and demand-driven approach in order to better understand and respond to the ICTD education needs of youth. The approach included extensive research into the current status of ICTD education in universities and colleges in the Asia-Pacific region to gather information on the present coverage of ICTD in different programmes and majors. It also involved a series of consultations, meetings and workshops with relevant stakeholders to conceptualize and create a framework for the Primer Series. Throughout the development process of the Primer Series, APCICT has received generous support from numerous stakeholders from across the region and beyond. APCICT would like to thank all participants of the meetings and workshops organized as part of the development of the Primer Series who provided their valuable feedback and perspectives on strengthening ICTD education in Asia and the Pacific.

In addition, APCICT would like to thank the individuals and organizations who contributed to the development and review of Issue 1 of the Primer Series: “An Introduction to ICT for Development”. Over 100 university professors and stakeholders in the fields of education, development and ICT provided their valuable insight and experience towards the Primer Series. In addition, APCICT received valuable input and support from numerous students and interns, who have helped shape and refine the scope and design of the Series. In particular, APCICT would like to thank Usha Reddi, lead author of Issue 1 of the Primer Series, for her dedicated effort to create this groundbreaking resource for students in the Asia-Pacific region. APCICT would also like to acknowledge the contributions of the Asian Disaster Preparedness Center, Shahid Akhtar, Christine Apikul, Richard Labelle, Maria Juanita R. Macapagal and Rajnesh Singh who have generously lent their expertise and support to further strengthen the content of the Primer Series. Lastly, APCICT would like to thank the Government of the Republic of Korea for its financial support in the development of this resource.

Hyeun-Suk Rhee, Ph.D.
Director
UN-APCICT/ESCAP

ABOUT ISSUE 1 OF THE PRIMER SERIES

Development is about change. Change for the better. And all governments, irrespective of levels of development or political ideologies are interested in bringing about such change within their social and political systems. This may mean changing a health care system to benefit more poor and the elderly; or providing access to primary education for all. To do this, countries use all strategies and tools at their command to accelerate this process of change. Information and communication technologies (ICTs) are among the powerful tools that nations seek to deploy.

Sometimes, the link between ICTs and development goals appears clear; at other times, it seems fuzzy. Yet, across the world, billions of dollars are spent every single year by the governmental organizations, non-governmental organizations (NGOs) and the private sector in ICT projects with the hope and intention of succeeding. Some succeed, some fail. To know the reasons for their success or failure require an understanding of both ICTs and development.

This primer seeks to provide an introduction to and preliminary understanding of the linkages between ICTs and the achievement of the human development goals in society. Today, this newly emerging academic discipline is called ICT for Development (ICTD or ICT4D). We will use the term ICTD during the discussion in this primer.

This primer is designed to provide background information that students in undergraduate and graduate programmes can use as a starting point in the exploration of the various dimensions of the linkages through case studies of ICT applications in key sectors of development in Asia-Pacific countries. The aim is to foster a better multidisciplinary understanding of how ICTs can be used for social and economic development, and to equip students of different fields, from engineering to the social sciences with the understanding needed to use ICTs to meet a country's development goals and needs. This primer can be used by all students, it does not focus on any aspect in detail; and it seeks to avoid the technical jargon that a specialized study of any aspect of ICTD may entail.

LEARNING OBJECTIVES

The primer aims to:

- Introduce the student to basic concepts of ICTs and their role in the knowledge society, and in meeting the development goals of a society.
- Foster a better understanding of how ICTs can be applied to achieve social and economic development in different development sectors, and provide case studies of successes and failures.
- Provide a development-oriented framework for managing and evaluating ICT-based and ICT-supported projects and interventions in a range of social sectors.

LEARNING OUTCOMES

After reading this primer, students will be equipped with the basic awareness and knowledge of the potential of ICT for promoting socio-economic development, and be able to leverage this potential in whichever fields they decide to work in.

Specifically, this primer provides students with:

- Conceptual frameworks to understand the process of socio-economic development, and the role of information and ICTs in the development process.
- New knowledge and skills to help in the effective planning, development, implementation and management of ICTD initiatives.

HOW TO USE THIS PRIMER

In order to provide logic and a sequence that will be useful for students of all disciplines, the primer has been structured for use as basic reading for an estimated three credit course, for an estimated duration of one semester spread across fourteen weeks. While a sequence has been provided and each section of the primer leads to the following one, each section can also be used in a stand-alone manner. Faculty and institutions can use the primer as essential or supplementary reading; as a whole or in parts, depending on their individual requirements and the needs of the students.

This primer provides a foundation and is to be seen as an introduction, and not the definitive text on the subject. It can be used in conjunction with the APCICT's *Academy of ICT Essentials for Government Leaders* module series so that a comprehensive perspective on the use of ICTs for development can be fostered. It can be used to support other texts and reading materials that faculty choose to use. Required and supplementary readings are provided at the end of each section of the primer so that students can benefit from a value addition and a global perspective that these readings will provide.

The primer is divided into three sections and 12 chapters. Each section begins with a set of learning objectives and outcomes against which readers can assess their own progress. Each chapter of the primer contains practical exercises and multiple choice questions to help readers check that they have understood the discussions. The practical exercises are intended to promote an interactive learning process among students and faculty, and encourage readers to think reflectively on the issues presented.

Case studies are also provided throughout the primer. These are intended for discussion and analysis, particularly in terms of the extent to which the key concepts and principles presented in the primer work in real-world projects and programmes. Case study analysis and assignments are intrinsic to the learning process and should be taken with the seriousness they merit.

In addition, the primer contains short "Youth In Action" synopses of what young people have done or can do in the field of ICTD. The synopses include technological innovations and projects that youths have initiated from around the world to improve the lives of the impoverished and marginalized. They also include suggestions on ways in which youths can assess and develop their own capacity in the area of ICTD. The intention of these synopses is to inspire students to go beyond classroom learning.

Learning about ICTs and their role in development is an ongoing process. Case and country studies may change from region to region and from country to country and therefore, the primer may require customization to suit local settings.

Finally, the intention of this primer is not to address needs of only those students who will go on to work in an ICTD related field. The intention is that all learners should become aware of the potential of ICTD, and be able to leverage this awareness even if they are not specifically working in the ICTD sector. Even if they go on to become civil servants, lawyers, doctors or private sector executives, the knowledge gained from exposure to ICTD will still be useful to have.

This primer can be used by students as basic material to understand the various aspects and issues in ICTD. Faculty can use this primer as a support for teaching and as a source for materials not always available in the Asia-Pacific region. It is best used by faculty who can incorporate the ideas and supplement these with case studies from local settings.

Educators are invited to enhance and modify the case studies provided, and/or supplement these with cases, assignments and questions that they think will be more effective and meaningful to the students.

If exercises and assignments are group work encouraging team work and collaboration, even better because using ICTs for development is essentially team work and the building of partnerships where each individual brings his/her knowledge and competencies to develop a more successful project.

Faculty may wish to use the template provided for case study development and analysis when identifying cases from their own countries and contexts. Faculties are encouraged to improve on the template or rework it as per their own needs.

Suggested Template for Case Studies on ICTD (maximum 2,000 words)

Title of the case study	
Major partners	
Project start date and duration	
Project status (ongoing, completed, etc.)	
Brief introduction	
A description of the case, including conditions and contexts, and where and how it fits in the context of ICTD	<ul style="list-style-type: none"> • Project rationale • Who initiated the process? • Who were the target beneficiaries? • Who were the service providers? • How did the initiative work? • Was there a local champion? • Was there a partnership?
Project management and evaluation	<ul style="list-style-type: none"> • How was the project managed? By whom? • Was there any independent evaluation of the project? • What were the major findings of such an evaluation?
Identification of strengths and weaknesses	<ul style="list-style-type: none"> • How did the strengths and weaknesses affect the overall outcome of the initiative?
Issues to reflect over	
A couple of exercise questions	
Any other remarks	
Source and useful references for further information	

By no means, is this an exhaustive textbook nor is it meant as a stand-alone text in either development or in ICTD. Wherever possible, references consist of materials readily and freely available in the public domain on the Internet.

It is hoped that as ICTs change, and as experience in ICTD grows, this primer can be revised and added upon by faculties using their own knowledge and experience to enhance learning outcomes and content quality. It is also hoped that the primer can emerge as a dynamic and useful text capturing the Asia-Pacific experience in all its rich diversity. This primer is not the destination, but the beginning of a journey of exploration and learning.

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ACRONYMS

ABIA	Annual Bibliography of Indian Archaeology
ABU	Asia-Pacific Broadcasting Union
ACDEP	Association of Church Development Projects
ADB	Asian Development Bank
AIBD	Asia-Pacific Institute for Broadcast Development
AIDS	Acquired Immunodeficiency Syndrome
AIESEC	Association Internationale des Étudiants en Sciences Économiques et Commerciales (International Association of Students in Economics and Management)
AKUH	Aga Khan University Hospital (Pakistan)
APCICT	Asian and Pacific Training Centre for Information and Communication Technology for Development
APDIP	Asia-Pacific Development Information Programme (United Nations Development Programme)
ASEAN	Association of South East Asian Nations
B2B	Business-to-Business
B2C	Business-to-Citizen
C2C	Citizen-to-Citizen
CARD	Computer-Aided Administration of Registration Department (India)
CD	Compact Disc
CEC	Commission for Environmental Cooperation
CGIAR	Consultative Group on International Agricultural Research
CIDA	Canadian International Development Agency
COL	Commonwealth of Learning
DESA	Department of Economic and Social Affairs (United Nations)
DFID	Department for International Development (United Kingdom)
DVD	Digital Video Disc
EEA	European Environmental Agency
ENRAP	Knowledge Networking for Rural Development in the Asia-Pacific Region
ESCAP	Economic and Social Commission for Asia and the Pacific (United Nations)
FAO	Food and Agriculture Organization (United Nations)
FMIC	French Medical Institute for Children (France, Afghanistan)
FOSS	Free and Open Source Software
FTP	File Transfer Protocol
G2B	Government-to-Business
G2C	Government-to-Citizen
G2G	Government-to-Government
G8	Group of Eight
GAID	Global Alliance for ICTs in Development
GDP	Gross Domestic Product
GIS	Geographic Information Systems
GNH	Gross National Happiness (Bhutan)
GNP	Gross National Product
GPS	Global Positioning System
HDI	Human Development Index
HDR	Human Development Report
HINARI	Health Inter-Network 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
IICD	International Institute for Communication and Development
IP	Internet Protocol
IPCC	International Panel on Climate Change
IPR	Intellectual Property Rights
IPST	Institute for the Promotion of Teaching Science and Technology (Thailand)
IRIN	Integrated Regional Information Network
ISP	Internet Service Provider
IT	Information Technology
ITES	Information Technology Enabled Service
ITU	International Telecommunication Union
LCD	Liquid Crystal Display
MDG	Millennium Development Goal
MGNREGA	Mahatma Gandhi National Rural Employment Guarantee Act (India)
MIGIS	Mobile Interactive Geographic Information System (China)
MIS	Management Information System
MMS	Multimedia Message Service
NGO	Non-Governmental Organization
OCHA	Office for the Coordination of Humanitarian Affairs (United Nations)
OECD	Organisation for Economic Co-operation and Development
OS	Operating System
PC	Personal Computer
PDF	Portable Document Format
PFnet	People First Network (Solomon Islands)
PhilGEPS	Philippine Government Electronic Procurement System
PRSP	Poverty Reduction Strategy Paper
RML	Reuters Market Light
RSS	Really Simple Syndication
SIDA	Swedish International Development Agency
SITE	Satellite Instructional Television Experiment (India)
SMS	Short Message Service
SOPAC	SPC Applied Geoscience and Technology Division
SPC	Secretariat of the Pacific Community
SWAGAT	State Wide Attention on Grievances by Application of Technology (India)
TEWS	Tsunami Early Warning System
TPD	Teacher Professional Development (Thailand)
TV	Television
UN	United Nations
UNAIDS	United Nations Programme on HIV/AIDS
UNCTAD	United Nations Conference on Trade and Development
UNDP	United Nations Development Programme
UNEP	United Nations Environment Programme
UNESCO	United Nations Educational, Scientific and Cultural Organization
UNFCCC	United Nations Framework Convention on Climate Change
UN-HABITAT	United Nations Human Settlements Programme
UNICEF	United Nations Children's Fund (formerly United Nations International Children's Emergency Fund)
UNISDR	United Nations International Strategy for Disaster Reduction
UNTPDC	United Nations Trade Point Development Centre
USAID	United States Agency for International Development
USB	Universal Serial Bus
USP	University of the South Pacific
USPNet	University of the South Pacific Network

VoIP	Voice over Internet Protocol
VP	Village Phone (Bangladesh)
VSAT	Very Small Aperture Terminal
WBS	Work Breakdown Structure
WFP	World Food Programme
WHO	World Health Organization
WiFi	Wireless Fidelity
WiMax	Worldwide Interoperability for Microwave Access
WIPO	World Intellectual Property Organization
WSIS	World Summit on the Information Society
WTO	World Trade Organization
WYSIWYG	What You See is What You Get

List of Icons



Case Study



Points To Remember



Practical Exercise



Questions to Think About



Test Yourself



Youth In Action Note



SECTION I – CONCEPTS

Learning Objectives

The learning objectives of this section are to introduce learners to:

- The basic concepts of human development
- The link between communication and development
- The concept of the “digital divide”
- The definitions of information and communication technology (ICT)
- The strengths and weaknesses of ICTs

Learning Outcomes

After completing this section, learners will be able to understand:

- Key concepts in human development
- The basic elements of using communication for development
- Ways of bridging the digital divide
- ICTs and their strengths and weaknesses
- Key concepts and trends in ICT for development (ICTD)

Introduction

Across the world, the unevenness of economic development and social change presents us with stark contrasts and realities. Street children without shoes and in tattered clothes polish expensive cars in some countries. Women of all ages carry heavy head loads of concrete at construction sites for high rise buildings housing businesses and shopping centres.

What distinguishes the economically rich from the poor in many countries? Some argue that it is income poverty—not having enough of an income to access the benefits that the rich take for granted. Others will argue that the history of economic exploitation is the cause for the extensive poverty. Still others will argue that the historical reality of gender inequality accounts for the continuing depressed state of women and girls. Depending on their individual and collective academic disciplines, scholars and policymakers contributing to the extensive debate on development, its history, process, problems and solutions will chart different paths to reduce the great inequality between the rich and the poor.

It is not the intention here to enter this grand debate on development. Rather, the purpose of this introduction is to draw attention to the simple concept that today, ICTs offer the global community an unparalleled opportunity to reconsider ways and means of delivering the benefits of development by providing access to knowledge and to services that were earlier limited to the few rich in a society.

One of the recurring themes in the current debates on development centres on communication and the role of information and knowledge as making the difference between the rich and the poor. In other words, if the poor had information literacy,¹ they would be able to use the

¹ To be information literate, a person must be able to recognize when information is needed and have the ability to locate, evaluate and use effectively the needed information. Definition provided by the American Library Association, *American Library Association Presidential Committee on Information Literacy: Final Report* (Chicago, 1989).

information to improve their lives. To be information literate, the poor would need the same access to information and knowledge and to the services that the rich take for granted; the poor would benefit as much or more than the rich.

To understand the role of ICTs in the development process currently underway in the world, it is necessary to explore existing concepts of development, and study the historical role of ICTs in this process, and then link ICTs to development goals. It is important to understand what these ICTs are, their different components and elements, their attributes and their limitations and how these interact with each other and with social, political, legal and technological environments. It is also necessary to understand emerging trends in global thinking on the purpose of development; and become familiar with the role that international institutions are playing in the Asia-Pacific region to promote the use of ICTs in the development process.

That is what this section sets out to do.

CHAPTER I.

UNDERSTANDING DEVELOPMENT

Development is about change. Change for the better. Development is about making a better life for everyone. “A better life for everyone” might mean different things in different countries and contexts, and the concept is not restricted only to the developing world. In a world full of inequalities, a better life means first of all, the meeting of basic needs of food, shelter, education, health and a safe environment, and where all people can live with dignity and respect. A better life or development is not merely about money and wealth; it is also about ethics and values that all societies hold dear.

1.1 Understanding Human Development

What do we mean by development? The term is not new; it is highly complex, contradictory, and full of debates and discourses. The term means different things to different people, based on economic, geographic, political, social, cultural, religious and ethnic contexts. And finally, development can be viewed from the perspectives of a number of “academic disciplines”. Because it means different things to different people, it is a term difficult to define and understand.

Development has been a field of study extensively explored from various perspectives especially in the second half of the twentieth century. To establish the link between current development perspectives and the use of ICTs to address development, it is necessary to understand how development discussions coalesced into the human development framework.

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.

Mowlana and Wilson² argue that “development” as a conceptual framework for a number of individual, institutional, national and international changes is essentially a post World War II phenomenon. The term became synonymous with growth, modernization, change, democracy, and many similar Western values, and in the beginning was focused largely on economic development.

There are three dominant political perspectives to the study of economic development, dependent to a large extent on their origin. Within the neoliberal Western economies, the perspective of a free market economy with little or no state intervention prevails. In leftist, socialism dominated political systems, planned economies with extensive state intervention in the planning and management of the economic processes prevails. And in many of the developing countries, a model of a mixed economy prevails, with both a private sector market led engagement present alongside state intervention, regulation and participation in the economic activities of the country.

Economic Development

Since it was in development economics that the concepts of planned social change first emerged soon after World War II; much of the early discussions centred on economic growth. The assumptions that current economic development is based on is about the inherent nature of human beings—that free individuals operate in free markets, with competition as its defining

2 Hamid Mowlana and Laurie J. Wilson, *Communication Technology and Development* (Paris, UNESCO, 1988).

feature. There is little or no state intervention in the working of the economy. Economic indicators such as Gross National Product (GNP)³ and GNP per capita,⁴ Gross Domestic Product (GDP)⁵ and GDP per capita,⁶ and per capita income formed the indicators of development that they studied. Therefore, as the GNP and GDP grew, and as per capita income increased, development would gradually percolate, move or “trickle down”⁷ to the larger population and the poor.

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 immediate post World War II era. New paradigms have emerged since, such as the Washington Consensus,⁸ 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 financial crisis ended the era of the belief that economic change alone through private sector led growth could, by itself, trigger development.

The second major perspective to economic development came from the planned economies of the erstwhile Soviet Union and Eastern Europe, and China. The state became the major, often, the only player in the economy, and development took a Marxist-Leninist approach⁹ to economic development. Other countries such as India followed a middle path, with planned economic development through extensive state intervention in the economy operating parallel to private sector growth.

Social, Psychological and Cultural Theories of Development

Schooled in Western political and social philosophy, a parallel group of scholars focused more on the modernization of individuals and groups to understand the forces that would bring about change and development at an individual and a larger societal level. Teams of political scientists, sociologists, and psychologists from many of the West’s elite institutions tried to draw contrasts between the “traditional” and the “modern” individual and societies in terms of social traditions and personality traits.¹⁰ Modernization and development for these scholars meant a move from traditional, community-based, feudalistic societies to ones that stressed innovativeness, education, political participation and access and exposure to information that changed people’s way of thinking.

The perspectives described here are neither mutually exclusive nor exhaustive. None of them explain in totality the phenomena of development; each brings a different value addition to the discussions. They each intersect and overlap with other perspectives such as the basic needs

3 GNP is the total value of all final goods and services produced within a nation in a particular year.

4 The GNP per capita of a country shows the average value of goods and services produced by each person each year.

5 GDP is the total market value of all goods and services that are produced within a country.

6 GDP per capita is the approximation of the value of goods produced per person in the country.

7 Proponents of the trickle down approach argued that the wealth created by industry and other successful parts of the economy would gradually benefit everyone in a society. See <http://web.mit.edu/sanyal/www/articles/Myth%20of%20Dev.pdf>, and http://www.investorwords.com/5075/trickle_down_theory.html.

8 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 such as 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.

9 Marxist-Leninist political theory is an entire system of political and economic analysis of society. It served as a counterpoint to liberal and individualist economics of the industrial society in the nineteenth century. While there are many arguments as to whether the economic system of the erstwhile Soviet Union reflected Marxist thought in its purity, it has often been interpreted as an economic system where the state, rather than the market, is the major player in the economic development of a society.

10 Among this group of scholars were people like the political scientists, Everett Hagen in his book, *On the Theory of Social Change* (1962); Samuel Huntington, *Political Order in Changing Societies* (1968); S.N. Eisenstadt, *Tradition, Change, and Modernity* (1973); rural sociologist David Lerner, *The Passing of Traditional Society: Modernizing the Middle East* (1958); communication scholar Everett Rogers, *Modernization Among Peasants* (1969); and Wilbur Schramm, *Mass Media and National Development* (1964).

approaches, the sustainable development perspectives and the women and development perspectives—all introduced in the early 1970s.

Criticisms of these early approaches 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.

1.2 The Human Development Framework and Global Development Goals

Parallel 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 Haq¹¹ and Amartya Sen,¹² 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*¹³ that increase in income is 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.

Couple this with the work of Amartya Sen, a new paradigm for development emerged. In his book, *Development as Freedom*,¹⁴ Amartya Sen argues that in individual freedom lies the capacity for political participation, economic development and social progress. The goal of all development is the enabling of the exercise of such a freedom—the freedom to make a choice, and consequently the empowering of an individual so that he or she is able to make the choices that determine his/her quality of life. Haq and Sen's work were a strong influence in terms of expanding development discussions to include new indicators that focused on social development and freedoms, and giving greater importance to people-centric approaches to development. For the poor, the exercise of the freedom of choice is limited by a poverty of income; education, health care, and equality in a society. Sometimes, but not always, these limitations are also a result of socio-economic status, gender, religion and ethnicity.

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. Pioneered by Haq and Sen, the human development approach was introduced by the United Nations Development Programme (UNDP) in 1990 and supported later by other international organizations. This approach 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.

11 A world renowned Pakistani economist whose work focused on social realities and who is acknowledged as the originator of the HDI, a composite statistic used to rank countries by level of "human development".

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

13 Mahbub ul Haq, *Reflections in Human Development* (Oxford University Press, 1995).

14 Amartya Sen, *Development as Freedom* (New York, Alfred A. Knopf, 1999).

Currently, the Human Development Report (HDR) developed by UNDP is an important document through which the debate on human development is understood. The annual HDRs are intended to open the development debate through well researched scientific and policy analyses followed by recommendations for action. The HDR combines annual thematic presentations, preceded by definition, measurement and analysis of indicators of education, health and income sufficient to ensure adequate living standards, to develop the Human Development Index (HDI).

The HDRs are based on five development indices: the HDI; the Human Poverty Index 1 (HPI 1) for developing countries, and the Human Poverty Index 2 (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.¹⁵

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 2010.¹⁶

15 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.

16 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>.

Table 1. Trends in the Human Development Index, 1970-2010

	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	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 enrollment 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, 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 (rows 3, 4, and 6 in table 1), 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.¹⁷

Adding a word of caution, the *Human Development Report 2010* 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

17 UNDP, *Human Development Report 2010*, p. 1.

and inequalities while harnessing dynamic market forces for the benefit of all.¹⁸

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.¹⁹

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. And if, indeed, all governments had succeeded in meeting these noble objectives, there would be no need for a discussion on global development.

1.3 The Millennium Development Goals²⁰

In the year 2000, world leaders met at the United Nations headquarters to discuss the role of the United Nations at the turn of the twenty-first century. At this meeting, world leaders ratified the Millennium Declaration. At the Millennium Summit, 189 member States of the United Nations agreed to help citizens in the world's poorest countries to achieve a better life by the year 2015 through the framework of the Millennium Development Goals (MDGs).

The adoption of the Millennium Declaration and the MDGs by all 189 member States of the United Nations General Assembly in 2000 was a watershed in global cooperation. The Millennium Declaration sought partnership between rich and poor nations to make globalization a force for good. While the importance of human development had been reiterated for decades and at various platforms and global conferences throughout the 1980s and 1990s, it was the first time that all stakeholders—countries and governments, donor and development agencies, non-governmental and civil society organizations—recognized and accepted that unless there is common understanding and commitment, the goal of equitable development would never be reached. By the end of the Summit, the Millennium Declaration's eight chapters were drafted, from which the eight goals of the MDGs were developed and promoted in the years following the summit.

The MDGs are the most broadly supported and the most specific poverty reduction strategies that the world has committed itself to. They are, in a sense, the common denominator that all countries, irrespective of their ideological, political or cultural affiliations, have adhered to. Each and every stakeholder in the global community accepted the common goals, targets and strategies for achieving them. For the international system consisting of donor and technical aid agencies, the goals constitute a common agenda upon which development assistance is based. For countries, it means commitment to goals and measurable targets so that progress could be measured, tracked, monitored and evaluated. If the goals are met, it will mean that the more than 1 billion people living in poverty and deprivation will have a means to a more productive and poverty-free life.

These eight goals are given in box 1.

18 Ibid.

19 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. Links to these reports are available at the respective websites of the organizations.

20 For a detailed analysis, see Usha Rani Vyasulu Reddi, *Module 1: The Linkage between ICT Applications and Meaningful Development*, 2nd edition, *Academy of ICT Essentials for Government Leaders* module series, (Incheon, UN-APCICT/ESCAP, 2011), <http://www.unapcict.org/academy>.

Box 1. The 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 least developed countries
Target 14: Address the special needs of landlocked 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>.

Each of the eight goals has specific targets that countries will seek to meet as part of the progress toward achieving the goals by the year 2015. Within the MDGs are 18 targets and 48 indicators that are to be tracked as the global community moves toward achieving them. It is within this context of development as it is perceived today that we place this discussion. Even though governments recognize that the process of evolutionary change is slow, they are all committed to telescoping the change of centuries into a small, intensive period of 15 years (from 2000 to 2015).

Also part of the global commitment is a strategy and plan of action to address each of the goals and targets that foresees action at global and national levels, supported by activities at the regional level. At the global level is the United Nations system, which will, through core elements such as monitoring, analysis, campaigning and mobilization, work towards the achievement

of the goals. At the national level, it is essential that there be enabling policy frameworks, partnerships, country studies and activities, done through the policy dialogue and country-driven strategy setting process envisaged through the Poverty Reduction Strategy Papers (PRSPs) or other similar national plans and strategies. Promoted by the World Bank Group of institutions, the PRSPs are essentially policy and position documents that describe the individual country's macroeconomic, structural and social policies over a period of at 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.²¹ A good example of such kind of work is India's Five Year Plans and the Approach Papers to the Five Year Plans (prepared since 1952) in India.²²

There have been several mid-term reviews of global and regional progress in meeting the targets in different parts of the world, beginning in 2004. By 2007, halfway through the defined period of 15 years, the alarm bells were ringing and it was clear that while there had been some progress, it was not enough. The *Millennium Development Goals Report 2007*²³ shows that global progress is uneven. So does the report in 2011,²⁴ which shows that there have been some visible and widespread gains as poverty continues to decline in many countries, and every region has made progress in improving access to clean drinking water. Yet, the most vulnerable failed to be reached, and disparities in progress between urban and rural areas remain daunting. Moreover, a World Bank study reports that the economic crisis of 2008 has adversely impacted progress toward achievement of the MDGs in many parts of the world.²⁵ 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. Large parts of the world may miss the targets to be achieved by 2015. At the same, there is cause for optimism since there have been vast improvements in some basic sectors such as education and gender equality.

As a result, what is important is that the MDGs, and the date of 2015, have to be seen today more 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 toward development. The crossing of the target date of 2015 will not diminish their importance as commitments from a global community.



Points To Remember

- The human development approach is a new development paradigm that looks at the process of development through a more people-centred and humane approach.
- This approach is best exemplified in the HDI and the Human Development Reports.
- Global development goals are currently based on the human development approach.
- Even after 2015, the MDGs have to be seen more as a road map toward progress rather than end posts in themselves.

21 PRSPs from different countries are available at <http://www.imf.org/external/np/prsp/prsp.aspx>.

22 India's PRSP is available at http://eeas.europa.eu/india/csp/07_13_en.pdf.

23 DESA, *The Millennium Development Goals Report 2007* (New York, 2007), <http://www.un.org/millenniumgoals/pdf/mdg2007.pdf>.

24 United Nations, *The Millennium Development Goals Report 2011* (New York, 2011), <http://www.un.org/millenniumgoals/pdf/MDG%20Report%202010%20En%20r15%20-low%20res%2020100615%20-.pdf>.

25 World Bank, *The Global Monitoring Report: The MDGs after the Crisis. 2010* (Washington, D. C., 2010), <http://issuu.com/world.bank/publications/docs/9780821383162>.

1.4 Managing Human Development

Management of development in a developing country is a political and ethical process, a matter of the use of power and good governance to bring about desired goals in contexts characterized by conflicts of interests, values and agendas, and shrinking resources. It consists of policymaking and setting development goals, identifying priorities, developing and establishing enabling legislations and regulatory practices, working with different governmental and non-governmental organizations (NGOs); engaging with citizens both to provide access to and provision of services and to promote social accountability; and monitoring and evaluation to ensure that there is progress.

Development is as much about economic growth, as it is about values, many of which are the foundation upon which current human development discussions and debates are built. Some of these values include:

- Inclusiveness – A pattern of growth that allows all people to contribute to and benefit from the development process.
- Equality – A state of being equal, especially in status, rights and opportunities. But there is inherent inequalities in any society. Therefore, a policy that enables systematically disadvantaged and vulnerable groups to share in development through positive discrimination is necessary to ensure that benefits reach them.
- Quality – The general excellence of standard that goes beyond just the provisioning of services, but ensuring that these services are of good quality.
- Accountability – A state of being accountable to citizens, partners, stakeholders, etc. in the effort to promote and maintain openness, responsiveness, fairness and trust. It includes government's active engagement with citizens and other stakeholders.

These are values that have emerged from political thought and philosophy over several centuries, and the managers of a development process in any country need to incorporate these values in their management in one way or another.

The development process has become more complex in a world interconnected by technological innovation—a networked world linking people and areas of diverse resources, concerns, and levels of development into a common globalized space.

An event in Brazil can trigger a response in Asia, and a crisis in an African country can produce a response in the far Pacific. The economic crisis of 2008 in the United States and Europe and its subsequent impact on smaller countries in Asia, Africa and Latin America is the best example of how interdependent and globalized today's world is. To some extent, the cross border flow of goods and services facilitated and sped up by innovations in ICTs has created a networked world.



Case 1. Bhutan and Gross National Happiness

Bhutan, a country about the size of Switzerland, is located on the eastern ridges of the Himalayas between India and Tibet. Bhutan has important geopolitical significance as it borders two Asian giants. The country has a population of approximately 682,000 and in 2008 shifted from being an absolute monarchy to a multiparty parliamentary democracy. Seventy per cent of Bhutan's population live in rural areas and mostly farm for a living, although like in many other countries, rural to urban migration is a growing trend in Bhutan.

The concept of Gross National Happiness (GNH) was first introduced in 1972 by the fourth King of Bhutan, H.M. Jigme Singye Wangchuck. For years following the introduction of the concept, GNH served as a guiding philosophy for the absolute monarchy that is based on four pillars: Equitable Economic Development; Environmental Preservation; Cultural Resilience; and Good Governance.

Having absolute power, the King used the four pillars of GNH to guide the construction and implementation of policies in Bhutan. In recent years, however, with more Bhutanese students pursuing education in India, the United States, and elsewhere, and with Bhutan slowly opening up to the world, the concept of GNH has been scrutinized and sometimes criticized for not being measureable or statistically sound. GNH first came to public global attention in 1986 when H.M. Jigme Singye Wangchuck told the Financial Times, "Gross National Happiness is more important than Gross National Product" in an interview in London.

Bhutan is indeed a living example of a society that has actively opened a dialogue that addresses the questions of: What is progress? What matters to us as a society? How do we measure it? How do we use statistics to shape institutions and policies? As any other country in the South Asian region and other developing regions of the world, Bhutan faces many social, economic and political challenges. But what does differentiate Bhutan from other nations is that it has fully embraced an alternative, more holistic, and more sustainable approach to development in using GNH as their metric of progress and as the driver for policies in the country. However, GNH is potentially problematic on various dimensions.

Source: Adapted from 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>.



Practical Exercise

1. Read the article:

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>.

2. Review the material presented in the article in terms of the current approaches to human development.
3. In a decreasing order of priority, list what you consider to be the most important values and benefits from development that you would like to see in your country. Compare your list with that of fellow students sitting on the immediate left and right of you.
4. What is common in the three lists? What is different? Along with your fellow students, make a new list—once again prioritizing the values and benefits from development you would like to see in your country. Present to your class how you discussed and arrived at the final list and how you compare “happiness” to increased economic wealth.



Test Yourself

1. The human development approach introduced by UNDP in 1990 focuses largely on:
 - a. Material progress
 - b. Material well-being of countries
 - c. Well being of individuals
 - d. All of the above
2. Which of the following is not an index upon which the Human Development Reports are developed?
 - a. Human Development Index
 - b. Gender Empowerment Index
 - c. Human Poverty Index
 - d. Sustainable Poverty Index
3. The MDGs reflect the global community’s commitment to:
 - a. Economic growth in developing countries
 - b. Poverty reduction strategies worldwide
 - c. Reducing the divide between different political systems
 - d. Climate change

4. A country's Poverty Reduction Strategy Papers usually reflect:
 - a. Individual country's economic and social policies over a three year period
 - b. Banking policies in a country
 - c. A country's national health and education plan
 - d. None of the above

5. Managing development is about:
 - a. Balancing economic, political and social development priorities
 - b. Reducing abject poverty in countries
 - c. Using political power to achieve economic goals
 - d. Providing for equality and human rights

1.5 Communication and Development

The imperatives of using ICTs are well delineated in any number of documents. Evidence abounds of the transformational changes that these technologies have brought about in society; their potential for meeting the human resource development needs of societies; and their catalytic role as agents that can propel and accelerate change.

We have already discussed the concept of development. An understanding of communication is a must before proceeding further. Communication is a process as old as human society itself and is a process in which all of us are engaged, from the time we awaken in the morning to the time we sleep at night, whether speaking, reading or writing; watching, hearing, listening to radio or television (TV), interacting through e-mail or live on Internet. We are constantly either receiving or sending messages, non-verbal (i.e. without sound) or verbal through sound signals.

At a very basic level of understanding, communication can be described as a process whereby someone sends a message to someone else through a channel and gets a response or feedback. This process can have interference (physical, psychological or environmental), which is also called noise. However, communication takes place in cultural and social contexts, which give a shared meaning to messages that form part of the process. For this reason, it is impossible to think of communication as simply a process of information transmission alone. Communication is inseparable from the institutions of communication, of culture, and of development.

Communication can be interpersonal and face-to-face, that is an individual addressing another or a group directly; in which case there can be direct response or feedback. In such a situation, the process can be equal and interactive. Sometimes, when an impersonal channel or carrier is used, as in the use of mass communication media, the initiative and ability to communicate is overwhelmingly with the sender, and the communication is an impersonal, one-way flow of messages. This is the case with mass media such as newspapers, magazines, radio, TV and films, where these media create and disseminate messages. Early models of the Internet and website development have some of these same features as the mass media of communication. Feedback or response from such impersonal one-way flow of communication is very weak or non-existent. However, given the sheer size; reach (in terms of numbers and geographical spread); speed of delivery across the world, it is but natural that early theories and pioneers in communication assumed that mass media had considerable power to inform, and consequently influence behaviour. The perceived role of mass media of communication was one of informing, educating and entertaining; and in this process, influencing attitudes and changing the behaviour of individuals and societies.

The process of communication has to be delinked from the technologies of communication. Communication is a process, while technologies are the tools or media employed in the process. Empirical evidence from many efforts over a time span of nearly six decades of applying communication media for different purposes in a society has pointed to the complexity of the process. What is known from these decades of deployment and research is the following:

- There are differential effects of the same media or content, and these effects are dependent on factors such as age, sex, predispositions, perceptions, social environment and past experience.
- There is no direct relationship between media, media content and users. Communication tools such as mass media are only one of several variables that influence attitudes and change behaviour. Interpersonal relations, access and exposure, channel characteristics, content, and social and psychological predispositions are intervening variables. The use of interpersonal communication is a must to bring about behaviour and attitude change.
- Users of communication tools are not passive, accepting everything that they are exposed to. They are active participants in the communication process and their use of communication tools and content are dependent upon their preference, familiarity and existence of other equally, more attractive, or easier alternatives, and the gratification or satisfaction they receive as a result of such use.
- The purpose for which users will attend to a given communication tool or content will depend upon a wide range of factors and the extent to which the tools meet an existing informational, social, psychological or economic need.

There is now a better understanding of the relationship between communication processes, tools, content and audiences. There is also a better understanding of the need to take into account the differences in cultural contexts and conditions; histories and geographies; the diverse audience characteristics and demographics; and the varying psycho-social profiles of various groups of people especially among the marginalized. It is now known better how messages are constructed and packaged; when and how they should be delivered; what communication media are used in terms of their relative strengths and limitations; and why it is important to involve, rather than exclude, people in the communication process.

Advances in ICTs have also revealed their strengths and their flaws; and how it is necessary to mix and match content, technologies and communities for better results. There is today a better understanding of the power of communication media; for example in setting an agenda for discussion, in influencing public opinion, in changing attitudes and influencing behaviour, and in meeting the diverse needs and gratifications of individuals and groups of society.

Today, the field of communication has emerged as an independent discipline drawing from various social sciences such as psychology, political science, sociology, economics and development on the one hand; and the technologies, hardware and software on the other hand. Communication as a field now encompasses several other sub-disciplines such as advertising, social research, media production and delivery, public relations and advocacy, and development communication, which is the major focus of study in this primer.

“Development communication” scholars and practitioners approach the relationship between communication and development from two different perspectives. The first is a more broad and general relationship between communication and development. The second dimension is the organized use of communication to meet development objectives or development support communication.

The General Relationship

The theoretical foundation for the potential use of communication to meet the challenges of development started with the pioneering studies in the 1950s and early 1960s. Lerner's²⁶ pioneering study that showed the link between communication and modernization of individuals in Turkey was followed by a large number of studies in the early 1960s, and an equal number of projects where the role of communication was tested in developmental settings. The Radio Rural Forums of the 1950s and the classic study by Rogers and Shoemaker²⁷ set the stage for the incorporation of communication as a critical element of development programming. At the same time, initiatives led by the United Nations Educational, Scientific and Cultural Organization (UNESCO) and Schramm²⁸ emerged in different parts of the world when countries such as Brazil, China, India and Mexico invested heavily in the use of media for educational and developmental purposes.

Much of the experimentation in the first two decades of development (during the 1950s and 1960s) focused on trying to understand the relationship between the two aspects. However, results from the field often yielded contradictory results—much at odds with planners' expectations and have, consequently, added to the debate on effective use. The conflicting results did not challenge the general link between communication and development; they did, however, give rise to the more action oriented or strategic “development support communication” perspective.

Development Support Communication

Development support communication essentially refers to the organized and systematic use of communication to support the development process, either at a national or location and project specific level. Specifically, it is the integration of communication (and in today's parlance) the use of ICTs as part of the planning, design, development, delivery and evaluation of developmental projects. This could mean large-scale experimentation as in Mexico's Telesecundaria²⁹ and Brazil's Telecurso.³⁰ It could also mean small-scale experimentation and use as in community radio initiatives globally or in the current use of multi-purpose telecentres located in remote villages.³¹

The adoption and use of ICTs in the practice of development is not new. It has been going on for decades, beginning with the use of radio in the middle of the twentieth century; and moving on to TV. In earlier decades, the use of the older technologies such as radio and TV for development support was extensive. Potential reach and access were the main drivers for using radio and TV. There was parallel support from donor and technical assistance agencies to exploit these technologies. Examples abound and one of the oldest successful applications in the Asia-Pacific area is the use of satellite-based radio and TV for education at the University of the South Pacific (USP). Other equally famous and often quoted examples include China's Radio and Television University,³² and India's Satellite Instructional Television Experiment (SITE) in 1975-1976, and post SITE efforts.

26 Daniel Lerner, *The Passing of Traditional Society: Modernizing the Middle East* (New York, The Free Press, 1958).

27 Everett M. Rogers, et. al., *Communication of Innovations: A Cross Cultural Approach* (New York, The Free Press, 1971).

28 Wilbur Schramm, *Mass Media and National Development* (Stanford, Stanford University Press, 1964).

29 Telesecundaria is a system of distance education programmes for secondary and high school students created by the Government of Mexico and available in rural areas of the country, running successfully since 1968. See <http://www.unesco.org/education/educprog/lwf/doc/portfolio/abstract8.htm>. See also Jose Calderoni, “Telesecundaria: Using TV to Bring Education to Rural Mexico”, *Education and Technology Notes Series*, Vol. 3, No. 2 (1998), pp. 1-10, <http://go.worldbank.org/18DR286ON0>.

30 Claudio de Moura Castro, “Is Education by Television Just an Old Technology”, Notes from the Education Unit, Inter-American Development Bank, January 2000, <http://idbdocs.iadb.org/wsdocs/getdocument.aspx?docnum=1481484>.

31 The set up of telecentres is one way of developing common facilities in rural and deprived communities to provide access to ICT facilities and resources that can meet the information needs of the local community. For more details on telecentres and the telecentre movement, see <http://www.telecentre.org>.

32 China's Radio and Television University, currently called China's Open University, is a dedicated technology-enabled higher education institution established since 1979. For more details, see <http://www.edu.cn/20010101/21803.shtml>.

Two factors spurred an increased interest in the use of ICTs for development in the late 1990s and the first decade of the twenty-first century. The arrival of the Internet on the global scene and technology convergence; and this blending with the global development agenda as visualized in the MDGs gave rise to renewed interest in using ICTs for development. The following key initiatives contributed to an increased investment in ICT infrastructure and projects:

- The World Bank's *World Development Report 1998/99*³³ recognized that knowledge made the difference between poverty and wealth
- The establishment of the Digital Opportunities Task Force³⁴ by the G8 countries³⁵ to develop an agenda for ICTD
- The World Summits on the Information Society in Geneva in 2003 and Tunis 2005.³⁶

With very practical applications and interventions, the projects were typically in areas identified by the MDGs, including poverty alleviation, education, health, environment and sustainable development in poor communities. Given the still high costs of ICT devices and applications about a decade ago, and the fact that costs prohibited personal ownership of ICT devices, programmes and projects remained donor and government funded, focusing on delivering services through community locations, or telecentres.

During this period, a body of knowledge on ICTD, based on extensive studies of projects in developing countries, emerged so that there is now a better understanding of what works and what does not, and of key issues related to the financial and social sustainability of ICTD projects.

1.6 Linking ICTs to Global Development Goals

The focus of the global development agenda has been on two cross-cutting themes. The critical importance of the MDGs and their achievement by 2015 is one theme that has been accepted by the global community. The second theme relates to the importance of using ICTs in accelerating the development process.

The use of ICTs to meet development goals, as spelled out in the eighth MDG to develop a global partnership for development, needs to be played across a rich spectrum of actors that includes government organizations, the private sector, civil society and media agencies. The government remains the prime instigator of ICT policies to enable the creation of infrastructure and telecommunications hardware that are essentially the underpinnings of any effective use of ICTs. This is because without the infrastructure and hardware, access, reach and availability of ICTs is impossible. Private industry has a major role to play as instruments of investment to create the infrastructure in terms of the building of information highways, and the provision of Internet and mobile services. Government, industry, civil society, and media are important providers of the services that are "mounted" on the information highways. Citizens are the users and the ultimate beneficiaries of the deployment of ICTs.

Of particular importance to this primer on ICTD is Target 18 of the MDGs that specifically states:

In cooperation with the private sector, make available the benefits of new technologies, especially information and communications technologies.³⁷

33 The World Bank, *World Development Report 1998/99: Knowledge for Development* (Washington, D.C., 1998), <http://go.worldbank.org/UF2JZG21NO>.

34 Jeffrey A. Hart, "The Digital Opportunities Task Force: The G8's Efforts to Bridge the Global Digital Divide", paper originally prepared for the Annual Convention of the International Studies Association, Montreal, Canada, 17-20 March 2004, and revised for a conference on Security, Prosperity and Freedom: Why America Needs the G8, Indiana, USA, 3-4 June 2004, <http://www.g8.utoronto.ca/conferences/2004/indiana/papers2004/hart.pdf>.

35 G8 or the Group of Eight is the forum of the eight major economies, formed as an economic council in 1975 (G6 at that time) and meets annually. After the 2008 economic crisis, the G20 replaced the G8 as the main economic council of wealthy nations.

36 See ITU, "World Summit on the Information Society", <http://www.itu.int/wsis/index.html>.

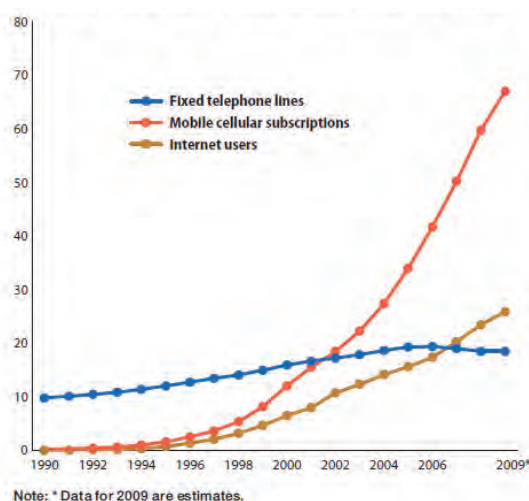
37 The United Nations Millennium Project, "Goals, targets and indicators", <http://www.unmillenniumproject.org/goals/gti.htm>.

This is where the role of ICTs becomes important—as tools that governments can deploy in their poverty reduction programmes to accelerate growth. Indeed, within the last ten years, the ability to effectively use computers and the Internet 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
- Facilitate complex planning processes and coordination across sectors
- Enable increased information sharing, outreach and monitoring of key efforts

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

Figure 1. Number of fixed telephone lines, mobile cellular subscriptions and Internet users per 100 population in the world, 1990-2009



Source: DESA, *Millennium Development Goals Report 2010* (New York, 2010), p. 71, <http://www.un.org/millenniumgoals/pdf/MDG%20Report%202010%20En%20r15%20-low%20res%2020100615%20-.pdf>.

Governments that use ICTs as part of an overall governance and administration role find that ICTs can help to:

- Facilitate complex planning processes
- Improve coordination across sectors
- Increase information sharing
- Promote outreach and monitoring of services
- Scale up access to education
- Link communities to markets
- Create disaster warning and decision support systems
- Provide a direct link with citizens thereby ensuring a greater degree of accountability and good governance

Good governance translates to better development outcomes, both at the individual and at the macro level. The link between ICTs and development therefore lies in the power of ICTs to help make reliable, timely and accurate information available to the people on the one hand, and to the government on the other, to make good judgements and choices in the decision-making processes.

Recognizing this, countries in the Asia-Pacific 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 mitigation systems for geographically sensitive locations. In light of these, it is not an exaggeration to say that the achievement of development goals in general, and the MDG targets in particular, is inextricably linked to the use of ICTs.

1.7 Current Trends in ICTD

Experimentation in the first two decades of the ICT revolution has enabled a far better understanding of ICTD—the contexts and the conditions of their application and success. What has become clear is that it is not so much the technologies themselves but the increasing influence of these ICTs in economic and social progress that has made the difference in the shift from agrarian and industrial economies to systems that are built on knowledge as a key ingredient of growth and progress. From access to knowledge to sharing and participation in the creation and use of knowledge for economic and social advancement today differentiates advanced and emerging countries from the less developed.

As a result, there have been changes in the way that ICTD is reported. The early e-readiness indexes and e-government surveys from 2003³⁸ onwards have been benchmarking infrastructure, human capital, and e-connectivity, and ranking e-readiness across countries, based on six pillars of e-readiness:

1. Connectivity and technology infrastructure
2. Business environment
3. Social and cultural environment
4. Legal environment
5. Government policy and vision
6. Consumer and business adoption

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.”³⁹

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.⁴⁰

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

39 DESA, *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.

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

Table 2. Digital economy rankings and scores in 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.

Essentially, there is a shift away from earlier perspectives where governments and the private sector engaged directly with the provision of services through ICTs for citizens. The emphasis is now on how ICT infrastructure and capabilities have been embedded within economic and social systems so that they can be effectively leveraged to convert an agrarian and industrial society to one that is based largely on the development of knowledge and knowledge products. What is clear from this data is that those countries in the Asia-Pacific region that have invested heavily in next generation Internet infrastructure (China, India, Japan, Republic of Korea, Singapore and Taiwan) have benefitted more than many countries in Western Europe and North America in terms of becoming leaders in the knowledge economy.

Specifically, the transforming impact of ICTs has been most visible amongst the small, medium and micro enterprises where they have been able to grow their businesses by:

- Improving the efficiency of internal business operations such as by reducing costs associated with communication and human resources
- Improving internal communication (with different internal departments)
- Maintaining better inventories to reduce storage space and deliver “just in time” products and services while reducing wastage, and consequently increasing profits
- Improving accounting and financial processes
- Improving external communication with clients for exploring new markets, developing a global client base, and increasing volumes of demand

The use of ICTs as tools to improve economies has the effect of providing individuals and systems with a new set of capabilities and competencies that go beyond the immediate use of the tools themselves. Essentially, the use of ICTs in a knowledge economy centred around knowledge-based products results in expanding the capabilities of individuals and institutions; developing not just economic, but more importantly, social and intellectual capital. Such ideas or intellectual capital, which form part of knowledge societies, are the new key to prosperity and to the wealth of nations.

1.8 From Knowledge Economies to Knowledge Societies

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.

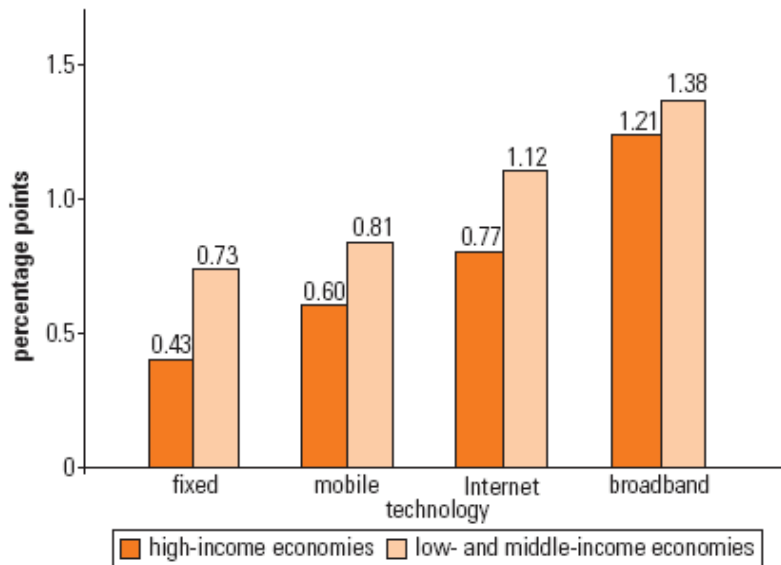
In the *Information and Communications Development Report 2009* of the World Bank, it is reported that for every 10 percentage points increase in the penetration of broadband services, there is an increase in economic growth of 1.3 percentage points.⁴¹ Similar results were found in other studies which showed that an increase in Internet penetration by 10 per cent in emerging economies correlates with an incremental GDP increase of 1-2 per cent.⁴²

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.

41 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., World Bank, 2009), pp. 35-50, <http://go.worldbank.org/NATLOH7HV0>.

42 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>.

Figure 2. Economic growth effect of ICTs

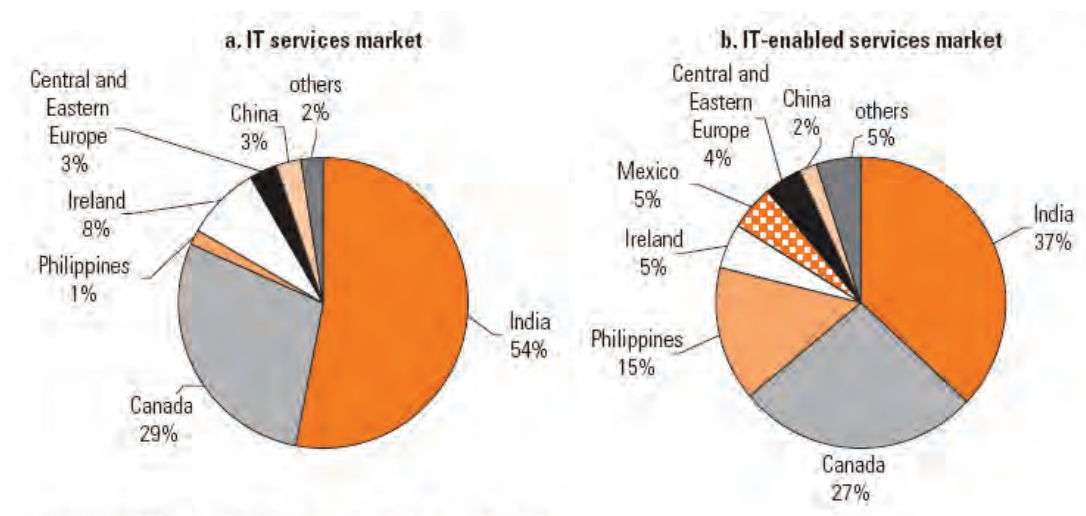


Note: The y axis represents the percentage point increase in economic growth per 10 percentage point increase in telecommunications penetration. All results are statistically significant at the 1 per cent level except for those for broadband in developing countries, which are significant at the 10 per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

Figure 3. 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., World Bank, 2009), pp. 35-50, <http://go.worldbank.org/NATLOH7HV0>.

Box 2. The story of Manju

Manju is a young Nepali woman, aged 23 and living in Hyderabad, India. Her family migrated as landless labour from Nepal to India. She is a first generation literate and learner, i.e. the first person in three generations in her family to get an education. Her parents and grandparents are illiterate and live on a monthly income of about USD 50.

Manju studied in English in a government school, and then pursued a degree in commerce and computers at a local government college. She gained some IT skills and then applied for a job in a call centre. From small local call centres where she learned the ropes, she now works in a call centre of a multinational and earns USD 300 per month, six times more than her father earns in a month. Work is hard, and the work hours and shifts are hard.

Yet, Manju has persisted because, with this work, she has been able to lift herself and her family out of poverty. She is able to help pay for the education of her siblings and is able to afford small luxuries. She is self-assured and self-confident and she sees a future where she can enroll in an online course and get an advanced degree, and a better job.

Source: Profile created by author, on the basis of an interview with Manju, a young woman working in an international call centre in Hyderabad.

The story of Manju is real and is representative of the experience of many who have improved their own lives and those of their family, and are engaged in a fast growing economy based on knowledge workers and knowledge products. At an individual level, it is the story of many young people, mostly women. When aggregated to a national economy level, it is an example of how investment in ICTs and ITES has spurred rapid economic growth and lifted large numbers of people out of poverty.

A knowledge society is different from a knowledge economy. The knowledge economy is based on the development and trade of knowledge products and services, dependent to a large extent on the innovations in ICTs made by others. The knowledge society is about a society's "capabilities to identify, produce, process, transform, disseminate and use information to build and apply knowledge for human development."⁴³ The link between knowledge and development is fundamental to the building of knowledge societies—where knowledge is both to achieve economic goals as well as to enable human development. Within such a context, access to knowledge is an intrinsic part of development, of the fundamental freedom of speech and the freedom of choice and empowerment.

While there is extensive evidence to show the link between ICTs and economic growth, and between ICTs and development, there is also a continuing debate among economists as to whether a focus on overall economic growth is enough to reduce poverty. In some cases, overall economic growth may have led to poverty reduction;⁴⁴ but in less developed countries, governments need to address poverty proactively and directly and not just through interventions in the economy to spur growth, hoping that this, in turn, will benefit the poor. Implicitly, this means that while the longer term goal would be to advance toward a knowledge society, more direct and functional interventions are necessary to address the digital divide, an underpinning cause of inequitable development.

43 UNESCO, *Toward Knowledge Societies* (Paris, 2005), <http://unesdoc.unesco.org/images/0014/001418/141843e.pdf>.

44 OECD, "Good Practice Paper on ICTs for Economic Growth and Poverty Reduction", an article prepared for the DAC Journal, Volume 6, No. 3 (2005), <http://www.oecd.org/dataoecd/2/46/35284979.pdf>.

1.9 Bridging the Digital Divide

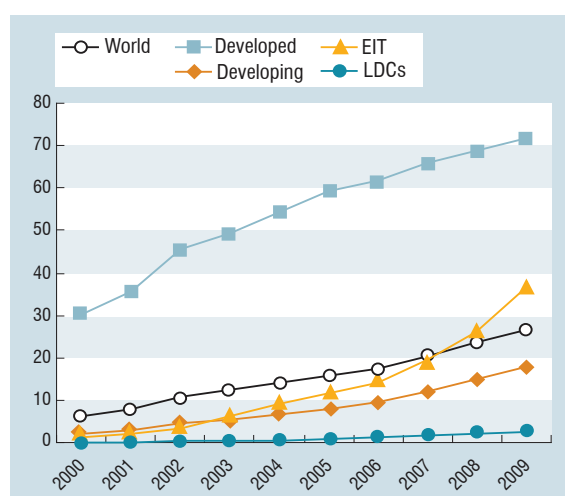
We draw attention to the digital divide, because it is of special significance when we speak of ICTD. One of the defining aspects of the development process is the gap between rich and poor countries and rich and poor people. This gap has been variously defined in development literature. In communication terms, this was earlier called the “knowledge gap”⁴⁵ and in the context of current ICTs, is defined as the “digital divide”.

Box 3. 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,
Geneva, 10 December 2003

Figure 4. Internet users per 100 inhabitants, by country group, 2000-2009



Source: UNCTAD, Information Economy Report 2010: ICTs, Enterprises and Poverty Alleviation, (New York and Geneva, United Nations, 2010), p. 22, http://www.unctad.org/en/docs/ier2010_embargo2010_en.pdf.

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.”⁴⁶ 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

45 P.J.Tichenor, G.A. Donohue and C. N. Olien, “Mass Media Flow and the Differential Growth of Knowledge”, *Public Opinion Quarterly*, Vol. 34 (1970), pp. 159-170.

46 “The Economist”, “The Real Digital Divide”, 10 March 2005.

more consequential for getting jobs, seeking information and engaging in civic or entrepreneurial activities.⁴⁷ 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 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 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.

It is important to understand the concept of “digital divide” because of the importance given to this in current ICTD debates; and because international institutions as well as national governments are making concerted efforts to narrow the divide through policies, funding mechanisms, and implementation of programmes and projects in development.

Box 4. Meeting a Universal Service Fund obligation

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
- 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.

There are other specific ways in which ICTs can be used to bridge the digital divide, and efforts need to be directed toward promoting universal access by policies and actions at a national level, and at the same time, creating opportunities for use of such access facilities at the community level.

Some of these specific ways could include the following:

- Given the high speed at which ICTs are being invented, converging and changing, governments in poor countries could focus more on channeling their scarce financial and

47 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.

political resources to developing social and human capital, building the basic infrastructure and creating a level playing field for the private sector. Encouraging the private sector will reduce the heavy burden on the government exchequer while at the same time speeding up infrastructure growth, driving down costs, and helping the government concentrate on those geographic and social sections that need public investment the most. In other words, the role of government is important to create the prerequisites for the ICT sector to flourish.

- Beginning modestly with such areas as data processing and teleworking, poor countries can gradually move to more sophisticated tasks of software development and hardware innovation. Notwithstanding the concerns voiced on the perils of being left behind in this digital age, developing countries should carefully balance between their conflicting needs of adopting modern technology and preparing the basic foundation for economic development.
- Investment in education, both formal and non-formal, is another priority. Whether to achieve the MDGs or simply to bridge the digital divide, education is important because it provides the skills required for creating, adapting and utilizing such technologies. While not denying that even the illiterate or near-literate can possibly take advantage of certain technological applications, education becomes increasingly important to go beyond basic applications. Indeed, international evidence suggests that education is a strong complement to the achievement of other MDG targets. Access to secondary and higher education will enable the creation of human resource, in turn spurring innovation and large-scale growth.
- In establishing physical infrastructure and 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. Somalia is one instance where, in the absence of government role in regulating the telecommunications sector, a variety of mobile networks exists, creating a nightmare for any government that may seek to regulate *post facto*.
- At the community level, governments can look at the opportunities of 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 need to create portals as dynamic repositories where specific development knowledge is stored and updated. At the user end, the creation of community telecentres or kiosks can enable easy access to knowledge stored in such portals.
- In terms of content and services, overlapping technologies to enable access and use are essential. An example is the development of content for both the Web and mobile phones so that users can access the content in more than one manner, and in a way that is both easy and convenient for them.

1.10 The Role of International Development Frameworks and Organizations

From the immediate post World War II era, and with the increasing decolonization process, international donor, technical assistance and NGOs led the way in the practice of development and the use of communication for development. For a long time, the Western approach of introducing innovations (that worked in Western conditions) into developing countries took place. Some of the major international organizations that had adopted variations of this approach included UNESCO, the Food and Agriculture Organization of the United Nations

(FAO), the Rockefeller Foundation, the Department for International Development (DFID) of the United Kingdom, and the Ford Foundation.

With technology developments leading the change, global organizations began to look at different ways of addressing issues in ICTD. Following the World Bank's *World Development Report 1998/99* cited earlier and the inclusion of the engagement of ICTs among the targets in the MDGs, the ICTD approach began to take a different turn. On the one hand, organizations were founded specifically for the sole purpose of engaging in ICTD activities and on the other hand, commercial companies began experimenting with ICTD activities as part of their corporate social responsibility and even as part of their marketing activities.

Soon after the adoption of the MDGs, in 2001, the United Nations formed the United Nations Task Force on ICTs to address a variety of ICTD topics. The Task Force's mandate ended on December 2005 and a new group, called the "Global Alliance for ICT and Development" (GAID),⁴⁸ was created to continue much of the work of the Task Force, as a "multi-stakeholder forum" and a "cross-sectoral platform and forum that will bring together all stakeholders representing relevant constituencies". GAID includes a large number of stakeholders from government, development cooperation, foreign policy, finance, the social sector (health, education), regulatory agencies, industry and workers' associations, producers and consumers of ICT, the media, NGOs, community-based organizations, foundations, scientists, academicians, ICT professionals, and other individuals providing advocacy and oversight on Information Society issues and implementing programmes addressing the MDGs.

GAID is led by a steering committee, Strategy Council, a set of high-level advisors, and a "champions' network". GAID has held meetings to forge a partnership between governments, private sector, civil society and international organizations.

In November 2002, the United Nations Secretary-General Kofi Annan issued a call for Silicon Valley to create the computers and communication systems that would enable villages to leapfrog several generations of technology and enter the Information Age directly.⁴⁹ This provided the technical basis for the World Summit on the Information Society (WSIS) discussions at Geneva in 2003 and Tunis in 2005.

WSIS was a pair of United Nations-sponsored conferences about information, communication, and, in broad terms, the Information Society. The conferences took place in 2003 in Geneva, and in 2005 in Tunis. One of its chief aims was to bridge the so-called global digital divide separating rich countries from poor countries by spreading access to the Internet in the developing world. At the end of the Geneva Summit, delegates from 175 countries adopted a Declaration of Principles and a Plan of Action, although there was no agreement on how this plan of action would be achieved. The second Summit in Tunis resulted in agreement on the Tunis Commitment and the Tunis Agenda for the Information Society, and the creation of the Internet Governance Forum.⁵⁰

Following WSIS I and II, the International Telecommunication Union (ITU) has been engaged in a stocktaking process by providing a publicly available register of activities carried out by governments, international organizations, the business sector, the civil society and other groups in order to mark the progress with reference to the 11 WSIS Action Lines.⁵¹

48 United Nations Global Alliance for ICT and Development, <http://www.un-gaid.org>.

49 Kofi Annan, "Perspective: Kofi Annan's IT challenge to Silicon Valley", *CNET News*, 5 November 2002, <http://news.cnet.com/2010-1069-964507.html?tag=lh>.

50 The Internet Governance Forum is a multi-stakeholder forum for policy issues on Internet Governance. See the forum's website at <http://www.intgovforum.org>. See also Module 5 of the *Academy of ICT Essentials for Government Leaders* module series that provides an extensive understanding of the framework and concepts of Internet Governance.

51 WSIS Stocktaking, <http://www.itu.int/wsis/stocktaking/help-action-lines.html>.

Figure 5. WSIS targets

Targets	
1.	To connect villages with ICTs and establish community access points
2.	To connect universities, colleges, secondary schools and primary schools with ICTs
3.	To connect scientific and research centres with ICTs
4.	To connect public libraries, cultural centres, museums, post offices and archives with ICTs
5.	To connect health centres and hospitals with ICTs
6.	To connect all local and central government departments and establish websites and email addresses
7.	To adapt all primary and secondary school curricula to meet the challenges of the Information Society, taking into account national circumstances
8.	To ensure that all of the world's population have access to television and radio services
9.	To encourage the development of content and to put in place technical conditions in order to facilitate the presence and use of all world languages on the Internet
10.	To ensure that more than half the world's inhabitants have access to ICTs within their reach

Source: ITU, "Measuring Information and Communication Technology Availability in Villages and Rural Areas", May 2008.

Other international agencies are also actively involved in ICTD.⁵² UNDP is the United Nation's global development network working in 165 countries that is advocating for change and connecting countries to knowledge. UNDP has been involved in ICTD since 1992. UNDP's ICTD strategy focuses on policy advice to help countries design a strategic approach to ICT as an enabler for development and to link it to PRSPs and related development processes. This is complemented by support to the implementation of ICTD priority programmes based on a multi-stakeholder approach, and innovative national and global partnerships to secure additional resources and expertise.

Table 3. Indicative list of ICT applications in developing countries and the international organizations involved in the Asia-Pacific*

Sector	Applications	Organizations
Agriculture and Livelihoods	<ul style="list-style-type: none"> • Telecentres • Information on pricing and weather for farmers • Sustainable livelihoods • Income generation 	ADB, CGIAR, DFID, ESCAP, FAO, IDRC, IFAD, ITU, SOPAC, UNDP, WFP, World Bank Group
Education	<ul style="list-style-type: none"> • Distance education • Teacher training • ICT human capacity building 	ADB, APCICT, ASEAN, COL, DFID, ESCAP, IDRC, SOPAC, UNDP, UNESCO, UNICEF, World Bank Group
Health	<ul style="list-style-type: none"> • Telemedicine • Digital publication and online resources • Continuing medical education 	ADB, DFID, IDRC, SOPAC, UNAIDS, UNDP, UNICEF, WHO, World Bank Group
Business and Economy	<ul style="list-style-type: none"> • e-Banking • International trade • Globalization 	ADB, ESCAP, OECD, SOPAC, UNCTAD, UNTPDC, WIPO, WTO
Media, Culture and Tourism	<ul style="list-style-type: none"> • Digital newsrooms • Culture and culture products • Archival technology • New media formats 	ABU, AIBD, SOPAC, UNESCO, World Tourism Organization

52 See list of organizations in the Annex.

Sector	Applications	Organizations
Environment	<ul style="list-style-type: none"> • GIS mapping • Networking of activists • Environmental protection • Climate change 	ADB, CEC, EEA, ESCAP, IPCC, SOPAC, UNDP, UNEP, World Bank Group
Governance	<ul style="list-style-type: none"> • Online citizen services • Social accountability • NGO development 	ADB, ESCAP, SOPAC, UNDP, World Bank Group
Urban Development	<ul style="list-style-type: none"> • Urban planning • Service delivery • Urban telecentres 	ADB, ESCAP, UN-HABITAT, UNDP, World Bank Group
Rural Development	<ul style="list-style-type: none"> • Rural community networks • Rural tourism • Health care 	CGIAR, ESCAP, FAO, IDRC, IFAD, ITU, SOPAC, UNDP World Bank Group

*All organizations have a strong focus on gender and gender-related issues

Credit: Usha Rani Vyasulu Reddi, June 2011.

The United Nations Children’s Fund (UNICEF) has been an active user of ICTs to meet its mandate of addressing the needs of women and children in developing countries. UNICEF has a long history of use, working with media such as TV and film in the highly successful Meena Communication Initiative.⁵³

UNESCO⁵⁴ is an active player in the ICTD field by supporting actions designed to empower people so that they can access and contribute to information and knowledge flows in its Knowledge Society Bureau and its International Programme for Development of Communications initiative.⁵⁵ Its thematic areas of work include access to information, capacity building, and content development, freedom of expression and media freedom. At its Asia and Pacific Regional Bureau for Education, UNESCO manages 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”.⁵⁶

The ITU has pioneered the World Telecommunication/ICT Development Report and is actively engaged in the WSIS stocktaking exercises. The *World Telecommunication/ICT Development Report 2010* focuses on monitoring the WSIS targets.⁵⁷

Within the Asia-Pacific region, the Economic and Social Commission for Asia and the Pacific (ESCAP) is extensively involved, through its ICT and Development Section⁵⁸ in assisting ESCAP members and associate members to address economic and social challenges resulting from natural disasters and related risks through regional cooperative mechanisms, capacity building, knowledge sharing, better connectivity and increased access to ICTs. The work of the ICT and Development Section is organized around three pillars—economic connectivity, social connectivity and ICT for disaster risk reduction.

53 UNICEF developed the Meena Communication Initiative as a mass communication project aimed at changing perceptions and behaviour that hamper the survival, protection and development of girls in South Asia. See http://www.unicef.org/rosa/media_2479.htm.

54 UNESCO, “UNESCO’s activities in communication and information by themes”, http://portal.unesco.org/ci/en/ev.php-URL_ID=1645&URL_DO=DO_TOPIC&URL_SECTION=201.html.

55 UNESCO, “International Programme for the Development of Communication”, <http://www.unesco.org/new/en/communication-and-information/intergovernmental-programmes/ipdc/>.

56 UNESCO Bangkok, “ICT in Education”, <http://www.unescobkk.org/education/ict/>.

57 The report can be downloaded from http://www.itu.int/ITU-D/ict/publications/wtdr_10/index.html.

58 ESCAP, “ICT and Development Section”, <http://www.unescap.org/idd/ids.asp>.

Following WSIS, ESCAP established the Asian and Pacific Training Centre for Information and Communication Technology for Development (APCICT)⁵⁹ whose mission is to strengthen the efforts of the member countries of ESCAP to use ICT in their socio-economic development through human and institutional capacity building. To meet this objective, APCICT's work is focused on three interrelated pillars—training, research and advisory services. Together they form an integrated approach to ICT human capacity building.

There are many other international organizations working in the field of ICTD. Some are donor and funding agencies such as the Asian Development Bank (ADB); others such as the Commonwealth of Learning (COL)⁶⁰ provide technical assistance; still, others support front line research work in the emerging discipline, such as Canada's International Development Research Centre (IDRC).⁶¹



Points To Remember

- The use of ICTs to meet development goals has been embedded in the MDGs in Goal 8 where governments have agreed to, in “cooperation with the private sector, make available the benefits of new technologies, especially information and communications technologies.”
- ICTs can be used to provide improved and equitable delivery of services; facilitate complex planning processes and coordination across sectors; and enable increased information sharing, outreach and monitoring of key efforts.
- The active engagement of international agencies in the use of ICTs for development is now called ICTD. This began with the United Nations ICT Task Force that later became the United Nations Global Alliance for ICT and Development.
- To work out and to spell out a plan of action for the use of ICTs in development, two major conferences, WSIS I and II were held in 2003 and 2005.
- Following WSIS II in 2005, most international agencies have engaged with ICTs for development in their mandated areas of operation.

Summary

To summarize, there has been strong commitment among all stakeholders, international and national, and intense activity in using ICTs for development. Billions of dollars are spent every year to understand and apply these very powerful tools. This commitment is manifested in the many international agreements, including the MDGs, followed by the meetings of WSIS in Geneva and Tunis in 2003 and 2005 respectively.

Governments are now keen to exploit the latest technologies to extend reach and improve the quality of development activities. As a result, there are a range of ICT-based development efforts across the world, both sectoral and based on the WSIS agenda of action. These include policy work, human capacity building, infrastructure development, and citizen services.

59 APCICT, “About Us”, <http://www.unapcict.org/aboutus>.

60 Commonwealth of Learning, <http://www.col.org>.

61 International Development Research Centre, <http://publicwebsite.idrc.ca/EN/Pages/default.aspx>.



Case 2. Connecting Nangi

Nangi is a mountain village of 800 inhabitants in the mid-hills of western Nepal at 7,300 feet elevation, near the Annapurna and Dhaulagiri ranges of the Himalayas. The hike into Nangi takes six to nine hours from the nearest large town, Beni, and includes an ascent through several mountain villages and forests. Nangi has no factories. All of its people are farmers whose tools are wooden ploughs, iron spades, axes, sickles, chisels and hammers. No machinery or automated tools are available. Ox and yak power, not tractor power, is used to plough the fields. The people are accustomed to carrying large loads on their backs, as they have been doing for centuries. Life in Nangi is very difficult.

Figure 6. Himanchal high school, Nangi village



Source: Himanchal Education Foundation, <http://www.himanchal.org>.

Led by Mahabir Pun, a village school teacher, about ten years ago, Nangi embarked on a long effort to take advantage of the Internet. Initially computers were built in wooden boxes, a small hydro-powered generator was developed and connectivity established through a robust WiFi network connecting four other villages and the Internet hub in Pokhara, a large city about 22 miles away from the nearest relay station. A dozen access points were connected to the dial-up Internet service provider (ISP) in Pokhara using equipment supplied at cost price by manufacturers.

Over the past eleven years, Pun and the villagers have constructed a secondary school (with a library), a plant nursery, a health clinic and its associated telemedicine video link to Pokhara, a carpentry facility, paper-making and sewing machine workshops, a camping ground for trekkers (which includes e-mail capability), a fish farm and a yak farm. The computer lab was a hodgepodge of equipment donated from many sources. When online processing was instituted some of the software used was freeware, saving on expense and complexity. Currently, Mahabir Pun is working with Open Learning Exchange, an NGO, to develop interactive educational contents using open source based on the government's curriculum for school students.

The availability of links to the outside world has made it possible for Nangi to have a rudimentary telemedicine system, interact with villagers in other locations, improve agriculture, and teach children the use of computers.

Many developmental projects, even in very poor countries, try to use the very newest and most complex equipment, reasoning that it will help the local project to "leapfrog" ahead. In Nangi the model was very different. Nangi did not have any funding available when it started the wireless project in 2002. Therefore, the emphasis was on using the simplest, cheapest, and used equipment and leveraging it to the maximum—and they have succeeded where other government funded initiatives have not taken off.



Practical Exercise

Go to Himanchal Education Foundation's website (<http://www.himanchal.org>) and review it carefully. Then answer the following questions:

1. What are the key development goals and objectives that this project in Nepal seeks to address? Make a list of the goals and try to prioritize them. Compare the list you have made with that of your neighbour in the class. Create a brief presentation explaining your and your neighbour's views for the entire class.
2. How have ICTs been used to address the different development objectives here? List the ICTs that have been used in this project. List the advantages and limitations of each of the ICTs listed. Organize the list in an order of importance. Add this list to that of question 1 in the presentation. Summarize the link between the development goals and the ICTs in this project.



Test Yourself

1. The link between development goals and ICTs:
 - a. Lies in the power of the latter to make timely and reliable information for decision-making available
 - b. Improves coordination between different sectors and planning processes
 - c. Helps good governance translate to good development outcomes
 - d. All of the above
2. The "digital economy rankings" that replace the older e-readiness indexes:
 - a. Benchmark the extent of ICT skills development in a country
 - b. Benchmark the quality of a country's use of ICTs for social and economic activities
 - c. Rank countries according to their "knowledge products" outputs
 - d. Rank countries according to their teledensity
3. The difference between a "knowledge economy" and a "knowledge society" refers to:
 - a. Difference between "goods and services" in ICT to "capabilities in the use of ICTs"
 - b. Access to information and knowledge among the poor
 - c. Narrowing of the digital divide
 - d. The ability of a country to develop back office operations for developed country
4. Which of the following is the best way to narrow the digital divide?
 - a. By building up IT infrastructure
 - b. Providing universal access
 - c. Reforming the economic, educational and telecommunications system
 - d. One cannot prioritize between the three alternatives
5. Which of the following is NOT an organization working in ICTD in the Asia-Pacific region?
 - a. ADB
 - b. ESCAP
 - c. UNESCO
 - d. ECLAC

Further Reading

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CHAPTER 2. INFORMATION AND COMMUNICATION TECHNOLOGIES FOR DEVELOPMENT

2.1 ICTs in Our Lives

The convergence of development practice and the use of ICTs for sustainable and inclusive social and economic development is the newly emerging discipline of ICTD. The field emerged as a discipline during the last quarter of the twentieth century, and so, when compared to other fields of knowledge, it is still young and draws its knowledge base from several disciplines leading to both its interdisciplinary nature and its complexity.

Box 5. How ICTs have transformed our lives

Picture this:

A digital picture taken in Bangladesh on a mobile phone camera is transferred to a laptop computer. Though the Internet, the picture is e-mailed to a person in India and as a multimedia message to a person in Brazil. The picture also reaches international broadcasters through search engines such as Google. In one part of the world, the picture is used in a document, somewhere else it is inserted into a video production; elsewhere it is burned onto a CD and sold. In South Africa, the production is sent to South Africa Broadcasting Corporation and is broadcast across the country. Someone in the United Kingdom captures a single frame of the production as a digital still and he e-mails it to a friend traveling in the Pacific carrying a Web-enabled mobile phone. They in turn e-mail to a friend in Zimbabwe who mounts it on a local website. A person in Canada copies the picture from their site, puts it in a magazine and later is sued because the picture is found to be copyright protected. All of this is done within 24 hours.⁶²

Or picture this:

A doctor from a remote rural area urgently needs expert medical advice to treat a poor patient who developed cardiac complications after the delivery of her third child. The doctor could not properly diagnose her condition due to the lack of proper medical equipment at the district hospital. Using the high speed communication links on a satellite link between the rural facility and a high specialty urban hospital, doctors at the latter location were able to diagnose and advise treatment—a possibility unheard of a decade ago.

The rural doctor, encouraged by the possibilities offered by the technology undertook a continuing medical education course through the distance mode and within a few years was able to provide expert medical advice without leaving his practice in the rural village.⁶³

The two experiences described in box 5 illustrate both the excitement and the potential transformation that ICTs have brought into our individual lives. Today, an inexpensive mobile phone in the hand is enough to access these benefits; a person does not need a complex or expensive computer or access to high speed Internet. And if ICTs can be used for communication and for pleasure, they can also be used to speed up and ease the process of development.

62 David Walker, former Education Specialist for the Commonwealth of Learning, in a speech in 2003, used with permission from the author.

63 The author has observed several telemedicine initiatives in operation in villages of Andhra Pradesh and elsewhere in India. This description is a composite of several such observations.

2.2 Understanding ICTs – Scope and Definitions

What are these ICTs and what is the current understanding of their capabilities? 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 TV and telephony are included in the discussions. Definitions of ICTs vary widely, depending on contexts and conditions of use.

A more comprehensive definition is available from TechTarget,⁶⁴ an online leading global technology media company catering to the specialized needs of the ICT market. TechTarget, which places emphasis on the different types of technology, describes ICTs as:

An umbrella term that includes any communication device or application, encompassing: radio, television, cellular phones, computer and network hardware and software, satellite systems and so on, as well as the various services and applications associated with them, such as videoconferencing and distance learning. ICTs are often spoken of in a particular context, such as ICTs in education, health care, or libraries. The term is somewhat more common outside of the United States.

According to the European Commission, the importance of ICTs lies less in the technology itself than in its ability to create greater access to information and communication in underserved populations. Many countries around the world have established organizations for the promotion of ICTs, because it is feared that unless less technologically advanced areas have a chance to catch up, the increasing technological advances in developed nations will only serve to exacerbate the already-existing economic gap between technological “have” and “have not” areas. Internationally, the United Nations actively promotes ICTs for Development (ICT4D) as a means of bridging the digital divide.⁶⁵

For the purpose of discussion and clarity, it would be useful to accept the definitions provided by the UNDP in 2003:

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.⁶⁶

64 TechTarget, <http://www.techtarget.com>.

65 SearchCIO-Midmarket.com, “Definition: ICT (Information and communications technology - or technologies)”, TechTarget, <http://searchcio-midmarket.techtarget.com/definition/ICT>.

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

Traditionally, it was possible to distinguish ICTs in terms of their particular features (text—print; audio—radio; audio-visual—TV). But since the 1990s, such distinctions have become blurred as convergence, or the blending of what were 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-based technologies.

At this juncture, it is important to recognize that ICTs are now a part of everyday life beyond the typical uses referenced earlier. The evolution and use of ICTs have refined and redefined many traditional industry sectors and have made considerable impact on how industries and sectors operate and/or are managed.

These range from traditional sectors such as agriculture, where ICTs make crop management easier by helping to analyse and predict optimum planting and harvesting conditions. Technologies are also available to help run and monitor industrial processes such as factory and building management systems, which can control internal and external access to rooms and offices, and manage heating/cooling and lighting systems to save and conserve energy. ICTs are used in modern motor vehicles to control the efficient running of the vehicle’s engine and fuel systems, and help guide drivers (e.g. through the use of parking sensors and global position systems [GPS]). All these systems use ICTs in various forms to function, to increase efficiency, as well as to relay information to other systems and the user, in order for appropriate decisions and actions to take place.

ICTs can be further unpacked into technologies, applications, services and content. The development of newer and faster computers and mobile phones running multiple applications, the building of more wireless towers, the laying of more fibre optic cables, and the embedding of smart sensors and related technology in various everyday items from cars to fridges form part of the ICT infrastructure and must be seen as part of technologies.

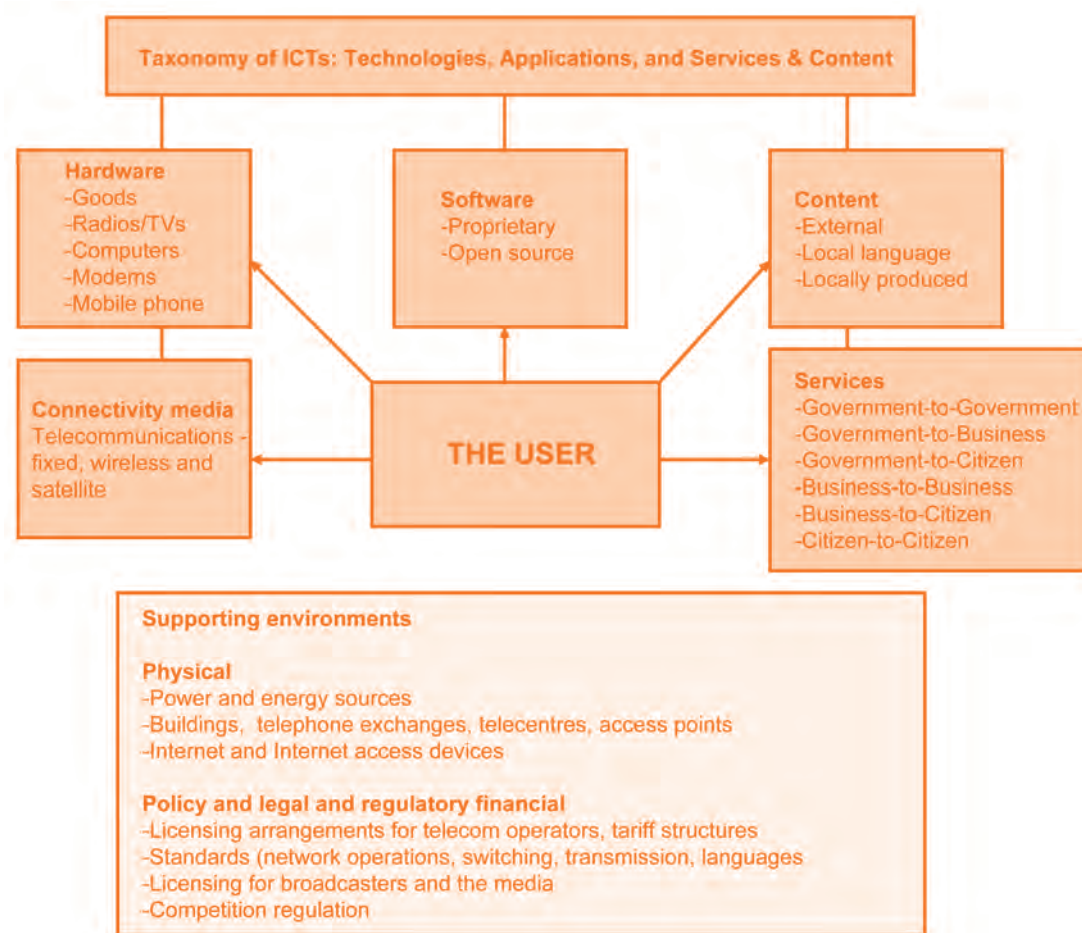
The development of software applications both in English and in local languages, whether these are proprietary or created from Open Source⁶⁷ consist of applications; and the tools provided through the technologies or the content of the applications—whether for business or for e-government—are the services that can be provided through the technologies or the applications. What forms the substance of the services is the content 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 elements of the taxonomy 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. Appropriate technical resources to build, deploy, operate and maintain such systems are also required. Other enabling environments include laws and implementation norms, whether these are in licensing, competition norms and processes, revenue sharing mechanisms, or intellectual property rights (IPR).

Figure 7 describes ICTs in terms of their empirically observable and measurable characteristics.

67 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 organisations. 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 7. Typology of ICTs



Credit: Usha Rani Vyasulu Reddi, 2011.

2.3 Unpacking the Technologies

Any person with a small mobile phone in hand, or a personal computer (PC) has the ability to access a world of information. This is done through a seamless network of technologies, applications, services and content, interlinked through a grid of telecommunications technologies. While it is immaterial to the final user as to how the system works, as long as it delivers what is wanted; for a student or for a provider of development services, a broad introduction to the diverse technologies and an unpacking or unbundling of the various terms is critical to understanding the conditions and contexts of their applications and effectiveness. This section explores the common understanding of the various terms used in figure 7.

Essentially, ICT devices and applications are used in the production, storage and sharing of information and knowledge. They consist of hardware and application software that run the hardware and also enable development of content. Together they enable the provision of services to the user through connectivity media. Underpinning the entire process is a set of supporting environments—physical, policy, legal and regulatory, and financial frameworks. Let us examine each in some detail.

Hardware

Hardware can be classified into:

- Information capture devices, e.g. cameras, keyboards, microphones and recorders, and scanners.
- Information storage devices, e.g. servers, hard disks, and external storage devices such as films and tapes, CDs, DVDs, memory sticks and memory cards.
- Information sharing devices, e.g. radios, TVs, telephones—fixed and mobile, hand-held devices such as e-book readers, and computers, including laptops and tablets.

Computers and mobile phones with their capture, storage and sharing capabilities have become very powerful hardware tools.

Software

To run and use the hardware devices, software applications are needed. These can be operating systems or application software. These can be proprietary or open source. Proprietary software is computer software licensed under the exclusive legal right of the copyright holder. The licensee is given the right to use the software under certain conditions, but restricted from other uses, such as modification, further distribution or reverse engineering.

On the other hand, Free and Open Source Software (FOSS) refers to computer software that is available in source code form for which the source code and certain other rights normally reserved for copyright holders are provided under a software license that permits users to study, change and improve the software. It is important to note that the term free software refers to the freedom associated with it (freedom to run the software, redistribute, study, adapt, improve and release the improvements for others to use) and not the price. However, as the source code has to be freely available for use and redistribution, FOSS can usually be obtained at no or very little cost. This has the advantage of freeing up budgets used otherwise for expensive licensed software and their respective upgrades.

There is little value for software vendors to localize or customize software for small markets and languages. However, a FOSS application can be customized to suit local configurations, to display character sets with the use of special fonts, or even perhaps to provide a better user experience through the modification of the user interface. Localization is made easier as there are set language templates that can be created and linked to the software, without disturbing the underlying software code.⁶⁸

- **Operating system (OS):** When the computer or the hardware device is switched on, it starts the operating system that controls the machine. An operating system is a set of programs that help in controlling and managing the hardware and the software resources of a computer system and other hardware devices. Operating systems can be proprietary; where a company designs, develops and markets it as their own system. Windows is one, Mac OS is another. Operating systems can also be free and open source such as Linux.
- **Application Software:** Application software is also known as an application or an “app”. These are computer software programs designed to help the user perform singular or multiple tasks. Application suites often come bundled with several applications working together. Examples of proprietary software include Microsoft Office, iWork, enterprise software, accounting software, office suites, graphics software and media players. Examples of FOSS include the Linux OS applications such as Open Office and Firefox.

⁶⁸ Rajnesh Singh, *Module 4: ICT Trends for Government Leaders*, 2nd edition, *Academy of ICT Essentials for Government Leaders* module series (Incheon, UN-APCICT/ESCAP, 2011), <http://www.unapcict.org/academy/>.

Content

Dictionaries define content as the subject matter, the substantive information or creative material contained inside a medium—a book or newspaper, a recording or playback device, and as distinct from the medium itself. The medium as a mode of delivery may vary; and the manner and format in which the creative material is presented may vary; but the content will remain the substance as opposed to the manner of its presentation. The medium without the content would be like a hollow tube. Content can be defined as:

- Text – written material
- Audio – sound bytes, pre-recorded materials
- Video – visual, moving TV footage
- Film – visual, moving film footage
- Graphics – graphs, charts, tables, photographs
- Animation – moving graphic animated objects

Content can also be defined as a narrative, interviews, dramatization, and/or any other form of matter. In addition, means of interaction between the creator and the user may also be included.

Content is perhaps the most important element of ICTD activities. Content may be globally, nationally, regionally, or even locally developed and used. It may be pre-recorded or obtained from other sources. It may be recorded originally for the purpose of the programme or project. It may be produced by a single agency for mass distribution over the Internet as in a website, or produced by many for a small group. It may be in an international language such as English, or in a national or local language and produced individually for wide distribution, as in a blog or a social networking site.

Services

Content is developed to meet a set of given requirements or services. Broadly, these can be categorized into information, education and entertainment. Within an ICTD context, the concern here is more with information and education, and less with entertainment. The various types of services that can be provided through the use of ICTs include:

- Government-to-Government (G2G) – Where ICTs are used in a closed system to link and network all government offices to ensure smooth, speedy and effective functioning of the various branches of government.
- Government-to-Business (G2B) – When a substantial percentage of government activities such as public works and services are provided by private firms; the use of ICTs for G2B activities helps governments to improve service delivery, increase cost efficiencies and savings in public expenditure. The use of ICTs in providing G2B services is known to reduce corruption.
- Government-to-Citizen (G2C) – Government's largest interaction is with the citizens of the country for whom government provides services in return for taxes levied. G2C includes information dissemination to the public, basic citizen services such as license renewals, ordering of birth/death/marriage certificates and filing of income taxes, as well as citizen assistance for such basic services as education, health care, hospital information, and libraries, among others.
- Business-to-Business (B2B) – Also known as e-biz when done through the Internet, B2B is the exchange of products, services or information between businesses rather than between businesses and consumers.

- Business-to-Citizen (B2C) – A B2C business is one that provides products or services direct to the consumer.
- Citizen-to-Citizen (C2C) – When citizens and citizen groups use ICTs, whether the Internet or the mobile phone, to communicate and network with each other for a particular cause or to share information about issues of public interest.

Most of these services today are enabled either by using the Internet or mobile technology as platforms.

Connectivity Media

The power and capabilities of ICTs come from linking the different parts to a seamless and convergent network through connectivity media. A network of telecommunications links that includes fixed phone landlines, line of sight transmitters, wireless networks, satellites and fibre optic cables are part of an extensive grid enabling the network. At the user end, connectivity media include cables, modems and routers (internal or external) to a computer or mobile phone.

The Internet rides on this convergent network, using only a small portion of the total portion of telecommunications resources available worldwide. Sometimes called simply “the Net”, the Internet is a worldwide system of computer networks—a network of networks in which users at any one computer can, if they have permission, obtain information from any other computer (and sometimes talk directly to users at other computers). Today, the Internet is a public, cooperative and self-sustaining facility accessible to more than 2 billion people worldwide. The most widely used part of the Internet is the World Wide Web (often abbreviated “WWW” or called “the Web”). Using the Web through one of many available Web browsers, an individual anywhere in the world can have access to millions of pages of information.

Telecommunications operate within environments, with physical and infrastructural on the one hand; and policy, legal, regulatory and financial on the other (i.e. the rules of the game). Without going into much detail on each of these different environments⁶⁹ it is necessary to understand their importance. The use of ICTs in any social system, especially in developing countries, needs to be placed within a context of supporting environments—physical and socio-political. Without these environments, ICTs cannot function effectively.

Supporting Environments: Physical

Underlying the practical use of current developments in telecommunications and computing are important but related aspects of the physical infrastructure. These are sometimes called the “last mile” connectivity issues. The last mile is the final leg of providing connectivity to a consumer. This could mean simply the cable link from the computer to the nearest telephone pole; it could also mean linking one village to the nearest telecommunications tower through a cable running for more than 1 kilometre. Or it could mean providing a wireless tower whose signals reach the village. The last mile for the telecommunications service provider is often the first link that the user has to connect to the world either through a landline or mobile phone; and if it does not work, there is no connectivity.

Without basic connectivity, there can be no access to the Internet. Stable electric power or alternate energy sources are essential for the use of ICTs. Physical and topographical constraints continue to inhibit line of sight communication especially in hilly terrains, and pose problems

⁶⁹ The modules of the *Academy of ICT Essentials for Government Leaders* module series explore various aspects of the different environments. For instance, Module 2 explores ICTD policy and processes; Module 3 focuses on e-government applications; Module 4 on ICT trends; Module 5 on Internet governance; Module 6 on security aspects; Module 7 on ICTD project management; Module 8 on the financial aspects of ICTD; Module 9 on the use of ICTs in disaster risk management; and Module 10 on ICTs and climate change abatement. All of these modules are available from <http://www.unapcict.org/academy>.

of signal strength in wireless communications. Some satellites are highly sensitive to tropical rain storms; and computers in hot dusty climates have to be designed purposefully or they fail. Laying of fibre optic cables is expensive, as is the replacement of outdated equipment. Similar problems arise with access points such as buildings, telephone exchanges and telecentres, as with access devices such as modems and routers. All of these physical conditions impede the practical use of ICTs in development.

Therefore, in parallel with the installation of transmission towers, fibre optic cables and similar wireless technology infrastructures, care has to be taken to ensure that stable electric power is provisioned for; that ground terminals and telephone exchanges and access points are built; and that computers, modems and routers are also provided. Along with establishing infrastructure, maintenance and upgrading of technology is a major issue in developing countries, alongside the building of technical capacity to establish, operate, maintain and update technology.

It is important to recognize that there are other factors, not physical, but socio-political, legal and financial that determine the context in which ICTs are to be used. These, to a large extent, determine the pace and spread with which growth in ICTs takes place; the way in which these technologies are used to meet development goals; and the manner in which the citizens benefit from the economic and social advantages that ICTs enable.

Supporting Environments: Social and Regulatory

Governments have policies, laws, and regulations that govern different sectors of society. A policy can be defined as a guiding principle, a procedure or course of action intended to influence and determine decisions and actions considered to be in the best interests of the society at large. Since it is very difficult to anticipate and plan for new technologies, governments often have to develop policies and procedures sometimes long after the technology is implemented in society. Nevertheless, governments do develop policies and procedures by which such technology will be introduced, implemented or regulated. Take for example an analogy of the aviation sector. If there were no policies and procedures governing the way in which the airways are managed, and if there were no regulations to manage this very important sector, there would be chaos in the skies.

So it is also with ICTs. Governments worldwide are increasingly focused on understanding and managing ICTs as a major economic and social resource. Decisions on how to harness ICTs for development purposes are part of this wide ICT policy. Specifically, the laws and regulations by which this sector is governed are part of the environment in which ICTs will grow, operate and meet societal needs. Therefore, ICTs operate within a set of policies, regulations and procedures that govern this sector, just as aviation policies, regulations and procedures govern aviation. ICT growth in a completely free market will be different from a planned economy; and will be different in terms not just of laws and rules, but also in the way in which financial allocations are made, spectrum allocation (because telecommunications depends on the wireless spectrum) is done, costs of services to the user are regulated, and so forth.

And specifically, without a clear cut ICTD policy in place, it would be difficult to prioritize and promote the use of ICTs for meeting development goals. Without a policy and governance framework, governments cannot measure and benchmark their progress against those of other countries.⁷⁰

⁷⁰ An extensive discussion of the policymaking process is given in Emmanuel C. Lallana, *Module 2: ICT for Development Policy, Process and Governance*, 2nd edition, *Academy of ICT Essentials for Government Leaders* module series (Incheon, UN-APCICT/ESCAP, 2011), <http://www.unapcict.org/academy>.

Box 6. India's IT revolution and the role of policy frameworks

The Indian experience provides an example of how fundamental, focused changes in policy and legislation in the IT sector can unleash forces that transformed India.

The IT industry experienced a temporary boost in 1994 when then-Prime Minister Rajiv Gandhi identified telecommunications and IT as a “core sector,” together with traditional industries such as electrical power generation, steel, oil and automobiles. Within a few years the National Informatics Centre and the National Centre for Software Technology had been established.

The New Industrial Policy (1991) saw a shift in perspective from a regulated economy to a freer and less regulated private sector. The new policy contributed to the rapid growth of the IT industry.

Internet had been in India for many years in the form of an Education and Research Network. However, it was not possible for many people to have access to it, as it was meant only for the educational and research communities. This followed the policy laid down by the American Internet manager, the National Science Foundation, at that time.

India's telecommunications monopoly, the Videsh Sanchar Nigam Limited (VSNL) introduced Internet in India via dialup in six cities on 14 August 1995. By 1998, India introduced a new ISP policy that ended VSNL's monopoly on the Internet.

Soon after, the IT Act 2000 was passed by the Indian Parliament, further spurring ICT interventions and innovations. Both foreign portals such as Yahoo and MSN launched Indian sites; while Indian players also created online sites such as Indya.com and Baazee. The large multinational company ITC launched e-Choupal taking Internet to the villages enabling farmers to connect to the market.

States such as Andhra Pradesh and Karnataka took the lead in e-government initiatives in procurement, land registration and citizen services, and by 2006, the National e-Governance Plan laid down a policy and a road map for the use of ICT, especially Web technologies for transforming government.

A Universal Service Obligation Fund⁷¹ was created in 2002 and later strengthened. This fund required all telecommunications providers to commit 5 per cent of their gross adjusted revenues to providing basic services to rural areas.

By 2009, the Internet became central to the new vision of India as an IT power in many respects. The uses of the Internet and telecommunications technologies have become central to the growth of the export-oriented software industry that have powered India into a global leadership position.

Adapted and repurposed from Usha Rani Vyasulu Reddi, “The Internet in a Developing Society”, in *netCh@kra: 15 Years of Internet in India - Retrospectives and Roadmaps*, Madanmohan Rao and Osama Manzar, eds. (New Delhi, Digital Empowerment Foundation, 2011), p. 155.

That is why it is important to understand that although ICTs seem to be all powerful, they are dependent on various external factors for their use. Their use is also dependent on what each technology's intrinsic attributes and limitations are and how these will impact upon successful use.

71 Ministry of Communications and Information Technology, Department of Telecommunications, “Universal Service Obligation Fund”, Government of India, <http://www.dot.gov.in/uso/usoindex.htm>.

2.4 Attributes of ICTs

When one compares the different technologies, there are both commonalities and differences that determine the conditions of use, and consequently, the likelihood of success or failure in their application. All the ICTs promote individualization of use (different people can have a different use for the technology), enable high speed delivery, wide reach, and have a low cost per unit. Many are distance and climate insensitive; and can serve multiple needs, functions and user groups. However, there are many conditions and factors that enable use of ICTs, these factors range from access and availability, to issues such as literacy and ownership of ICTs. These conditions are summarized in table 4.

Table 4. 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
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

ICT	Attributes	Limitations
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 factor inhibiting access to and ownership of instrument

Credit: Usha Rani Vyasulu Reddi, 2011.

Compared to the older ICTs, digital ICTs are transformationally different. For the earlier technologies such as print, radio and TV, the regulation, shaping and production of content and the delivery methodologies remained one way and in public hands. 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 who can control the remote, the mouse or the mobile phone, and therefore, vary the purpose for which the technology is being used. At the same time, the user can define the ICT in terms of one's own needs and wants, and in terms of one's own private space. For example, the Internet allows unbundling (no need to buy a whole CD, just download the song and bypass traditional means of dissemination). Similarly, on a mobile phone, it is possible today to download "just that bit of information" and "just in time" to meet a need; and later to simply delete it.

What this has resulted in are structural changes in the way that content is produced, stored, and diffused and disseminated. This leads to diversity in both form and content; and the possibility of localization in terms of language, culture, design, content and use. Because the newer ICTs address the weaknesses of the older ICTs, they are seen as key tools in the campaign toward the achievement of the MDGs.

The variety of use and the number of ICTD initiatives are many. They include the provisioning of access and infrastructure, development of policy and regulatory frameworks, and capacity building. There are also many ICTD initiatives that aim to improve the management and delivery of various sectors including agriculture, climate change abatement, disaster risk management, education, environmental management, gender, government and governance, and health, to cite a few. The uses will be explained in a later section of this primer.

The comparison of attributes and limitations of different ICTs shows that digital technologies have a definite comparative edge as information tools, and for this reason, the exploration of the history of use of these technologies is essential before discussing the contribution that digital ICTs make in addressing developmental goals.



Points To Remember

- ICTs can be defined as a basket of tools—a varied set of goods, applications and services that are used to produce, store, process, distribute and exchange information. They include the older technologies of radio and TV, and the newer digital technologies of computers, the Internet, and mobile phones.
- ICTs can be further classified into technologies, applications, services and content.
- ICTs operate within an external environment that consists of a physical infrastructure such as power and energy sources; and legal and regulatory framework.
- To use ICTs effectively for development, it is necessary to understand their attributes and limitations, and choose the appropriate technology in a development context.



Practical Exercise

An NGO in a small district of a country in a mountainous Central Asian republic is keen on exploring the use of voice mail technologies to deliver messages on preventing pulmonary diseases caused by air pollution to a large segment of the local population. The NGO is unsure as to where to start and how to go about using this mobile technology.

Help the NGO by:

1. Identifying the different hardware that will be needed by the producer of the voice mail, the service provider and the beneficiary for the capture, storage and distribution of voice mail messages. Make a comprehensive list of what you think are absolutely essential, and what are add-ons.
2. Identifying what may be the physical constraints that the mobile technology is likely to face; and what you would recommend as a solution.
3. Identifying what may be the social and cultural barriers to the use of mobile phones for delivering voice mail messages. Identify potential solutions and determine their relative costs, advantages and limitations, physical and social.
4. Modify your list made in question 1, after analysing your answers in questions 2 and 3.



Test Yourself

1. An e-governance portal in your country through which you file a complaint with government would be part of which aspect of ICT?
 - a. Hardware
 - b. Software application
 - c. Content
 - d. Service

2. Supporting physical environments for ICTs include:
 - a. Laws and regulations
 - b. Power and energy, buildings and access devices
 - c. Licensing procedures
 - d. Open standards

3. Hardware can be classified into:
 - a. Capture, storage, process and distribution equipment
 - b. Proprietary and open source
 - c. Large and small
 - d. Websites and networks

4. An “app” is an:
 - a. Operating system
 - b. Website
 - c. Application software programme
 - d. None of the above

5. Which of the following is not an attribute of an ICT-based system:
 - a. Sensitivity to distance and slow in speed
 - b. Low cost per unit
 - c. Just in time information
 - d. Personalization of system

2.5 Trends in ICTD Evolution and Growth

When Arthur C. Clarke⁷² wrote in 1945 of radio broadcasts through extra-terrestrial relays, few would have realized that the transformative power of telecommunications, satellites and computers would impact the world and make it into the “global village” envisaged by Marshall MacLuhan⁷³ in his pioneering work in 1964.⁷⁴ Within three decades and before the arrival of the new century, the information revolution was well underway and moving with a speed that no one could predict.

Predicting the trends in ICTs, their evolution and growth can be a tricky business. The evolution of ICTs has not stopped with the invention of satellites, computers, mobile phones and the Internet. Moore’s Law, propounded by Gordon Moore, one of the co-founders of Intel in 1965, described a long-term trend in the history of computing hardware, in which he argued that, at the pace of 1965, technology growth doubled every two years. Today, the law has been reinterpreted to assert that data density is doubling every 18 months. More important than the law is the recognition that technological progress has been so fast that it is hard to predict the course of technology change.

72 Arthur C. Clarke, “Extra terrestrial Relays”, *Wireless World*, Vol. II, pp. 305-308 (October 1945). Sir Arthur C. Clarke was a British science fiction writer who lived in Sri Lanka. Famous for his short stories and novels, he was also the author of *2001: A Space Odyssey*, the host of a science fiction series on BBC television, and was considered one of the “big three” of science fiction along with Isaac Asimov and Robert A Heinlein.

73 Marshall MacLuhan was a Canadian educator, philosopher and scholar, known for his writings on communication theory. His work is one of the cornerstones for the study of media theory; and he predicted the global village and the World Wide Web almost thirty years before it was invented.

74 See “Marshall McLuhan Foresees The Global Village”, http://www.livinginternet.com/ii/ii_mcluhan.htm.

But what one can say with relative comfort is that innovation within ICTs will most likely take place in improved platforms and services, such as cloud computing⁷⁵ and Web 2.0⁷⁶ applications; and they will fit into a broad umbrella of features discussed below.

Changes taking place in the first two decades of the twenty-first century and the trends that they indicate show that innovation will take place in technology and hardware, and in applications, content, services, interaction, income generation models and the like.

Technology, Hardware and Telecommunications

Earlier models of technology development and diffusion looked largely at PCs connected through a landline or at most, a broadband connection to the Internet. This model proved costly and unfeasible in poor countries as it was neither sustainable nor scalable. Telecommunications links and teledensity was just too limited and too expensive, and supports such as stable electric power were missing.

Innovation in technology development has led to work focused on developing low-specification, low-cost, robust terminal devices that could work in large numbers of poor communities. But these developments in low-cost computing have to some extent been upstaged by the phenomenal growth in mobile technology as today's mobile phones have features that resemble and have the capability of a low-end laptop computer.

Box 7. My phone is my computer

The small mobile phone in the hand of a person is a very powerful device. Not only does it allow us to make phone calls at very cheap rates, but it has many functions, and can serve as a simple calculator and address book, as well as a radio, music and video player. We can send text (SMS), photos and videos (MMS), and voice messages. It can capture, store and share information.

Apart from supporting voice calls, some of the current generation phones can offer functions that include:

- Multimedia recorder and player, supporting music and video recording and playback
- Voice recorder
- Camera, supporting video and still photography, with zoom facilities and high resolution photography; some have two camera's (front and back)
- Flashlight
- Radio tuner
- GPS and compass, for location referencing and navigation

Some more advanced mobile phones, also called smart phones, allow for the ability to install applications with features such as:

- Internet applications: Web browser, e-mail client, instant messaging clients, voice over Internet protocol (VoIP) client
- Personal Information Manager applications: Calendar, To-do List, Alarms, Reminders, Notes and Contacts, Synchronize Tool to connect to Microsoft Exchange and other enterprise-type services

⁷⁵ Cloud computing is Internet-based computing, whereby shared resources, software and information are provided to computers and other devices on-demand, like electricity. It is also understood to be the use of a Web service to perform the functions that were traditionally done with software installed on an individual computer.

⁷⁶ Web 2.0 is the popular term for advanced Internet technology and applications including blogs, wikis, RSS and social bookmarking. It also describes the changing trends in the use of Web technology and Web design that promotes participatory information sharing, user-centered design, interoperability, collaboration and creativity on the World Wide Web.

- Productivity applications: word processor, spreadsheet, presentation, Acrobat Reader for PDF files, zip file utility, file manager
- Support for direct printing to Bluetooth or Wireless Fidelity (WiFi) enabled printers
- Support for virtual private networking

To provide such functionality, these smart phones also need to have suitable hardware. Some of the hardware (depending on the model of the phone) includes:

- QWERTY keyboard (physical or virtual), with a layout similar to that of a standard keyboard, as well as a navigation joystick or optical trackball for easier system interaction
- Touchscreen display
- Large built-in system memory (256MB-512MB is common for smart phones) and additional storage capacity through add-on storage memory cards that can support 32GB (or more)
- High-speed processor (some smart phones run at 1GHz or more)
- WiFi Wireless local area network support
- Bluetooth and USB support
- Accelerometer or gyroscope for three-dimensional interaction and orientation

By being able to provide such functionality, current generation smart phones are able to provide most, if not all, of the office/work related and other functions that a typical user needs on a daily basis, regardless of time or location. It really can become a computer rather than just a humble telephone.

Adapted from Rajnesh Singh, *Module 4: ICT Trends for Government Leaders*. 2nd edition, *Academy of ICT Essentials for Government Leaders* module series (Incheon, UN-APCICT/ESCAP, 2011), <http://www.unapcict.org/academy/>.

With access to stable electric power and energy remaining a distant dream in many rural communities in poor countries, land-based telecommunications solutions are giving place to low-cost wireless systems, such as WiFi and WiMax.⁷⁷

At the end of 2010, there were 2,649 million mobile subscriptions in Asia-Pacific, compared with 880 million in the Americas and 741 million in Europe.⁷⁸ Much of the growth is coming from the world's most populous nations—China and India. Another aspect of the growth is the willingness of consumers to experiment with new technologies and the various types of content these technologies can deliver. Many of the innovations now being tried out by marketers in the West, such as Quick Response or QR codes, were born in Asia.⁷⁹ Opportunities to experiment with different services on mobile phones exist—whether it is m-agriculture, m-banking, m-learning or m-health, among others.

⁷⁷ See Glossary for definitions of WiFi and WiMax.

⁷⁸ See MobiThinking, "What Makes the Asia Pacific the Most Exciting Mobile Market in the World?", <http://mobithinking.com/mobile-asia-pacific-mma-interview>.

⁷⁹ Ibid.



Youth In Action 1. Kopo Kopo

In Kenya, a group of young entrepreneurs established Kopo Kopo that integrates microfinance and mobile technologies to help poor communities. Kopo Kopo allows small- and medium-sized enterprises to leverage mobile money as a payment channel. Mobile money allows people to make payments using their mobile phones. People can add credit to a mobile account and then use their phone to pay for goods and services, transfer money and pay bills. Users no longer need to close their shops and travel across town in order to pay loan installments, thus save time, reduce transport costs and increase income.

Sources: Kopo Kopo, <http://www.kopokopo.com> and <http://genvcampaigns.org/2011/05/17/the-entrepreneurial-path-tech4btrworld>.

Trends in Applications

Dramatic changes are taking place in the development of applications, in operating systems and in computer software programmes designed to help users perform singular or multiple related specific tasks.

The earlier PC revolution and later the Internet were systems that invited innovation by others. Both were generative: that is they were designed to accept any contribution that followed a basic set of rules (either coded for a particular operating system, or respecting the protocols of the Internet). Both were overwhelmed by large businesses and ventures that were essentially proprietary, non-generative competitors, such as the makers of stand-alone word processors and proprietary online services like CompuServe and AOL. In other words, if you bought a PC, it came bundled with the proprietor's software and you were dependent on the same company for upgrades and changes. In the year 2000, applications based on Windows OS would not work on a Mac OS and vice versa.

But the future unfolding right now is very different from this past. The first is that the revolution in FOSS offers low cost and equally robust and efficient operating systems and application software.

Box 8. Free and open source software

FOSS (also referred to as FLOSS or Free/Libre Open Source Software) has come to public attention in recent years. The relative success of software applications such as the Mozilla Firefox browser and OpenOffice office productivity suite has helped establish FOSS as an alternative to closed source (or proprietary) software.

So what exactly is FOSS?

The Free Software Foundation founded by Richard Stallman defines free software as follows:

Free software is a matter of liberty, not price. To understand the concept, you should think of free as in free speech, not as in free beer.

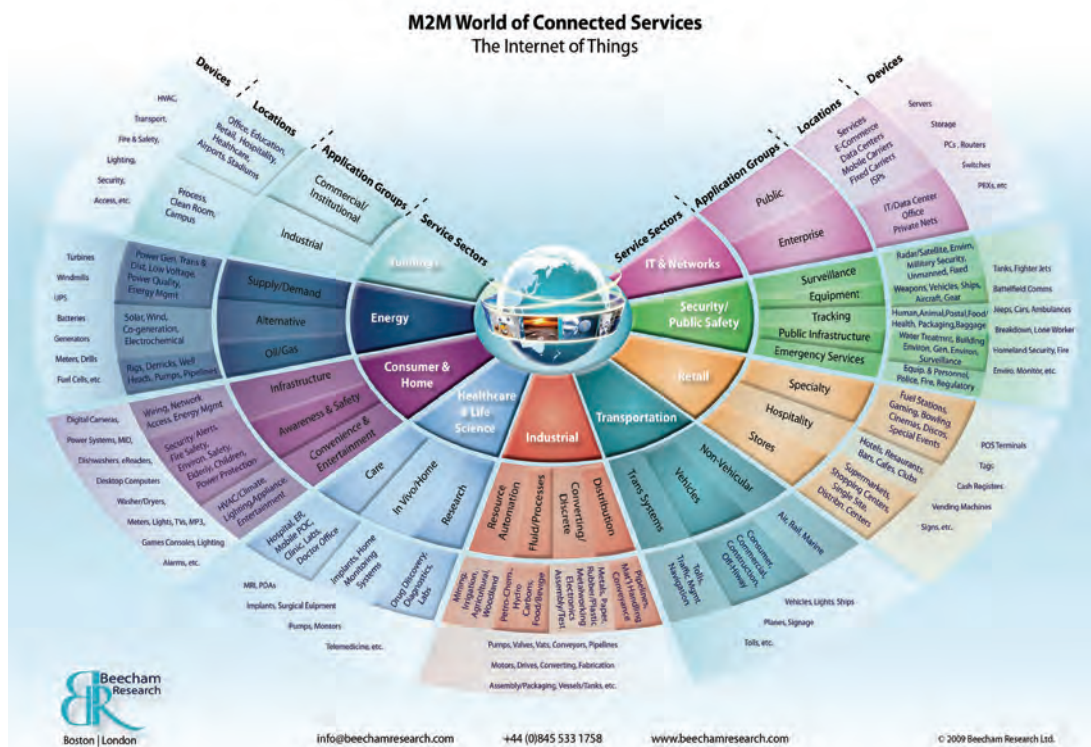
Free software is a matter of the users' freedom to run, copy, distribute, study, change and improve the software. More precisely, it refers to four kinds of freedom, for the users of the software:

- The freedom to run the program, for any purpose (freedom 0).
- The freedom to study how the program works, and adapt it to your needs (freedom 1). Access to the source code is a precondition for this.
- The freedom to redistribute copies so you can help your neighbour (freedom 2).
- The freedom to improve the program, and release your improvements to the public, so that the whole community benefits (freedom 3). Access to the source code is a precondition for this.⁸⁰

Abridged from Rajnesh Singh, *Module 4: ICT Trends for Government Leaders*. 2nd edition, *Academy of ICT Essentials for Government Leaders* module series (Incheon, UN-APCICT/ESCAP, 2011), <http://www.unapcict.org/academy/>.

From expensive proprietary systems, the trend in both operating systems and application software is to move to open systems and software. New applications will allow not just people to communicate with each other through the Internet, but will also evolve into new scenarios, including what is understood as Web 2.0 and the Internet of Things.

Figure 8. The world of connected things and services: The Internet of Things and Machine-to-Machine communications



Source: Beecham Research, "M2M world of connected services. The Internet of Things", <http://www.beechamresearch.com/Downloads.aspx>.

The term Web 2.0 is not so much technology transformation as it is concerned with Web applications that facilitate participatory information sharing, interoperability and user-centered design, and address some of the limitations of the earlier World Wide Web. Web 2.0 refers to various Web-hosted services and software that facilitate user-generated Web content and the technologies these software are based on, including social bookmarking, social writing platforms,

⁸⁰ GNU Operating System, "The Free Software Definition", Free Software Foundation, <http://www.gnu.org/philosophy/free-sw.html>.

and other Internet tools that facilitate the creation and saving of information.⁸¹ A Web 2.0 site allows users to interact and collaborate with each other in a social media dialogue as creators of content in a virtual community, in contrast to websites where users are limited to the passive viewing of content that was created by others for them. Examples of Web 2.0 include social networking sites, blogs, wikis, video sharing sites, hosted services, Web applications, and others.

Box 9. The Internet of Things

The Internet of Things refers to the evolving nature of technology towards a future where everyday objects around us are all linked via a network (the Internet), for example the washing machine, or air conditioner at home being activated by a message from a distant mobile phone.

The concept revolves around such objects all having Internet protocol (IP) addresses and the user being able to interact with these objects. Such a network would depend, for example, on embedding sensors and radio frequency identification or RFID tags in objects around us and being able to access and interact with them for information and status updates. Such information could include updates on how much fuel is in the car (without having to get inside the car and look at the fuel gauge), to checking if there is milk in the refrigerator (without opening it).

Abridged from Rajnesh Singh, *Module 4: ICT Trends for Government Leaders*. 2nd edition, *Academy of ICT Essentials for Government Leaders module series* (Incheon, UN-APCICT/ESCAP, 2011), <http://www.unapcict.org/academy/>.

The new forms of applications have begun to address the weaknesses and the gaps left unattended by earlier software and software platforms. For instance, the emergence of Wiki as part of the FOSS movement allows the creation and editing of any number of interlinked or connected web pages via a Web browser using a simplified markup language or a “what you see is what you get” (WYSIWYG) text editor.⁸² Wikis are typically powered by wiki software and are often used collaboratively by multiple users. In yet another instance, FOSS facilitates the development of local language support enabling localization of content.

The trends in the development of the FOSS movement; the move from expensive landline-based PCs to the more affordable, robust, wireless and user-friendly mobile telephony; and the increasingly simplicity of use have major implications for the development of content that will be addressed next.

Content and Content Development Trends

Earlier models of content development posed many problems and impediments for developing countries. The use of English as the language of IT, and consequently of the Internet became the first impediment as concerns of both literacy and language emerged. Equating the poor in developing countries with illiteracy led to the belief that minimum literacy was essential for benefitting from ICTs. Finding a literate person in a village was not a problem; however, finding one proficient in English to be able to access the Internet or to develop content remained an obstacle. Large software application companies did not find it economically profitable to develop local language fonts.

For a long time, older ICTs such as radio and TV scored over the Internet as favoured media for accessing information and knowledge. The ability to use rich audio-visual and graphic elements as part of Internet-based content was limited both by the size of the computer memory required to store them and by issues of low connectivity and bandwidth. This changed with new forms

81 Andrea Lin and Kavita Karan, “Internet and Information Circulation: Motivations for Passing on the Message Online”, *ASCI/ Journal of Management*, Vol.39, No. 2, p. 45 (2010).

82 See Wikipedia, “Wiki”, <http://en.wikipedia.org/wiki/Wiki>.

of content development, from learning objects, digital stories, and Web 2.0 applications (such as blogs, wikis and social networking sites) that facilitate the development of user-generated content.⁸³

Box 10. Some types of user-generated content

- **Blogs:** A type of website or part of a website. Blogs are usually maintained by an individual with regular entries of commentary, descriptions of events, or other material such as graphics or video. Most blogs are interactive, allowing visitors to leave comments and messages, and it is this interactivity that distinguishes them from static websites.
- **Social Networking Sites:** A social network service focuses on building and reflecting on social networks or social relations among people, e.g., who share interests and/or activities. Social networking sites allow users to build online profiles, and share information, pictures, blog entries and music clips. Common social networking sites include Facebook, LinkedIn and Twitter.
- **Learning Objects:** A digital self-contained and reusable entity, with a clear educational purpose and at least three internal and editable components: content, learning activities and elements of context. Learning objects are a new way of thinking about learning content. Traditionally, content comes in a several hour chunk. Learning objects are much smaller units of learning, typically ranging from 2 to 15 minutes. They are reusable, can be used independently or in multiple contexts, and can be combined by the user to meet specific needs. An Internet-based reservoir of learning objects is called a Learning Object Repository.⁸⁴
- **Digital Stories and Digital Storytelling:** The terms cover a variety of new forms of digital narratives (Web-based stories, interactive stories, hypertexts and narrative computer games). Here, ordinary people tell their own “true stories” in a compelling and emotionally engaging form. These stories are usually short (less than eight minutes) and can be interactive. A mobile phone with a camera and a recorder is enough to create a digital story and share it through MMS or any simple application that may be downloaded or enabled on a mobile phone.

Services

The number and variety of services that can be provided or developed through the options offered by new developments in technologies, applications and content are limited only by the imagination. From banking to health care, education to gaming, music and live streaming of TV content, government, travel and tourism, news and emergency information, education, culture and heritage—a variety of services can be offered, made possible by the advent of affordable high-speed connectivity, enabling inclusion of all sectors of a population into the mainstream of development.⁸⁵ Recent research has also shown that Asian audiences are open to receiving relevant, useful content on their mobiles and are willing to engage in mobile experiences that add value to their lives.⁸⁶

83 User-generated content refers to online content that is produced by users of websites, as opposed to traditional media producers such as broadcasters and production companies. It reflects the democratization of media production through new technologies that are accessible and affordable. These include digital video, blogging, podcasting, mobile phone photography and wikis. Prominent examples of websites based on user-generated Content include eBay, Facebook, Flickr, Twitter, Wikipedia and YouTube. For definitions of different kinds of user-generated content, see Open Content and Public Broadcasting, “Glossary”, WGBH Educational Foundation, <http://opencontent.wgbh.org/report/glossary.html>.

84 A good example of such a repository is available at MERLOT, <http://www.merlot.org/merlot/index.htm>.

85 The website <http://mbillionth.in/> provides an insight into the range of services that can be provided using mobile services and when combined with existing Internet-based applications.

86 mobiThinking, “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>.

Summary

As one looks back at the various inventions that have transformed society over the past hundred years, the revolution in ICTs, with the Internet riding on it, emerges as the one invention that has managed to unleash unparalleled social and economic changes. The world today is very different from what it was even twenty years ago. Today, it best fits the description of a global village, where everyone can be connected irrespective of time, space, culture, language and distance. Riding on this revolution, some very poor countries have suddenly become market leaders and global powerhouses.

The growth path of ICTs and, consequently, ICTD, is on a continuum beginning with the humble radio in the early part of the twentieth century and moving on to today's versatile mobile phone. The success and direction of its growth will depend not so much on the ingenuity of its developers but rather, on the inventive capacity of its ultimate users—whether in a rich metropolis or in a poor mountainside village. The factors that will also determine the direction of ICT growth will largely remain the same as they were earlier, these being:

- Adaptability – The extent to which it can be adapted to a range of tasks
- Leverage – How well it makes a difficult task easier—the more capable it is of producing change
- Ease of mastery – How easy it is for broad audiences to understand how to adopt and adapt it
- Accessibility – How easy it is to obtain and access
- Affordability – How much it costs
- Participatory – How much it engages its users and is interactive with them
- Transferability – How easily its use can be transferred to others
- Generative capacity – How easily it enables the user to create and build on its features for his/her own benefit and use

All of these factors are also important in ICTD programmes and activities. Keeping the features of ICTs in mind, it is now important to study the link between ICTs and development goals.



Practical Exercise

Consider this situation:

Your old mobile phone is damaged; and you need to purchase a new mobile phone. List the features that you want your mobile phone to have.

Consider that you are also buying a mobile phone for your grandparent. Make a list of the features that you will like to have on his/her mobile phone.

Assess both mobile phones on the basis of the factors listed in the summary of this section. Compare notes with your best friend and ask his/her help in purchasing the phones.

Now make a list of all the discussion points you have had with your best friend. Present and defend your findings before an open classroom among your classmates and your teacher.



Test Yourself

1. The generative capacity of any innovation is:
 - a. The extent to which it re-invents itself
 - b. The extent to which the system invites innovation by others
 - c. An ICT-based system where you buy both the hardware and the software from the same company
 - d. None of the above

2. The Internet is a:
 - a. Generative system
 - b. Locked down system
 - c. Both
 - d. Neither

3. To use FOSS, one has to:
 - a. Buy it from the market
 - b. Sign an agreement not to pirate it
 - c. Download and use freely from the Internet
 - d. Write your own programme

4. Web 2.0 refers to:
 - a. A New IP
 - b. New kinds of Internet-based services that allow and encourage networking among people
 - c. The Internet of Things
 - d. New ways in which individuals can use mobile phones

5. “User-generated content” refers to:
 - a. An online website of a broadcasting company
 - b. Online content produced by Web users
 - c. Both
 - d. Neither



SECTION II – APPLICATIONS

Learning Objectives

The learning objectives of this section are to introduce learners to:

- The concept of direct and indirect applications of ICTs
- Case studies in the use of ICTs in various development sectors

Learning Outcomes

After completing this section, learners will be able to:

- Understand the application of ICTs in specific cases
- Be able to identify cases of ICTD in their own country and context
- Be able to analyse such identified cases in terms of success and failure

Introduction

There are many players in the ICTD space including international agencies, governments, NGOs and the private sector. Each group of players works within their mandates and capabilities. For instance, international agencies bring both funds and technical expertise to the use of ICTs. NGOs, with their strong links to the grass-roots, work independently and also as intermediaries between other agencies and people. The private sector engages in ICTD as part of its larger corporate social responsibility to integrate social and environmental concerns in their business operations and give back to society. In many instances, the various groups work together, each bringing their individual capabilities to the use of ICTs to meet development goals.

The biggest and perhaps the most important player is the government, which often has a constitutional mandate to provide public services to the citizens. Governments use a variety of ways and methods to deliver development services. They include:

- Direct government provision
- Contracting out to the private sector and to NGOs
- Devolution and decentralization of power and responsibility to local governments
- Community participation and direct transfers to households

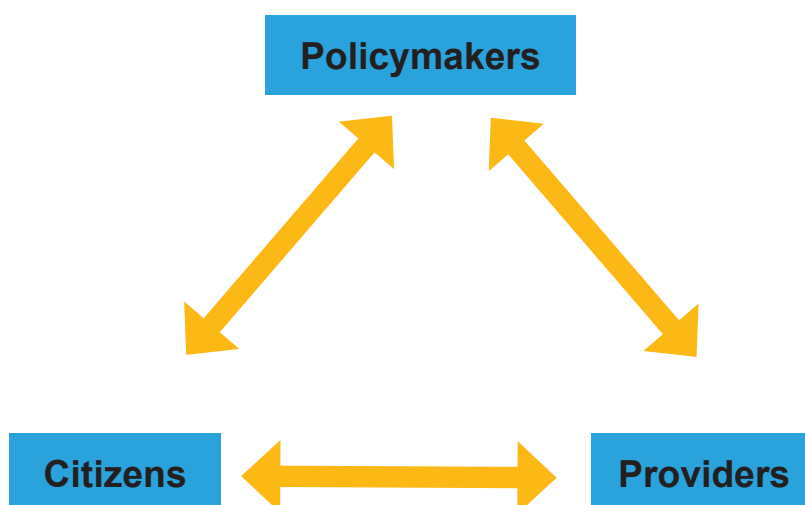
There have been some widely acclaimed successes of cases where government has done well. However, there are also many instances where there have been failures in the delivery of quality services.⁸⁷ Both successes and failures point to the relationships between the various stakeholders—the government, the service provider and the citizen. This relationship is important for effective service delivery; and its breakdown could lead to unrest and citizens protest.

ICTs can be used to strengthen the relationship between the three groups of stakeholders towards meeting key human development goals in an equitable, productive, sustainable and participatory manner. There are many ways in which ICTs have been used historically and presently to meet these developmental goals.

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

To help understand the stakeholders and the various dimensions and components, it is necessary first, to understand the different sets of actors at play in the relationship; and second, to understand the different sets of relationships. To do this, it is necessary to focus on key services provided by the government in poverty reduction, health, education, water, electricity and sanitation for the citizens (clients of the services). In the *World Development Report 2004*,⁸⁸ the framework of relationships between the various actors (i.e. the clients of services, the service providers and policymakers) is illustrated below.

Figure 9. Stakeholders in ICT for development



Note: Policy makers=government; Providers=private industry providers; Citizens=users and beneficiaries in a society.

Source: Adapted from World Bank, *World Development Report 2004: Making Services Work for Poor People* (Washington, D.C., 2003), p. 6, <http://go.worldbank.org/S7MDO8EYS0>.

Citizens, as patients in a hospital, students in schools, and consumers of water and electricity are the clients as they pay for these services, either through taxes or through user charges levied by the state.

The service providers are the agencies or offices (public, NGO or private) where there is a direct interface between the citizen and the government. The electricity, water and sanitation supply boards, schools and the school systems, and hospitals (public or private) to whom an ordinary citizen goes to for service.

Policymakers can be easily identified as elected officials, government officials in positions to set policy and determine courses of action, and people who have supervisory, monitoring, and disciplining authority over service providers and who reward or penalize based on performance.

Let us consider the set of relationships that citizens have with policymakers or elected officials. In principle, citizens influence policymakers and politicians through existing political processes such as elections. In practice, this is a slow process, does not always work (especially for the poor who have less clout with politicians), and the distance between the citizens and the policymakers and elected officials grows because of weaknesses in the electoral system or the slowness of the process itself; occurring only once every four or five years.

⁸⁸ World Bank, *World Development Report 2004: Making Services Work for Poor People* (Washington, D.C., 2003), <http://go.worldbank.org/S7MDO8EYS0>.

Even if poor people can reach the policymakers, services will not improve unless the policymaker can ensure that the service provider will deliver the service to them. It is easier to influence service outcomes by strengthening the link between the citizens and the service providers.

The link between all three major stakeholders is through the processes of information, communication and advocacy, and monitoring that are facilitated through the tools of civic engagement and social accountability. This holds good as much for ICTD as it does for the social accountability of government.

The translation of policy guidelines and plans to achieve development goals are best seen when the goals are segmented into sectors of development. ICTs, by their very nature, are cross-cutting and their applications may be multisectoral and multipronged; as for instance in efforts in poverty reduction. However, for purposes of discussion, this section describes the various applications of ICTs to address such goals as generally identified and prioritized by governments in terms of various specific sectors of development.

There is a wide variety of ways in which ICTs have been applied across many development sectors. However, an analysis of applications will show that there are two main approaches to the deployment of ICTs. One is direct and targets the ultimate beneficiaries. Examples include G2C services and online citizen grievance mechanisms. The second approach is indirect and supportive, that is it targets the coordination of systems and development of policies, infrastructures, people and content, which in turn is expected to benefit the ultimate beneficiaries. Both approaches are critical to achieving development goals; but each has a different design when one moves from policy to implementation levels. They may also be used alone or together in order to achieve different objectives within the same programme or project. An effort will be made to look at both dimensions—direct and indirect—but within the context of individual sectors.

The ICTD examples and case studies presented in this section are mainly from the Asia-Pacific region. The section begins with a bird's eye view of examples and case studies from core or basic social sectors. This is followed by an analysis of cases from equally important but non-core sectors. What is important to remember is that although presented separately by sector, all examples have cross-sector linkages. Keeping them separate is only for understanding them better.



CHAPTER 3.

ICTD APPLICATIONS IN CORE SECTORS OF DEVELOPMENT

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; lack of mobility; lack of access to jobs for young people; and increased vulnerability to the consequences of natural disasters and conflicts. Often, a simple lack of awareness and information about entitlements and facilities can aggravate the conditions of poverty.

In such circumstances, it is critical that the basic needs of food, clothing and shelter, and the income needed to address these basic needs are first addressed. Given a multidimensional understanding of poverty, the process of poverty alleviation will include the facilitation of empowerment,⁸⁹ promotion of opportunity and enhancement of security. This can be done in a number of ways. The use of ICTs for addressing core sectors of development is, on the one hand, to provide access to information and knowledge, access to income generation opportunities, and access to public services and facilities in agriculture, rural development and education, and so forth. On the other hand, ICTs can be used by governments, public authorities, NGOs and private sector initiatives to build large-scale decision support information systems that will help in the speedy, efficient and effective delivery of services.

3.1 ICTs in Agriculture and Poverty Alleviation

In most developing countries, agriculture is the mainstay of the economy. Small farm holdings, low productivity, and poor access to finance and to markets to sell produce at favourable rates lead farmers into a vicious cycle of poverty.⁹⁰ The importance of providing timely information about agricultural practices, markets, finance and other opportunities has been recognized by countries, and many countries have a long history of agricultural extension activities in which they have used conventional media, specifically radio and TV in support of agricultural growth and rural development. Radio continues to be the most omnipresent medium, followed by TV. In recent years, the agricultural sector has worked towards exploring and tapping the potentials that digital ICTs have to offer. Many agricultural extension systems have yet to understand and apply the opportunities that digital media offer for mapping weather conditions, applying the benefits of remote sensing to agricultural systems, and the ability of ICTs to provide quick response mechanisms.

Both kinds of ICT interventions, the direct interface between the services and the poor, and the more supportive and indirect interventions that include natural resource mapping and the revamping of the programme management information systems (MIS), are ways in which to address the poverty reduction goals. If one integrates, for instance, the use of technology for mapping of natural resources and weather conditions with the input provided by the agricultural extension system, and matches these with the active participation of the agricultural community in the process, opportunities for maximizing the benefits of ICTs for poverty reduction exist.

⁸⁹ Empowerment refers to increasing the spiritual, political, social or economic strength of individuals and communities. It often involves the empowered developing confidence in their own capacities. The term empowerment covers a vast landscape of meanings, interpretations, definitions and disciplines ranging from psychology and philosophy to the highly commercialized self-help industry and motivational sciences.

⁹⁰ In India, nearly 200,000 farmers have committed suicide as a result of poverty during the past ten years.

Figure 10. An ICT e-Choupal initiative for farmers to check commodity prices in India



Source: Payal Kapadia, "Boss, Can U Spare Some Change?" *Outlook India*, 7 August 2006, <http://www.outlookindia.com/article.aspx?232105>.

Evidence from the many experiments underway in different parts of the world has shown that effective use of ICTs could help small and medium 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. In Viet Nam, villages such as Bat Trang and Hoi An are reported to have created websites by themselves to promote the selling of village goods.⁹¹



Case 3. 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 farming 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.

⁹¹ 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>.

Figure 11. A farmer uses his mobile phone to receive information from RML



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) 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.

Another specific way in which ICTs are directly impacting upon rural economies is through remittances from non-resident citizens and the diasporas⁹² abroad. The G8 group of countries estimates that international remittances are now approaching USD 100 billion annually. The simple mobile phone is proving to be an important factor facilitating the flow of remittances, both international and national, as it is in the flow of goods and services within nations.⁹³

These are direct approaches, where the poor are directly linked through ICTs to markets and economic opportunities and income sources; and where they can receive financial remittances directly through a mobile-enabled link. For governments, it is equally important to address the multidimensional aspects of poverty through the creation of effective ICT-based systems for supporting large public development programmes addressing poverty issues. Such public programmes, supported by ICTs, can be dynamic, readily expandable and/or replicable.

An example is the use of ICT applications by the Government of India to support a commitment to provide the rural poor with employment for at least 100 days annually under India's National Rural Employment Guarantee Act (see case 4).

92 A diaspora is any movement of a population sharing common national and/or ethnic identity. While refugees may or may not ultimately settle in a new geographic location, the term diaspora refers to a permanently displaced and relocated collective group of people, for instance, a Bangladeshi community living in the United Kingdom or United States.

93 OECD, "Good Practice Paper on ICTs for Economic Growth and Poverty Reduction", 2005, <http://www.oecd.org/dataoecd/2/46/35284979.pdf>. For a case study of the mobile wallet in Bangladesh, see David Murphy, "Comviva Powers M-wallet Service in Bangladesh", *MobileMarketing*, October 2010, <http://mobilemarketingmagazine.com/content/comviva-powers-m-wallet-service-bangladesh>.



Case 4. The Mahatma Gandhi National Rural Employment Guarantee Act, India

In India, the Mahatma Gandhi National Rural Employment Guarantee Act (MGNREGA) passed in 2005 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 to do 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.

Figure 12. Screenshot of the MGNREGA website



The implementation of this massive programme posed a series of problems, from its management to issues of social accountability and transparency in the system. This led to the use of ICTs to provide an end-to-end 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 to 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 villages across 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.

There are a variety of initiatives throughout Asia⁹⁴ that use ICTs to provide vital linkages between rural communities and the global markets. In Bangladesh, the e-Krishok or e-Farmer offers information and advisory services to farmers.⁹⁵ Similarly, Sri Lanka's eFarms website offers information and training resources to farmers in Sri Lanka in Tamil and Sinhalese.⁹⁶ Another example is the Ningxia ICT Project in China (see case 5).



Case 5. 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 departments such as the West China Electronic Company. The intervention was supported by the Knowledge Networking for Rural Development in the Asia-Pacific Region (ENRAP) ICT for Rural Livelihoods Initiative.⁹⁷

Through the integration of three platforms (telecommunications, TV and the Internet), a new integrated operational platform was created. The Ningxia ICT project consisted of 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.

94 UNDP, *Regional Human Development Report – Promoting ICT for Human Development in Asia*.

95 See e-Krishok, <http://www.ekrishok.com> and Bangladesh Institute of ICT in Development, "e-Krishok", in *WSIS Stocktaking: Success Stories 2011 - Case Studies* (Geneva, ITU, 2011), pp. 43-48, http://groups.itu.int/Portals/30/documents/WSIS/WSIS_ST_Success_Stories_2011_E.pdf.

96 eFarms, <http://www.efarms.lk>.

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

The comprehensive information website provides information on topics such as 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 ICT 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, et. al., "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>.

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.



Case 6. 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. The Ningxia ICT project reported as a case in this primer is an example of an ENRAP-supported project. 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.

ENRAP pursued a participatory and inclusive approach and engaged all stakeholders in decision-making processes. It also promoted knowledge sharing and collaboration through its website. It allowed for interactive database access, posting of documents and photographs in native formats by all users, conducting electronic conferences, and contributing Web pages online.

The effective use of the Internet and electronic communication by project staff and, ultimately, by project communities contributed to the empowerment of rural people and helped them better address their development objectives.

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



Points To Remember

- There is enough evidence to show that there is a direct connection between investment in ICTs and poverty reduction strategies.
- Direct ICT interventions that address poverty reduction link the poor to markets and market information.
- Equally important are indirect ICT interventions that support poverty alleviation programmes.
- Such interventions can be in the form of government programmes, NGO interventions and corporate social responsibility projects of the private sector.



Youth In Action 2. Smallholders Farmers Rural Radio

To develop relevant e-content to improve agricultural production and promote environmental conservation, a Nigerian youth developed the Smallholders Farmers Rural Radio and broadcasts information on agricultural and environmental management techniques, daily market information and farm products. The radio is interactive and invites feedback from listeners through the deployment of interactive radio mobile devices. This is a simple communication system intended to link those off the cellular and electrical grid with the rural radio. The device is small, rugged

and solar-powered. It records user voice input, and then asynchronously forwards voice feedback to the radio station via an ad-hoc delay-tolerant network. Due to the low power footprint, ease of use, and use of wireless connectivity between devices, users do not incur any costs. The project reported to have improved the livelihood of 65 per cent of the listeners, increased farmers' household income from USD 1 to USD 1.50 per day, and restored over 700 hectares of rainforests.

Sources: Smallholders Foundation, "The Smallholders Farmers Rural Radio", http://smallholdersfoundation.org/our_projects.html; and World Summit Youth Award, "The Smallholders Farmers Rural Radio", <http://www.youthaward.org/winners/smallholders-farmers-rural-radio>.



Youth in Action 3. Nahrani.com

To alleviate poverty and hunger, a Bulgarian youngster developed Nahrani.com that involves users in a word game. The food that users donate through playing the word game is provided by the website's advertisers. For them, it is a simple ad; for the people in need it is a hope to overcome their misery.

Sources: Nahrani.com; and World Summit Youth Award, "Nahrani.com - Improve your vocabulary and provide food to people in need", <http://www.youthaward.org/winners/nahranicom-improve-your-vocabulary-and-provide-food-people-need>.

3.2 ICTs in Education

The right to education is well recognized as fundamental, and education is seen as a vital input to addressing issues of poverty, gender equality and health in the MDGs. This has led to an expansion of demand for education at all levels. Given limited education budgets, the opposing demand for increased investment in education against widespread scarcity of resources puts intolerable pressure on many countries' educational systems. Meeting these opposing demands through the traditional expansion of education systems, such as building schools, hiring teachers and equipping schools with adequate educational resources will be impossible in a conventional system of education. ICTs offer alternate solutions for providing access and equity, and for collaborative practices to optimize costs and effectively use resources.

Just as there are different pathways to achieving a country's educational goals, different ICTs have different potentials to contribute to the different aspects of educational development and effective learning. Planning for use necessitates an understanding of the potential of various ICTs to meet different objectives. This understanding affects the choices of technologies and the modalities of their use.

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 (see figure 13).⁹⁸

Decision makers and teachers, who were earlier very skeptical, now want to know how this innovation will increase access to educational opportunities, what the costs are and what impact there will be on the key issues plaguing developing countries' attempts to address educational

⁹⁸ In 1997, Singapore launched a Master Plan for IT in Education. This has led to a highly successful and innovative ICT for education programme with four specific pillars: curriculum and assessment; learning resources; human resource development; and physical and technological infrastructure.

issues related to access, equity, resources and quality. Generally, access and equity are enabled by extending reach, while quality of digital content remains the same irrespective of time and distance, and ICT-based systems are cost effective in the long run.

Figure 13. ICT usage in Singapore⁹⁹

In 1997, Singapore launched a Masterplan for IT in Education (MPITE) was initiated to:

- enhance linkage between schools and the surrounding world
- generate innovative processes in education
- enhance creative thinking, lifelong learning and social responsibility
- promote management excellence in the education system.

This has led to a highly successful and innovative ICT for Education program, based on four key dimensions:

- 1. Curriculum and Assessment**
Focusing on achieving a better balance between skills and knowledge, encouraging pupils to engage in independent learning and including assessment modes that include information, thinking and communication.
- 2. Learning Resources**
Emphasizing the development of appropriate educational software, facilitating use of relevant internet resources, and providing effective procurement systems.
- 3. Human Resource Development**
Training every teacher and trainee teacher in the appropriate use of ICT, and involving partnerships with industry and institutions of higher learning.
- 4. Physical and technological infrastructure**
Providing access to IT in all learning areas of schools, with school networks, a pupil: computer ratio of 2:1 and a teacher: computer ratio of 2:1.

See <http://www.moe.gov.sg/edumall/mpile/overview/index.html>, accessed 6th May 2005.

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 resources 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.

Figure 14. The opportunities and benefits of using ICTs in education

Opportunities	Benefits
Access to high quality learning materials irrespective of location	Learning material developed anywhere accessible anywhere
Connectivity between learners	Collaborative learning
Interactivity	Networked ICTs allow interactivity between learners, teachers and learners
Remove spatial constraints	Distance, isolation is no longer a determinant of quality or cost of learning
Management of learning	Admissions, assessment, and certification can be organized lowering costs of educational management

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”¹⁰⁰ available as open educational resources;¹⁰¹ 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.

99 Tim Unwin, “Capacity Building and Management in ICT for Education”, in *Monitoring and Evaluation of ICT in Education Projects: A Handbook for Developing Countries*, Daniel A. Wagner, et. al. (Washington, D.C., infoDev / World Bank, 2005), p. 50, <http://www.infodev.org/en/Publication.9.html>.

100 A learning object is a resource, usually digital and web based, that can be used and reused to support learning.

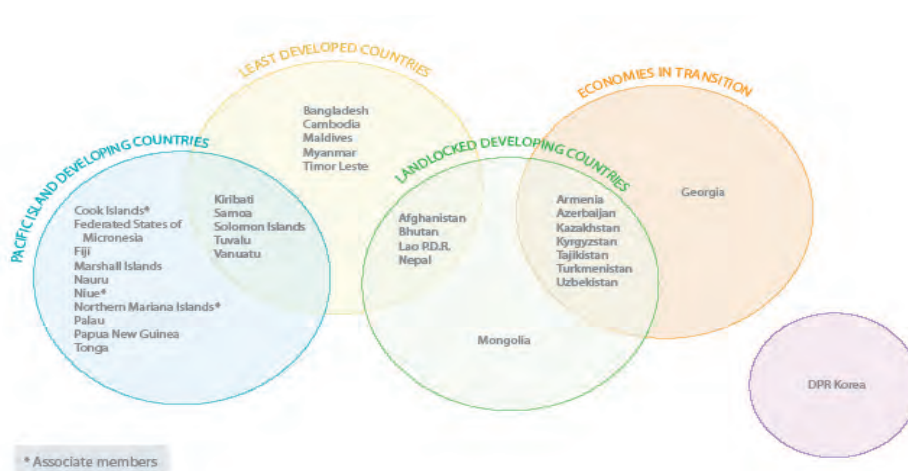
101 Open educational resources are digitized materials offered freely and openly for educators, students and self-learners to use and reuse for teaching. See http://en.wikipedia.org/wiki/Open_educational_resources.

This section 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. 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.

ICTs in Formal Education

A UNESCO study¹⁰² categorized the Asian countries into three broad groupings based on the level of integration of ICTs into the education systems. Advanced countries with integrated ICT in the education system included Australia, the Republic of Korea and Singapore. In these countries, almost all classrooms are equipped with computers and other ICT tools; student computer ratio is high; Internet access is available; curriculum reform and revision has taken place; and delivery of education is increasingly online. A second grouping, which includes countries such as China, India, Japan, Malaysia, the Philippines and Thailand, are those where various ICT integration policies have been formulated but ICTs are not fully integrated into the systems. The third and last group of countries, for example Bhutan and Nepal, is where work has just begun and pilot projects are running, but much work still needs to be done; and it is also where ICT infrastructure and penetration are still limited. Most of the ESCAP high priority countries¹⁰³ (landlocked developing countries, least developed countries, economies in transition, and the Pacific Island developing countries) would come under the third grouping where there is an urgency to look at models that have a potential to succeed in addressing ICT for education needs. These high priority countries of the Asia-Pacific region are listed in figure 15.

Figure 15. ESCAP high priority countries



Source: Usha Rani Vyasulu Reddi, *Module 1: Linkage between ICT Applications and Meaningful Development*, 2nd edition, *Academy of ICT Essentials for Government Leaders* module series (Incheon, UN-APCICT/ESCAP, 2011), <http://www.unapcict.org/academy/>.

To provide education for all, and reduce the deficiencies in quality with limited resources, many developing countries have established open school systems. These systems provide formal education through distance learning methods to out-of-school youths and disadvantaged and poor communities who would otherwise, for financial or social reasons, not be able to access education. The case study of “eSkwela” in the Philippines presented below, is one that best blends the requirements of formal education with the potential that ICTs offer for addressing educational problems.

102 UNESCO, *Integrating ICTs into Education: Lessons Learned* (Bangkok, 2004), <http://www.unescobkk.org/education/ict/online-resources/e-library/elibrary-themes/teaching-and-learning/integrating-icts-lessons-learned-volume-1/>.

103 Goal 8, Target 18 of the MDGs charges the international community with the commitment to address the special needs of landlocked, small island states and the least developed countries.



Case 7. eSkwela, Philippines

Educational data in the Philippines had showed that only 43 per cent of those enrolled in the school system completed high school. This led to the exploration of new and different ways of providing schooling to out-of-school youth.

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.

The initiative responds directly to a national development priority. It brings e-learning opportunities and ICT for learning resources to teachers, instructional managers and out-of-school learners in the Philippines in an exciting, innovative and locally meaningful way.

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.

Partnerships with other government educational systems, universities, NGOs and communities has helped to make education interactive, appealing, relevant, enriching and readily available for Filipino out-of-school youth and adults, with a curriculum that has the enhancement of life skills and lifelong learning skills at its core.

Sources: eSkwela, <http://eskwela-apc-nstp.wikispaces.com/about+the+project>; and 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>.

A similar but smaller experiment in Mongolia revealed what would be major constraints and ground realities that needed to be addressed if ICT use in education would be successful.



Case 8. ICT in education initiative in rural schools in Mongolia

With the aim of providing developing member countries with better guidelines for using ICTs in Education, the project titled the “Innovative Information and Communication Technology in Education and its Potential for Reducing Poverty in Asia and the Pacific Region” was implemented in four countries, including Mongolia. The ICT for Innovating Rural Education in Mongolia Project was supported by ADB.

In Mongolia, 45 schools in rural areas of the country were provided with an equipment package consisting of at least one laptop, one liquid crystal display (LCD) projector and one digital camera. Teachers were given training in the use of the equipment and in the development of electronic teaching materials, including an introduction to integrating ICT into classroom teaching. A set of Mongolian education software titles for the subject matter, for professional development and for teacher productivity were also provided. In cases where electricity was not available, diesel generators were provided.

In summary, various activities were undertaken as part of the project. They included: capacity building for teachers and administrators, equipment procurement, and follow up training interventions.

The impact assessment conducted at the end of the 21-month project indicated that there are indeed differences to be noted on dimensions of teaching quality between schools that participated in the project and those that did not. At the same time, there were physical constraints, such as lack of electricity and lack of Internet access.

Overall, what became clear is that there are a number of drivers and barriers to the effective use of ICTs by teachers to enhance learning. Drivers and barriers exist at the teacher, school, and system level.

Source: Caarmen Strigel, Lkhagvasren Ariunaa, and Sukhbaator Enkhjargal, “ICT in Education Initiatives in Rural Schools in Mongolia”, in *ICT in Teacher Education: Case Studies from the Asia-Pacific Region*, Ellie Meleisea, ed. (Bangkok, UNESCO, 2007), pp. 95-109, http://portal.unesco.org/ci/en/ev.php-URL_ID=25825&URL_DO=DO_TOPIC&URL_SECTION=201.html.

ICTs in Higher Education

The most extensive use of ICTs in education has, however, been in higher education, especially with the establishment of open and distance learning institutions. These institutions are founded on the premise that the physical distance between teachers and learners can be bridged through the development of high quality learning materials delivered to students through various technology tools. Many follow the model of the Open University of the United Kingdom and can be found in all the countries of South, East and South-East Asia and the South Pacific.¹⁰⁴ 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 USP.

¹⁰⁴ The website of the Asian Association of Open Universities lists all the member universities at <http://www.aaou.net>.



Case 9. University of the South Pacific and USPNet

Established in 1968, USP is the only university of its type in the world. It is jointly owned by the governments of 12 island countries: Cook Islands, Fiji, Kiribati, Marshall Islands, Nauru, Niue, Samoa, Solomon Islands, Tokelau, Tonga, Tuvalu and Vanuatu. The university has campuses in all the 12 member countries and is in a region spread across 33 million square kilometres of ocean. The main campus, Laucala, is in Fiji. The Alafua Campus in Samoa is where the School of Agriculture and Food Technology is situated, and the Emalus Campus in Vanuatu is the location for the School of Law. The university also offers programmes through Distance and Flexible Learning in a variety of modes and technologies throughout USP's 15 campuses.

Long before ICTs became a household word in education, USP had operationalized a system of delivering education via a satellite-based two-way audio communication system. The system grew to a modern ICT-based network called the USPNet, a satellite communications network connecting all 12 member countries of USP. Video conferences allow people from several different countries to see and hear each other through a live video feed, and video broadcasts allow one-way transmissions of lectures to the USP Distance Learning Centres.

USPNet is today the USP-owned wide area network incorporating a 5 MHz IP satellite-based technology to deliver and integrate distance learning, and educational and administrative services throughout its 12 member countries.

The university owns and operates this private network, purely for USP use. For USP's distant students and staff, USPNet provides for the opportunity to: participate in interactive audio tutorials (conducted from any campus), communicate by e-mail with lecturers/tutors or other students, access the World Wide Web, access online MIS and banner applications, watch a live video multicast, access multimedia materials via server downloads, and participate in live video conferences (and tutoring) with the Laucala Campus in Suva. The implementation of two-way telephony is being planned for the near future.

The USPNet satellite earth stations are designed with different capabilities to meet the requirements of the university in an efficient way. The "Hub" is at the Laucala Campus in Suva. With a 7.6 metre antenna that has maximum transmit power of 100 watts, it is the master station. The Hub Station is responsible for synchronizing, controlling and allocation of all (outbound) services towards all the remote very small aperture terminals (VSATs) within the whole of USPNet. This is via a 1.9 Mb/s bandwidth pipe allocation from Laucala Campus.

Source: USP, "About the University", http://www.usp.ac.fj/index.php?id=usp_introduction.

The model of the USP, which is that of a consortia arrangement of 12 countries separated by oceans of water, is one to be examined and evaluated more carefully as a model to follow for the landlocked poor countries of Central Asia, for instance. Instead of discussions on very high technology approaches in each individual country, countries could look at Asian models of success or opportunities like the USP and the emerging Virtual University for Small States of the Commonwealth.¹⁰⁵

¹⁰⁵ See Virtual University for Small States of the Commonwealth, <http://www.vussc.info>.

ICTs for Non-formal Education

Experience with using ICTs for non-formal education is extensive in developing countries and the Asia-Pacific region is no exception. Some of the earliest examples of technology applications can be found here. Breaking through traditional constraints of space and time, and with reach extending to the most remote areas, ICT applications for non-formal education have ranged from literacy and basic education to lifelong education and skill enhancement in specialized fields of study, such as continuing medical education.¹⁰⁶

Today, the term non-formal education is an integral part of a lifelong learning concept that allows young people and adults to acquire and maintain the skills and abilities needed to adapt to a continuously changing environment. It goes beyond the provision of basic education and it assumes different dimensions depending on the needs and interests of the learners, reflecting the diversity of their demographic and socio-economic circumstances. For developing countries, however, a more traditional concept of non-formal education still prevails.

For example, literacy programmes have historically involved face-to-face interactions between and among learners and tutors. Other than radio and TV, ICT has not had much applicability because of the lack of resources and infrastructure in the communities where literacy programmes have typically been offered. But there is evidence that this is changing. A case in point is the Tata Group in India that is taking up the challenge to eradicate adult illiteracy through its computer-based functional literacy programme.¹⁰⁷

Figure 16. Computer training in Lao PDR



Source: United Nations Office on Drugs and Crime, Report on the BLO - Computer Based Training (CBT) Workshop, 11-14 May 2009, Vientiane, Lao PDR, http://www.unodc.org/documents/eastasiaandpacific/topics/Illicit_trafficking/BLO-CBT_LAO_PDR_2009.pdf.

The government of the Lao People's Democratic Republic has made technical vocational education and training an economic priority.¹⁰⁸

106 Anita Dighe, Hameed A. Hakeem and Sheldon Shaeffer, "ICTs in non-formal education in Asia Pacific", in *Digital Review of Asia Pacific 2009-2010*, Shahid Akhtar and Patricia Arinto, eds. (New Delhi, Sage, Montréal, Orbicom and Ottawa, IDRC, 2010), p. 59. <http://www.digital-review.org>.

107 Tata Literacy, <http://www.tataliteracy.com>.

108 ADB, "Proposed Grant Lao People's Democratic Republic: Strengthening Technical and Vocational Education and Training Project in Manila", Report and Recommendation of the President to the Board of Directors (June 2010), <http://www.adb.org/Documents/RRPs/LAO/42278/42278-02-lao-rrp.pdf>.

A project in the Solomon Islands is another illustration of the application of ICT in developing literacy skills (in this case, pre-tertiary English and English for all purposes), but in the context of a more specific national development goal. The purpose of the project was to explore the feasibility of using an existing communications network (PFnet) to provide educational opportunities to remote communities. USP established a PFnet gateway base station in the rural community of Sasamungga, Choiseul along with a solar-powered computer centre at the community school. Participants rated the project as very successful and achievements of the distance learners were high. More important, organizational and attitude changes were observed as village leaders came to realize the importance of good leadership in their communities, and staff and administrators at Sasamunga Community High and Primary School now have access to computers.

Finally, while ICTs do offer many beneficial opportunities for education, they are no substitute for formal schooling, even if technology may play a part in meeting the needs of children or adults who, for economic, social, or other reasons, cannot go to a conventional school or class.

ICTs and Teacher Training

If the use of ICTs in formal and non-formal education has a significant impact making education flexible, relevant and effective, its impact upon teachers is great. ICT use calls for a completely new teaching and learning paradigm, one that has to be taken into account at induction and in-service orientation programmes for teachers. Reasons why the context of teaching changes are because first, while there is no substitute for a good teacher, ICTs will make certain teaching resources (static textbooks) obsolete. Second, ICTs will make some forms of assessment redundant. Third, it will become necessary for teachers to encourage critical thinking skills, promote information literacy and accept and integrate collaborative learning practices. Finally, teachers will have to reassess the way in which they meet their students' learning needs.

For all these reasons, teachers need to be empowered to use ICTs so that they can gain the confidence and skills to work in an ICT-driven environment. When large numbers of teachers have to be trained in a short time, the best and most cost effective method would be through the use of ICT-enabled distance education. The success of Singapore's ICT in education effort was largely structured upon 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. The effort was synchronized with the deployment of hardware in schools so that post-training, teachers would use the technology more effectively. After the first round of teacher training, the second phase saw the integration of ICTs into the curriculum as a pre-requisite for the Bachelor of Education programme.¹⁰⁹

Similar efforts are underway in Bangladesh and Nepal where teachers are trained in a range of technologies—from computers to digital cameras.¹¹⁰ Similar initiatives are underway in countries as different as Mongolia, Samoa and Thailand (see case 10). Despite the differences, there is a common recognition that without effective teacher training in the use and application of ICTs as part of a teaching and learning process, a major component of educational reform would be left out.

109 Ellie Meleisea, ed., *ICT in Teacher Education: Case Studies from the Asia-Pacific Region* (Bangkok, UNESCO, 2007), http://portal.unesco.org/ci/en/ev.php-URL_ID=25825&URL_DO=DO_TOPIC&URL_SECTION=201.html.

110 Ibid.



Case 10. Teacher education in Thailand

In Thailand, the Institute for the Promotion of Teaching Science and Technology (IPST) is charged with the mandate of developing a Teacher Professional Development (TPD) programme in support of educational reform.

The TPD contains a component that aims to improve the ICT skills of teachers so as to enable them to use ICTs effectively as tools for teaching. The ultimate goal of the IPST is to improve student learning outcomes; and the pathway chosen is to build up the ICT capacity of teachers through a “training of trainers” approach.

Well-skilled ICT teachers from schools all over the country were recruited to be IPST lead trainers. IPST, in collaboration with university partners, began a series of train-the-trainer workshops for these lead trainers. With this approach, the lead trainers provided training to other teachers both in their own schools and other schools in their areas.

The content of the ICT training courses were frequently revised and updated with respect to content, pedagogical practices and assessment.

In the ten years since the implementation of the programme, the lead trainers became valuable resource persons for the IPST, for the Thai Ministry of Education and other ICT education projects.

Such a sustained effort has played a major role in building teacher capacity in ICTs. However, there remain challenges—that of scaling up to larger numbers of teachers, provision of a support system for teachers, and quality control and evaluation.

Source: Pornpun Waitayangkoon, “ICT Professional Development of Teachers in Thailand: The Lead-Teacher Model”, in *ICT in Teacher Education, Case Studies from the Asia-Pacific Region*, Ellie Meleisea, ed. (Bangkok, UNESCO, 2007), http://portal.unesco.org/ci/en/ev.php-URL_ID=25825&URL_DO=DO_TOPIC&URL_SECTION=201.html.

China, as part of its long-term educational reform and strategy, has incorporated the training of teachers in the use of ICT tools. Standards have been established, digital resources created for teacher support, and teacher training programmes developed. Four areas of training—attitude and awareness; knowledge and skills; implementation and innovation; and social responsibilities—along with precise indicators—have been developed so that teachers can self-assess their progress.¹¹¹

There are many constraints in the integration of ICTs in the education process. Such constraints pale in comparison to the challenges of educational provision—the need to quickly reach the majority of the poor and uneducated rural populations and to find out how to fund, implement and maintain the educational part of the ICT networks. The issues are not merely those of access, but of equity, relevance and local content.

The importance of large-scale reform in educational policies and practices and in the understanding of the role of ICTs in education cannot be stressed enough. Real learning gains and improvement in an educational system will only come when all the elements of educational change, from policies and practices, to teachers and learners come together in a partnership to benefit from the potential offered by the ICTs.

¹¹¹ Ibid.



Youth In Action 4. AIESEC Switch Project

The Switch Project, developed by the Association Internationale des Étudiants en Sciences Économiques et Commerciales (AIESEC), the world's largest student-run organization, is a project that seeks to promote the use of computers in high schools in Cameroon. In order to provide the exposure that high school students are missing out on, AIESEC assembles a team of college students from around the world to act as ICT tutors in Cameroon's secondary institutions, using students to educate students. The main goal of the project is to educate students in their last year of high school and ensure that they have the ability to use computers in their jobs and college life. It is hoped that with this know-how, so essential in the modern day economic system, students will be empowered and able to pursue many opportunities that were hitherto closed to them.

For more details on the Switch Project see <http://www.aiesec.org/cms/aiesec/AI/Africa/CAMEROON/AIESEC%20DOUALA/Pboxes/swITch/>.

For those interested in participating in AIESEC projects visit: <http://www.aiesec.org>.

3.3 ICTs in Gender

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 women and men, and girls and boys are culture bound and may differ from one society to another and from time to time.

Situated within a rights framework, this means that women and men should have equal rights to the benefits of development, to recognition for their contribution to society, and to participation in decision-making processes. Gender disparities have a debilitating effect on overall growth and human development, and unless these are directly addressed, development will simply not take place, whatever the pace.

The fundamental issue from a gender perspective is that economic growth need not necessarily impact on the status of women in a society. Proof of this is that women's issues remain at the forefront of the debate on rights even in the most advanced and developed countries.

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. Because social considerations are not easily incorporated into institutions such as policies, laws, markets and organizations, Goal 3 of the MDGs specifically charges the global community with the task of promoting gender equality and the empowerment of women.

The *Millennium Development Goals Report 2007*¹¹² reported that women's participation in paid non-agricultural employment was increasing slowly, especially in the Asia-Pacific region where women have some presence in the labour market. Women's political participation has also been growing, albeit slowly. Even in countries where previously only men were allowed to stand for political election, women now have a seat in parliament. However, this is no cause

112 DESA, *The Millennium Development Goals Report 2007* (New York, 2007), <http://www.un.org/millenniumgoals/pdf/mdg2007.pdf>.

for complacency. In gross numbers and in global percentages, women remain one of the most deprived and marginalized groups, often without access to education, health, sanitation and income generating activities.

Part of the problem can be traced to the lack of clarity at all levels of decision-making and implementation. A lack of understanding among governments and policymakers of the intersection of gender policy and ICTs can lead to general development policies that are gender blind; ignoring, by omission, the needs, requirements and aspirations of women as a specific target group. For instance, an agriculture department may have been developing plans for the country, but gender is assumed and subsumed in the policy and the importance of gender considerations bypassed with perhaps a sentence or two of mention. If women are the target of the programme, it is necessary that women be specifically identified as the target group in an ICT and gender intervention for there to be any tangible or visible results. "The first step in correcting this situation is to convince national IT policymaking bodies to apply gender as a cross-cutting component in all its policies in much the same way that gender mainstreaming is being implemented by many governments."¹¹³

Two critical pre-requisites for bringing ICT-based economic benefit to as large a group of women as possible are access and engagement with women as active participants in the process by promoting initiatives that include them specifically. Access must be affordable and effective, must be in a woman-friendly and safe physical and social atmosphere, and must be inclusive in drawing in women from both the formal and informal sectors. Engagement with women means they must be active participants in the development of content, must use their knowledge and experience as a basis for improvement, and must establish a real relevance to and evidence of clear economic benefits for them.

At an individual level, ICTs offer possibilities for women to directly engage in e-commerce, access education and e-government, bypassing the socio-cultural barriers that have hindered access to economic advancement. As the education level of women has grown, ICTs have offered employment opportunities, which in turn have created greater empowerment. At a different level, among women's groups, the use of technology has enabled women to collectively organize advocacy campaigns for rights and participation by providing a new communication forum for the expression of their views and to raise 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 factors that can severely restrict a woman's mobility. This lack of mobility can hamper women's ability to benefit from opportunities particularly if she needs to travel some distance to access the developmental programmes, or if the venue of the programme is either unsafe or is at a culturally inappropriate place, or if the time is inconvenient.

Then there are barriers to the availability of technology. While such barriers affect both women and men, it is the rural women who are more adversely affected. In order to ensure the availability of technology, it is necessary to provide access to equipment, access to an adequate communications infrastructure, electricity access, Internet access, and access to technical support that includes the provision of information and repair services to women.

113 Chat Garcia Ramilo in "Information and communication technologies (ICT) and their impact on and use as an instrument for the advancement and empowerment of women", Report from the online conference conducted by the United Nations Division for the Advancement of Women, prepared by Gillian M. Marcelle, 17 June to 19 July 2002, <http://www.un.org/womenwatch/daw/egm/ict2002/reports/Report-online.PDF>.

There are other barriers to women's access to ICTs, which can be summed up under three major categories: relevancy, availability and usage. The major barrier to the use of ICTs for women is its lack of relevancy to their lives. "Women encounter barriers to the use of ICTs when the content is not directly relevant to their livelihood, and when it does not value their knowledge, wisdom and experience. Unless the content delivered by ICT has a direct impact on women's lives, they will not perceive the need and benefits of ICTs. A large number of research studies have corroborated the above research findings."¹¹⁴

According to a Swedish International Development Agency (SIDA) study¹¹⁵ there are a number of areas where ICTs have helped to alleviate poverty. However, most ICT projects have focused on the "poor" as a general category without necessarily paying attention to issues of women.¹¹⁶ As a consequence, the benefits of the projects have not reached women.

Another barrier to overcome is the lack of knowledge of how to access the benefits of ICTs. The best known example of a direct ICT intervention that has helped women obtain and sustain a livelihood is Bangladesh's Grameen Phone.¹¹⁷ While Grameen Phone has sometimes been criticized for having used an older generation of mobile technology, it nevertheless treads a new path; especially if one argues that the "newness" or "oldness" of a technology is to be seen within a context where nothing existed before.

There are other efforts in the world that address women's needs directly. Traditional means are sometimes the best to overcome this barrier. In Sri Lanka, the Siyath Foundation¹¹⁸ provides educational and income generating information to women by downloading information from the Internet, translating it into Sinhala and distributing it throughout the island by post or fax. Other women's groups such as the Centre for Women's Research in Sri Lanka are using ICTs more extensively for training and as tools for women's education.¹¹⁹

114 Sophia Huyer and Swati Mitter, *ICTs, Globalization and Poverty Reduction: Gender Dimensions of the Knowledge Society* (Mimeo, 2005), <http://unpan1.un.org/intradoc/groups/public/documents/unpan/unpan037351.pdf>.

115 Alan Greenberg, "ICTs for Poverty Alleviation: Basic Tool and Enabling Sector" (Stockholm, Swedish International Development Agency, 2005).

116 Anita Dighe and Usha Rani 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.

117 Grameen Phone's Village Phone (VP) Project provides door-to-door telecommunications services to the rural poor in Bangladesh. 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 operator's income is derived from air time charges paid by the customers and a flat service charge. The project has now spread to more than 35,000 villages in 61 out of 64 districts of the country, and has distributed over 150,000 VPs across Bangladesh. Similar projects have been replicated in India and Africa by local organizations in partnership with Grameen Phone. See [NextBillion.net](http://www.nextbillion.net), "Grameen Phone 'Village Phone' project", World Resources Institute, <http://www.nextbillion.net/archive/Grameen-village-phone-bangladesh>.

118 See Siyath Foundation, <http://www.siyath.org/portal/>.

119 UNDP, *Regional Human Development Report – Promoting ICT for Human Development in Asia*, p. 137. (see footnote 91)



Case 11. The Info Lady in Bangladesh

An Info lady is a trained rural young woman who visits households in the villages with a set of ICTs (small portable laptop, digital camera, mobile phone, General Packet Radio Service [GPRS] Internet connectivity, headphone, webcam, and other light equipment such as a weight measurement machine, blood pressure machine, pregnancy test kit, sugar test kit etc.) She listens to the villager's livelihood problems and assists them with preloaded offline Bangla language livelihood and audio-visual content, and with online information from the Web. The Info lady can also arrange remote consultation with livelihood experts, including doctors, lawyers and agriculturists. A poor woman in a village can now discuss her problems and seek advice using modern ICTs. This is empowering both for the Info lady and for the women she attends to.

Women have been chosen for the Info lady initiatives since they have better access to conservative households as well as to those people with handicaps who are unable to come out from their home. By providing ICT access through the Info lady, it is possible to overcome the huge challenge of creating infrastructure and the triple illiteracy of the rural people (illiterate, ICT illiterate and information illiterate). Through this initiative, the Info lady offers a range of services and serves the poor and marginalized at their door steps with low-cost solutions, and earns an adequate amount herself.

The Info lady provides communication services as well; she connects the rural people with their relatives abroad using Internet telephony service providers such as Skype. The Info lady provides health check services to pregnant women, and also guides them on diet suggestions during pregnancy. She supplies contraceptives and hygiene napkins to the rural women who have never visited the market to purchase these goods. Through the services that the Info lady provides and the goods that she sells, she is able to generate a good steady income for herself. As she expands the range of services that she provides, she is also able to increase her earnings.

This is a practical low cost and viable model for connecting rural people and facilitating the creation of knowledge networks in rural Bangladesh. At the same time, it offers new technology-based self-employment opportunity for the educated rural women.

The Infolady initiative requires a tri-partied effort. The parties are: (1) a Lead Agency (D.Net); (2) local hubs; and (3) Infoladies.

Sources: Pallithya, <http://www.pallithya.org.bd>; and the author's review of the project.

This case study shows that access to ICTs in women friendly and safe locations can go a long way in creating an environment where the enabling features of ICTs can have a positive effect.

Once women have access to ICTs, it is also possible to empower women through innovative means. Evidence that ICTs have created new economic opportunities for women can be seen in the large number of women, especially in countries such as India and the Philippines, who have entered the workforce in the ITES sector that includes call centres and help lines.

ICT-enabled economic opportunities such as telework and e-commerce enable women to work from home, and better juggle family responsibilities and work commitments. Such opportunities tend to be more successful when designed, operated and managed by women, as in the case of eHomemakers, Malaysia.



Case 12. Salaam Wanita

Salaam Wanita is an initiative of the pioneering eHomemakers network of Malaysia and is an online community operated and managed by homemakers who, wanting to work from home experimented with ICTs as early as 1998, even though they had been termed a “digitally under-privileged group”. Initially, eHomemakers primarily addressed the needs of Malaysian women from middle- to low-income groups—women who wanted to and needed to stay at home to look after their children but also needed to be economically self-sufficient. Much of the preliminary work of planning, designing, and executing the effort was done by women volunteers who had similar needs. In a short period of a few years, eHomemakers enjoyed both financial success and recognition.

Figure 17. Examples of baskets created by Salaam Wanita homemakers



Source: Just Marketing Eco-Basket Project, <http://www.justmarketing.info/index.asp?p=/static/photo-gallery-exhibitions.html>.

Since receiving a government grant, a pilot project entitled “Salaam Wanita” was launched to address the needs of disadvantaged women, among them vulnerable groups like the abused, disabled, chronically ill, 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.

Expanding access to those who were not in a position to access IT-based options, the training was extended in 2003 to include skills-based training such as basket weaving and the baking of cookies. eHomemakers helped the Salaam Wanita members to source bulk orders of the products from private companies.

Recently, an appeal for the donation of mobile phones made through their website brought them forty handsets, which were distributed to Salaam Wanita members. Through a Web-linked service, the women receive SMSes for filling-in orders, which saves them precious resources including time, energy and of course, money. Once their products are ready they message back and the produce gets picked up.

Besides skill training, the women also receive business management training that includes costing their products and handling finances. This has provided the women with a better understanding of how to go about organizing a small business. Since its inception, two hundred women have been trained under this pilot, most of them socially and economically disadvantaged in some way, receiving no support from any quarter, and often abandoned by family. But networking through eHomemakers has turned around the lives of its members, giving them self-confidence and much needed support.

Sources: Rukmini Vemraju, “Empowering Homemakers to Become Homepreneurs: eHomemakers Malaysia”, *EduComm Asia: A Quarterly of the Commonwealth Educational Media Centre for Asia*, Vol. 11, No. 3 (March 2006), pp. 9-11, <http://www.cemca.org/newsletter/mar2006/mar2006.pdf>; and JustMarketing, “JustMarketing: Salaam Wanita Project”, Corpcom Services Sdn. Bhd., <http://www.justmarketing.info>.

ICTs can also facilitate women's participation in government and political affairs by providing a communication platform to exchange opinions, to articulate and aggregate interests, and engage with political leaders particularly about women's issues. Women's advocacy groups can effectively use ICTs to network and connect with each other, and to mobilize public opinion.

The Centre for Women's Research¹²⁰ that 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, in a strife-torn society, women's groups in Sri Lanka have become better connected with similar international groups and activists around the world.

In another pioneering effort, the Women's Networking Support Programme of the Association for Progressive Communications¹²¹ has developed a globally accepted Gender Evaluation Methodology¹²² for use in incorporating gender in development projects and in the evaluation of the extent to which gender considerations have been addressed by programmes and projects.

Figure 18. Female indigenous leaders of the Organization of Indigenous People in Bolivia



Note: Female indigenous leaders of the Organization of Indigenous People in Bolivia receive ICT training to increase their participation in lobbying and decision-making processes.

Source: IICD, "Gender: Africa and Latin America", (Amsterdam, IICD, February 2009).

But there are challenges. Social and cultural attitudes are so deep-rooted, and with a majority of women in rural areas being deprived of education and livelihood skills, it is difficult to imagine how they can harness the full potential of the ICTs. These problems are greater for non-English speakers who must add language difficulty to the irrelevance of content and packaged software that call for skills beyond what they possess. Furthermore, issues of access and affordability make the acquisition of ICT hardware so much more difficult.

Unless key players in national ICT policymaking and implementation integrate gender and women into every aspect of their plans, and target women as a specific group rather than just including them as part of a broader community to be served, visible results from women's use of ICTs will be limited and gender equity especially hard to achieve.

120 See <http://www.cenwor.lk>.

121 See http://www.apcwomen.org/en/about_wnsp.

122 See <http://www.apcwomen.org/gem>.



Youth In Action 5. HARASSmap

HARASSmap, created and maintained by a group of young volunteers, is an SMS system for reporting incidences of sexual harassment in Egypt. This tool gives women a way to anonymously report incidences of sexual harassment as soon as they happen, using a simple text message from their mobile phone. By mapping SMS reports on a public website displaying location and details provided by the victim, the Advocacy Online Map creates a powerful documentation of the extent of the problem. HARASSmap will pinpoint hotspots to increase police presence in high harassment areas. For victims of harassment, HARASSmap's Assistance Information and Referral System provides a list of services. Other projects include community outreach activities, social media awareness and blogging campaigns against sexual harassment. The entire HARASSmap system acts as an advocacy, prevention, and response tool, highlighting the severity and pervasiveness of the problem, as well as offering proactive responses.

Sources: HARASSmap, <http://harassmap.org>; and World Summit Youth Award, "Harassmap", <http://www.youthaward.org/winners/harassmap>.



Youth In Action 6. NextDrop

NextDrop, a project developed by a group of students from the United States, addresses the challenge of unreliable piped water in India where water is only available a few hours at a time. As a result poor households and women in particular, who are often responsible for collecting water, lose significant amounts of time waiting for the water to arrive. NextDrop harnesses the ubiquity of mobile phones in India and dependability of crowdsourcing to provide accurate information on water availability. NextDrop works by relying on utility employees who report when they open city water valves and residents who confirm that the water has begun to flow. Participants receive micro-payments in exchange for calling the NextDrop system when water begins to flow in their locality. NextDrop verifies this information and then pushes announcements to other subscribers nearby.

See NextDrop, <http://nextdrop.org>.

3.4 ICTs in Health

Three of the MDGs directly address issues of health among the poor. Other MDG goals are also relevant since the intersections between poverty, education, gender and health are so blurred they are almost non-existent. It is therefore difficult to look at health in isolation from other goals, but it is equally necessary to segregate it to understand the different stakeholders, and the different kinds of ICT interventions that can be implemented in the area of health.

Key stakeholders in the health sector in need of critical ICT support can be categorized into two groups. The first group is comprised of ordinary people who need health care, especially those people whose access to health services and/or health-related information is limited. This group also includes the poor, vulnerable and marginalized, such as victims of disasters and conflict, as well as persons with disabilities. In short, the first category of ICT-supported health

care beneficiaries includes those for whom the services are intended. A second major group of stakeholders includes the health care providers, comprised of policymakers and government officials working in the area of health, and medical professionals, such as doctors, nurses, care givers at the primary health care level, researchers and health managers.

For the first group, ICT interventions can be direct, linking the patient 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 medical education.

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 satellite, broadband, radio, telephone or other communication technologies. This is the most commonly reported ICT application in health. Telemedicine is often used to connect patients in rural and remote communities to medical specialists in the city. An added advantage is that it is now possible to capture and transmit clinical data from multiple sources to facilitate diagnosis and treatment.

One form of telemedicine is interactive video conferencing where doctors and patients at different sites 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 when there is an acute shortage of medical practitioners.

Pakistan has been running a telemedicine system since 1998,¹²³ which uses a “store and forward” method 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 usually takes about 24 to 48 hours.

Thailand¹²⁴ is among other Asia-Pacific countries to have also developed telemedicine systems. The Trans-Eurasian Information Network 2 is linking hospitals across a region that spans Australia, China, Indonesia, Japan, the Republic of Korea, Malaysia, the Philippines, Singapore, Thailand and Viet Nam, and supports a global community of over 30 million users.¹²⁵ In Afghanistan, an innovative public-private partnership has provided telemedicine services to remote locations (see case 13).



Case 13. Telemedicine in Afghanistan

Roshan, a telecommunications operator in Afghanistan, is expanding its first-of-its-kind telemedicine solution in Afghanistan beyond Kabul to include provincial hospitals. Bamyan Provincial Hospital will be the first provincial medical facility linked to the innovative telemedicine project, which uses broadband technology, wireless video conferencing and digital image transfer to provide hospitals in Afghanistan with real-time access to specialist health care diagnosis, treatment and training expertise from abroad.

Roshan has teamed up with Cisco, the Government of Afghanistan, Aga Khan University Hospital (AKUH) in Karachi, French Medical Institute for Children (FMIC), Aga Khan Health Services, Bamyan Provincial Hospital and other technology suppliers to undertake the project. Launched in 2007, the project already links FMIC in Kabul, Afghanistan to AKUH in Karachi, Pakistan, enabling access to a broad array of radiology expertise provided by AKUH.

123 TelmedPak, <http://www.telmedpak.com/>.

124 PubMed, “The Ministry of Public Health Telemedicine Network of Thailand”, National Center for Biotechnology Information, <http://www.ncbi.nlm.nih.gov/pubmed/11311665>.

125 DANTE Ltd., “TEIN2”, <http://www.tein2.net>.

Applications include the ability to send real-time X-ray, ultrasound and CAT Scans for evaluation. The technology also enables e-learning and learning through video conferencing. The initial service provided is tele-radiology, the electronic transmission of radiological patient images. An average of 40 tele-radiology cases are evaluated monthly between FMIC and AKUH and ongoing training is provided to medical professionals to build capacity. Telemedicine capabilities will gradually be expanded to other rural regions of Afghanistan, to include the use of smart phone and other hand-held devices, and to address different services and procedures including evaluation of tissue samples and the online performance of medical and surgical procedures.

“This project not only represents cooperation between the companies and institutions involved, but is also an important collaborative effort between Afghanistan and Pakistan to address regional healthcare needs,” said Firoz Rasul, president of Aga Khan University. “Telemedicine will dramatically expand the healthcare diagnostic and education of health professionals, who will be accessible to the people of Afghanistan and will allow hospitals across the nation to leverage AKUH’s world-class medical expertise.”

Sources: Wireless Healthcare, “Roshan And Cisco To Take Telemedicine to Afghanistan”, 21 June 2007, <http://www.wirelesshealthcare.co.uk/wh/news/wk25-07-0001.htm>; and Medpedia, “Telemedicine”, <http://wiki.medpedia.com/Telemedicine>.

A report that includes descriptions of various direct telemedicine projects in several Asia-Pacific countries¹²⁶ shows that there are initiatives such as HealthNet in Nepal,¹²⁷ a mobile telemedicine system with multi-communications links for urban and rural areas in Indonesia, and more.

Direct ICT interventions linking doctors to poor patients in rural areas to provide superior quality medical care can have a major effect upon health and health services in a country. Using ICTs to improve the quality of health care education and management of health care administration are 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.¹²⁸ 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 Inter-Network Access to Research Initiative (HINARI) is a global effort to provide support to health professionals and policymakers worldwide (see case 14).

126 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>.

127 Institute of Medicine, Kathmandu, Nepal, “HealthNet Nepal”, <http://www.healthnet.org.np/?p=profile>.

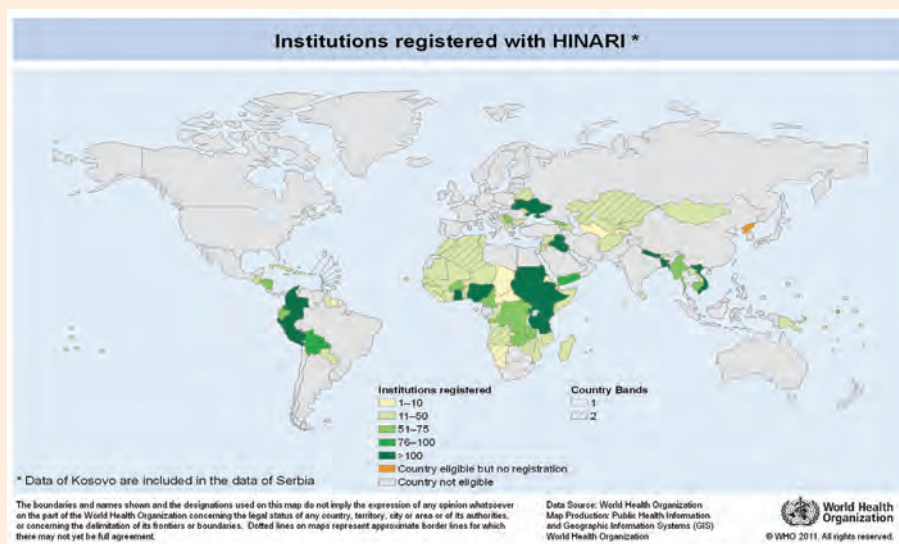
128 MEeRC EduTech Ltd., “SmarTeach”, <http://www.smartteach.com>.



Case 14. Health Inter-Network Access to Research Initiative

HINARI, set up by WHO together with major publishers, enables developing countries to gain 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.

Figure 19. Institutions registered with HINARI



Source: Hinari, <http://www.who.int/hinari/en/>.

Launched by the United Nations Secretary-General in 2000 and led by WHO, the network has brought together public and private partners to provide equitable access to health information. HINARI was created to bridge the digital divide in health and is currently widely available and effectively used by professionals, researchers and policymakers alike.

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

Similar efforts at modernizing hospital and health administration have led to the development of a large number of health administration software, mostly by private corporate hospitals that have taken the lead in this field. These MIS enable the recording and reporting of patient data of individual departments that are then linked into an online intranet system for effective administration. Public health systems in many of the poorest countries of the region are still far behind in their efforts to modernize, hampered by obstacles such as funding, lack of infrastructure and an unsympathetic bureaucracy.

Critical ICT-based surveillance systems for the prevention, reporting and monitoring of diseases such as HIV/AIDS, malaria, tuberculosis and leprosy exist in several countries of Asia.¹²⁹

129 UNDP, *Regional Human Development Report – Promoting ICT for Human Development in Asia*.

An often cited example is that of the Central Asian Epidemiology Service.¹³⁰ 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 the severe acute respiratory syndrome or SARS and the avian flu has been possible only because of ICT-based health surveillance systems.

However, an equal number of countries in Asia 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 strengthen the health support system, maximizing the potential of ICTs in health care may remain a distant dream.



Youth In Action 7. Remote Patient Monitoring System

In using ICTs to improve maternal health care in remote areas, Pakistani youths are engaged in the development of a Remote Patient Monitoring System. It is a low-cost patient monitoring system that provides point-of-care decision support to rural women in Pakistan in order to reduce the alarming rates of maternal and infant mortality. The system gathers the physiological data of pregnant women using wearable medical sensors and transmits them via mobile phones to a remote Web server in a main hospital. The data are stored in an electronic medical database and allows an intelligent clinical decision support system to scan for anomalies. A medical consultant can access the generated inferences on his or her smart phone and give a specialized opinion about the patient.

Sources: Remote Patient Monitoring System with Focus on Antenatal Care, <http://rpms.nexginrc.org/index.aspx>; and World Summit Youth Award, "Remote Patient Monitoring System with Focus on Antenatal Care", <http://www.youthaward.org/winners/remote-patient-monitoring-system-focus-antenatal-care>.

¹³⁰ This is one of the early experiments in using ICTs for health cited by many reports. The project started in 1995 and it is not clear from existing literature whether it is still continuing. It is also not clear how many countries participated in this project. There were some design-reality gaps that stemmed from its largely technical, rather than social-technical orientation. A more detailed analysis of the project is available from: Valeriya Krasnikova and Richard Heeks, "eHealth Case Study No. 7: Design-Reality Gaps - Computerizing a Central Asian Epidemiology Service", eGovernment for Development Information Exchange, University of Manchester's Institute for Development Policy and Management, 19 October 2008, <http://www.egov4dev.org/health/case/epidemiology2.shtml>.



Points To Remember

- The four basic sectors—poverty reduction, education, gender and health—are very closely linked.
- There are two ways in which ICTs have frequently been used when applied to development programmes—ICT driven and ICT supported.
- Applications in agriculture and rural development have often been to provide direct access to market and weather information for the poor, and to provide knowledge support to research and extension services.
- Management information systems for government in project implementation help to improve efficiency and effectiveness in delivering basic services.
- In education, the use of ICTs has been to enhance access and maintain quality standards while ensuring the best use of resources for formal, non-formal and teacher education.
- For women and girls, ICTs offer opportunities for communication to the outside world, home-based e-commerce opportunities, and networking with other women and forming support groups online.
- ICT is also a sector where a large number of women in developing countries have found income generating activities through call centres, etc.
- Telemedicine is the most frequent application of ICTs in the health sector, followed by continuing medical education and improving the quality of research networks.



Practical Exercise

From the existing case studies, it seems clear that the same ICTs can be used for multiple purposes; for instance, to expand access to education, enable collaborative networks among women, and provide access to health care.

Based on the case studies, answer the following questions:

1. Can ICTs be innovatively used in the absence of minimum literacy levels among the poor?
2. How can the same ICTs be used for multiple purposes? What steps are needed to use, say the Internet for meeting the educational and health needs of women in an isolated indigenous community in the forests.
3. Try to locate and discuss any experiment or project where this has been attempted, either in your own country or elsewhere in the world. Prepare a write-up on the case study identifying the following elements: background, a description of the project, the major stakeholders, the challenges faced, the ICTD solution opted for, and lessons learned.
4. Present this case study for a classroom discussion.



Test Yourself

1. The three sets of stakeholders in the ICTD space are:
 - a. Policymakers, service providers and citizens
 - b. IT companies, other businesses and shops
 - c. Regulators, telecommunications service providers and their consumers
 - d. The rural poor, the illiterate and the disadvantaged

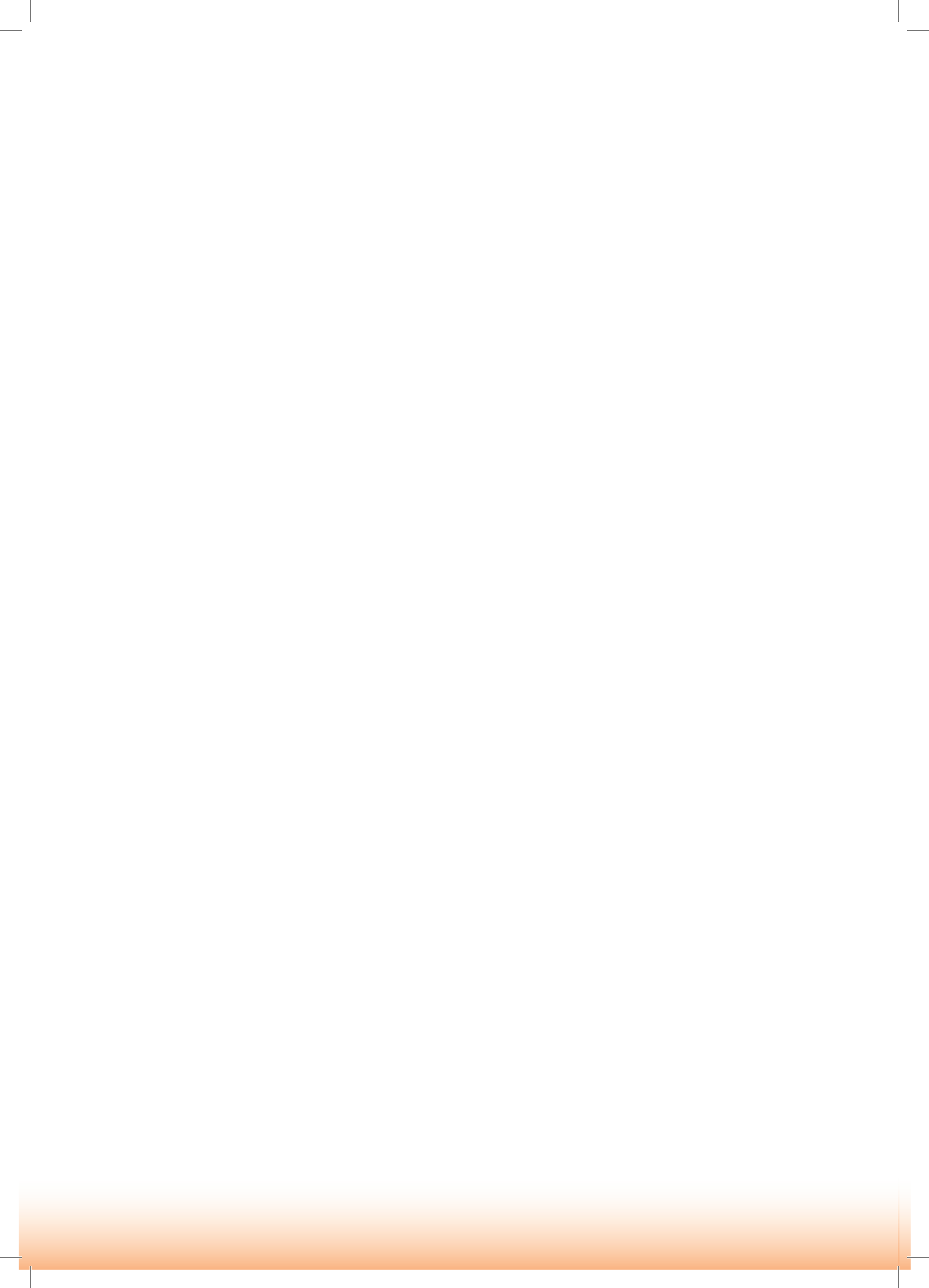
2. A G2C service in agriculture and livelihood could be termed as:
 - a. An indirect ICT intervention
 - b. A direct ICT intervention
 - c. Both
 - d. Neither

3. ICTD education means:
 - a. Creating a pool of human resource to serve the IT industry
 - b. Integrating ICTs in the classroom
 - c. Creating capacities in the use of ICTs for development
 - d. Putting computers in the classrooms

4. ESCAP high priority countries do not include:
 - a. Countries like China, India, Malaysia and Singapore
 - b. Pacific Island states
 - c. Countries emerging from conflicts
 - d. Landlocked states

5. The two most important factors in bringing about ICT-based economic opportunities to women and girls are:
 - a. Teaching women IT skills
 - b. Providing access and promoting the engagement of women as active participants in the ICTD initiative
 - c. Allowing the education system to take care of women's needs
 - d. Creating a women's welfare department in government

6. Telemedicine as an ICT driven intervention:
 - a. Brings patients to the hospital
 - b. Connects patients in a rural and remote area to a doctor in the city
 - c. Provides data to the government about diseases in rural areas
 - d. Provides educational resources to doctors for continuing medical education



CHAPTER 4.

ICTD APPLICATIONS IN SUSTAINABLE DEVELOPMENT

Inequitable distribution of resources and the unbridled exploitation of natural resources and of fossil fuels in particular, have created a global crisis of monumental proportions. A major consequence of such exploitation has been the changes in global climate, including global warming and extreme climate events that are increasingly being felt in various parts of the world. Island states are especially 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 such global change are the poor, irrespective of where they are located, since the scale of global degradation results in the loss of their livelihoods—farming, fishing, and animal husbandry.

This makes it all the more imperative that all stakeholders use existing and new, emerging ICTs as important tools to address sustainable development. Especially so, since the Asia-Pacific developing countries have been identified as: “among the most environmentally vulnerable in the world to climate change... The pressures from high population growth rates in many of the Asia-Pacific and African countries have stressed natural environments (particularly the atoll nations), unsustainable practices in some industries (notably logging), and, in some the additional pressures of coastal-based tourism and development, are continuing to degrade the region’s natural resources.”¹³¹



Youth In Action 8. Make your voice heard at Rio+20 and other international development forums

Facilitated by the Asia Pacific Mountain Network (APMN), Youth Perspectives is one of the many initiatives the United Nations and like-minded organizations are hosting in preparation for the Rio+20 Earth Summit in May 2012 to be held in Rio de Janeiro, Brazil. The initiative consists of a series of conferences, both virtual and conventional, aimed at stimulating thinking about climate change among the world’s youth. Examples of such events include the e-Conference on Sustainable Mountain Development in South-East Asia, the Youth Forum on Climate Actions and Mountain Issues, and the South and Central Asia Regional Virtual Consultation on Youth Perspectives on Rio+20. The strong turnout at these events has recently culminated in the drafting of the Asia Pacific Declaration on Climate Change and Sustainable Development and the Asia Pacific Youth Position Paper on Rio+20, both of which were compiled from the contributions of the participating young people and show the commitment of the next generation to solving climate change.

If you would like to participate in the discussion and become a part of the virtual network for youth on sustainable development visit <http://www.facebook.com/APY.Rioplus20?sk=wall#!/APY.Rioplus20?sk=wall>.

¹³¹ Roert L. Miles, “An Overview of ICT Applications for Sustainable Developing Focusing on Climate Change”, a discussion paper prepared for DESA, November 2009, <http://unpan1.un.org/intradoc/groups/public/documents/un-dpadm/unpan037120.pdf>.

4.1 ICTs in Environment and Climate Change

ICTs have a major role to play in abating the impact of environmental change in general and of climate change in particular; whether through the mapping of natural resources using Geographic Information Systems (GIS), sharing of environmental data, weather monitoring and earth observation from satellites, or directly mitigating the impact of climate change by enhancing energy efficiency and conservation through the use of smart technologies.

Figure 20. Solar panels in Bhutan



Note: The installation of solar panels in Bhutan provides a source of energy for remote areas that lack reliable sources of electricity.

Source: ADB, "Rural Renewable Energy Development Project: Bhutan", <http://pid.adb.org/pid/LoanView.htm?projNo=42252&seqNo=02&typeCd=2&projType=GRNT>.

More specifically, ICTs can be used to:

- Help countries to better monitor, understand and manage the environment and deal with environmental and climate risk to help them adapt to environmental and climate change; and create digital repositories of knowledge resources for information sharing and dissemination
- Reduce material use through dematerialization (using ICTs for travel substitution, replacing brick and mortar goods, and services and stores with online equivalents, etc.)
- Optimize and enhance process efficiency to abate greenhouse gas¹³² emissions while at the same time offering a unique and innovative opportunity to promote environmentally sustainable economic development and growth (Green Growth)¹³³

Developing countries may find it difficult to take advantage of many of these technologies due to prohibitive costs, or because the human capacity is not available. For this reason, strategic planning is needed to determine which technologies and practices could have the greatest impact for development. Strategic planning can also help countries secure the assistance of the international community in facilitating technology transfer through mechanisms such as the United Nations Framework Convention on Climate Change (UNFCCC).

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

¹³² A gas that contributes to the greenhouse effect by absorbing infrared radiation, e.g. carbon dioxide. These gases contribute to the Greenhouse Effect, the phenomenon whereby the earth's atmosphere traps solar radiation, caused by the presence in the atmosphere of gases such as carbon dioxide, water vapor and methane that allow incoming sunlight to pass through but absorb heat radiated back from the earth's surface. See The Free Dictionary, "greenhouse effect", Farlex, Inc., <http://www.thefreedictionary.com/greenhouse+effect>.

¹³³ Richard Labelle, *Briefing Note 10: ICT for Climate Change, Green Growth and Sustainable Development* (UN-APCICT/ESCAP, forthcoming). See also Module 10 of the *Academy of ICT Essentials for Government Leaders* module series.

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 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."¹³⁴ 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. This process is called "abating climate change", and is an essential part of ensuring sustainable development efforts in developing countries.

There are many well documented examples of ICTs being used to successfully address environmental and climate change and their impacts, as for example Tikiwiki in the Pacific Ocean (see case 15).



Case 15. Tikiwiki

The Tikiwiki Geospatial Content Management System (GeoCMS) project 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.

The main component of the project is GeoCMS that facilitates the collection and sharing of geographical data among the stakeholders in the project. The creation of this GeoCMS is a key innovative outcome of the project.

As there was no suitable software available for a GeoCMS at the time the project started, a new GeoCMS application was developed from two existing 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, and open to contributions from all over the world. All this helps in the development and vulnerability reduction of these nations as important information can now be made available more easily as and when needed.

The project was developed by the Secretariat of the Pacific Community Applied Geoscience and Technology Division (formerly named South Pacific Applied Geoscience Commission [SOPAC]).

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

Source: 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/>.

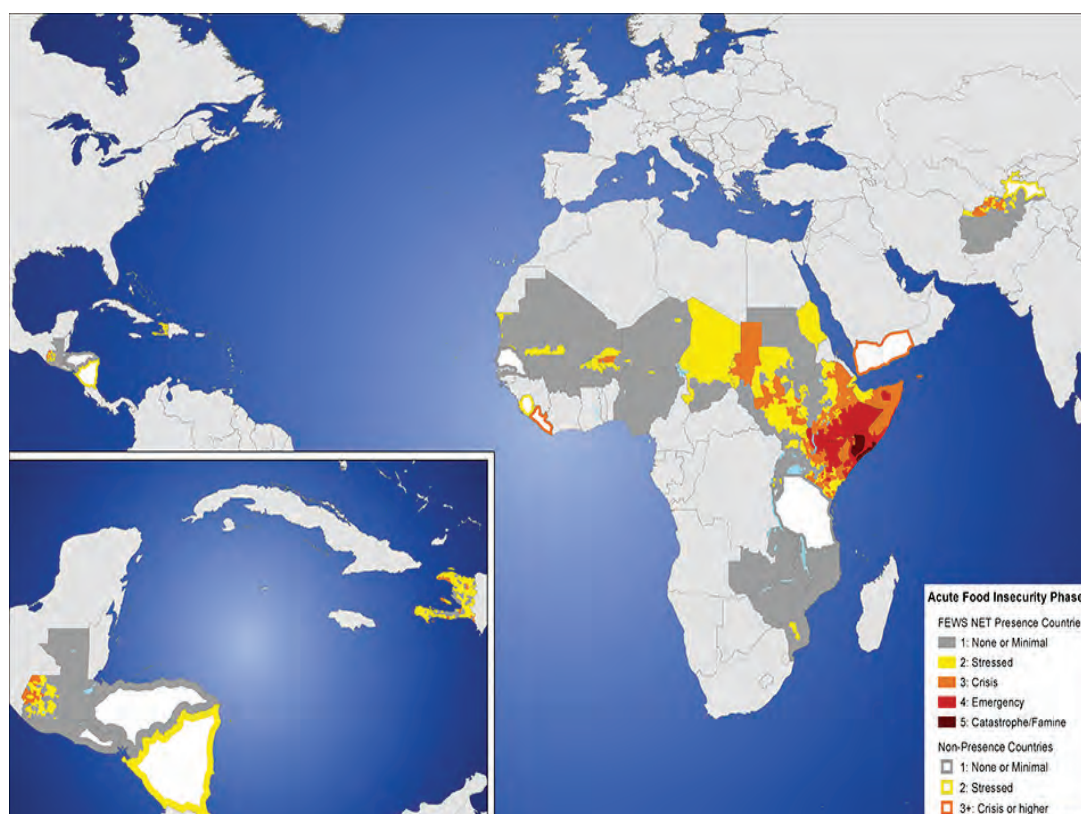
Some of these ICT-based capabilities are present at national levels. In China, the Mobile Interactive Geographic Information System (MIGIS)¹³⁵ is an approach to community-based planning that uses the MIGIS in conjunction with Participatory Rural Appraisal. It is designed to bring the best of indigenous knowledge and scientific information together to optimize planning. MIGIS works by converting to digital format the graphic information gathered through participatory learning and action exercises.

134 UNFCCC, "Full Text of the Convention", http://unfccc.int/essential_background/convention/background/items/1349.php.

135 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.

A system that helps poor farmers adapt to climate change and cope with extreme events is the Famine Early Warning System of the United States Agency for International Development (USAID), which has primarily been implemented in Africa and Latin America. This system has been successfully used since the 1970s to assist small-scale farmers in predicting crop yields in relation to seasonal weather and precipitation trends. It has also been an essential planning tool for government officials and the international community in preparing for drought and famine.¹³⁶

Figure 21. The Famine Early Warning System of the United States Agency for International Development



Source: USAID, "Agro Climatic Monitoring", <http://www.fews.net/Pages/imageryhome.aspx?map=0>.

It is critical that there be a seamless link and partnership between farmers and the farming communities, agricultural and veterinary extension of services, financial institutions, and ICT providers in a win-win situation to reduce the impact of climate change effects on poor communities.

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.¹³⁷

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 footprint¹³⁸ of many development and government sectors by enhancing their energy and material

¹³⁶ Ericsson, "Mobile communications to revolutionize African weather monitoring", press release, 18 June 2009, <http://www.ericsson.com/thecompany/press/releases/2009/06/1323500>.

¹³⁷ ESCAP, "Green Growth", <http://www.greengrowth.org>.

¹³⁸ 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.

use efficiency. In addition, by using “green and cool ICTs”,¹³⁹ countries can reduce the carbon emissions of the ICTs, and thus contribute to climate change abatement.

In the USA, for example, the outdated electricity grid converts only one-third of the total energy it consumes into useful electricity. Smart grid is a next-generation electrical power system that uses ICTs and other technologies to improve reliability, security and efficiency of the electric grid. It is one of the solutions for tackling climate change. It provides consumers with more information and options for choice of energy supply, thus allowing them to better manage energy usage. Additionally, a smart grid can enable the integration of small power producers such that consumers can also become producers of electricity through their rooftop solar panels, for example, and sell excess power to the grid.

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 2007.¹⁴⁰ Replacing heavy energy dependent systems with energy efficient ones, for instance the replacement of PCs 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.

The simple mobile phone is one example of “green and cool” ICT. Ten years ago a single call used 10 Watts of power; today the same call consumes around 1 Watt. Other factors such as the weight of the phone have come down, while the number of features available has increased exponentially. This translates directly to their improvement in eco-efficiency due to less use of hazardous materials.

139 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.

140 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.



Youth In Action 9. What can you do about e-Waste

e-Waste is the improper disposal of computers, mobile phones, televisions, and other electronic goods. This includes dumping and the transfer of products to other countries as second-hand goods without following safety standards. e-Waste has come to be seen as a negative externality accompanying the use of ICTs and poses an increasingly serious challenge to developing and developed countries alike. For example, according to one United Nations Environment Programme (UNEP) report, e-waste from used computers in India in 2020 will be 500 per cent its 2007 level. With the growth of populations worldwide and the proliferation of ICT, this problem will only get worse. It is clear that the promotion of ICTs must be accompanied by a plan for their sustainable use.

The most feasible solution to this problem is a simple system of recycling and reusing cast away electronics. Recycling refers to the processing and separation of a good's essential materials and funneling them back to the production for repeated use in new products. Reusing refers to the act of passing on any unwanted goods as second hand while upholding certain standards of quality and safety, essentially turning one person's trash into another person's treasure. By using these two strategies it is conceivably possible to simultaneously spread the benefits of ICTs more widely and make ICT production and disposal into a closed cycle, obtaining the goal of near zero waste.

In order to see an inspiring example of how a group of young people used these two strategies to combat e-waste visit <http://genvcampaigns.org/2008/11/06/e-waste-recycling/>.

Source: Science Daily, "Hazardous E-Waste Surging in Developing Countries", 23 February 2010, <http://www.sciencedaily.com/releases/2010/02/100222081911.htm>.

4.2 ICTs in Disaster Risk Management

The use of ICTs for disaster management is closely linked to the applications of ICTs in environmental management, and even in poverty reduction strategies. This is because the poor, due to their prior lack of access to financial and other resources are more vulnerable to disasters, whether earthquakes, floods, cyclones and typhoons, or for that matter, tsunamis as was evident from the Indian Ocean tsunami in 2004.

A disaster is defined as "a serious disruption of the functioning of a community or a society involving widespread human, material, economic or environmental losses and impacts, which exceeds the ability of the affected community or society to cope using its own resources."¹⁴¹

According to a United Nations report, countries in Asia and the Pacific are more prone to disasters than those in other parts of the world, with people in the region four times more likely to be affected by natural catastrophe than those in Africa and 25 times more vulnerable than Europeans or North Americans.¹⁴²

¹⁴¹ UNISDR, *2009 UNISDR Terminology on Disaster Risk Reduction* (Geneva, United Nations, 2009), <http://www.unisdr.org/we/inform/terminology>.

¹⁴² ESCAP, "First Asia-Pacific Disaster Report Launched by ESCAP and ISDR in Icheon, Republic of Korea", ESCAP press release, 26 October 2010, <http://www.unescap.org/unis/press/2010/oct/g53.asp>.

The Asia-Pacific is well known for its fast growing economies and rich cultural diversity. But many parts of the region have seen their economic and social development stalled, or even reversed, by natural disasters. The 2004 Indian Ocean tsunami, for example, raised Aceh's poverty rate from 30 to 50 per cent.¹⁴³

Climate change threatens to further magnify the vulnerability of the poor by increasing the frequency and severity of natural disasters. About 40 per cent of the world's climate-related disasters occur in Asia and the Pacific.¹⁴⁴

The application of ICTs can be divided into two broad usages in disaster management. The first set of usage is associated with "knowing the risks", including being aware of them and having access to relevant information on these risks to be able to minimize these risks in a timely manner. ICT applications that are used to enhance information management, forecasting, modeling, monitoring and risk mapping in support of decision-making fall into this category. It also includes ICT applications for teaching and learning, and for raising awareness that are all critical for developing a "culture" of disaster risk reduction, as well as building specific skills set required by disaster managers.

The second area of usage focuses on how best to "manage risks" and disasters by utilizing available ICT tools, including the Internet, phones, television and radio, in alerting communities of impending disasters, in coordinating response and rescue, and in managing mitigation programmes and projects.

Disaster risk management is "the systematic process of using administrative directives, organizations, and operational skills and capacities to implement strategies, policies and improved coping capacities in order to lessen the adverse impacts of hazards and the possibility of disaster."¹⁴⁵ This comprises all forms of activities, including measures to avoid or limit the adverse effects of hazards. ICT applications, particularly computer Web-based digital technologies, are increasingly being used in disaster risk management measures.

The use of ICTs for disaster risk management is not new.¹⁴⁶ Even before a disaster strikes, ICT-based GIS systems,¹⁴⁷ along with remote sensing data, can often identify high risk areas, so that remedial measures may be undertaken to minimize the impacts of a hazard. Disaster risk reduction measures include:

- Land re-zoning
- Demolition of unsafe structures or strengthening them (retrofitting) where possible
- Relocation of at-risk settlements and critical infrastructure to safe land whilst providing access to utilities and services
- Review and updating of land use plans and building codes to reflect changes in risk
- Implementing engineering solutions to address hazards themselves such as the construction of flood embankments, retention walls against landslides, and sea walls against storm surge and tsunamis

143 International Federation of Red Cross and Red Crescent Societies, *World Disasters Report 2009* (Geneva, 2009), <http://www.ifrc.org/publicat/wdr2009/index.asp>.

144 Ibid.

145 UNISDR, *2009 UNISDR Terminology*.

146 See Asian Disaster Preparedness Center, *Module 9: ICT for Disaster Risk Management, Academy of ICT Essentials for Government Leaders* module series (Incheon, UN-APCICT/ESCAP, 2011), <http://www.unapcict.org/academy/>; and UN-APCICT/ESCAP, *ICT for Disaster Risk Reduction*, ICTD Case Study 2 (Incheon, 2010), <http://www.unapcict.org/ecohub/ict-for-disaster-risk-reduction-1>.

147 A geographic information system (GIS) integrates hardware, software and data for capturing, managing, analysing and displaying all forms of geographically referenced information. GIS allows us to view, understand, question, interpret and visualize data in many ways that reveal relationships, patterns and trends in the form of maps, globes, reports and charts.

Computer modeling, database technology, GIS technology and remote sensing assist in collecting and analysing large amounts of data, and convert these into risk information for use in decisions for managing disaster risks.

Since the tragic loss of life that occurred during the 2004 Indian Ocean tsunami, many cities along the Pacific Rim have started designating tsunami hazard zones and planning evacuation routes, and early warning systems are being developed for tsunamis, tropical cyclones, floods, landslides and drought.



Case 16. The Tsunami Early Warning System

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 the Danish International Development Agency (DANIDA), UNDP and USAID. The Asian Disaster Preparedness Center (ADPC), an NGO supporting the advancement of safer communities and sustainable development throughout the Asian region, serves as the regional centre or focal point for the project.

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

The above case study shows that 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. ICTs are ideal in enabling and enhancing these collaborative efforts.

Sentinel Asia¹⁴⁸ 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.

All information processing and communication systems laid out will be tested during a disaster itself. At a time when large areas may be cut off from rescuers and imminent danger is present to large numbers of people, robustness is a critical characteristic for Standard Operating Procedures, contingency plans, communication protocols and disaster management plans. For the survivors and their loved ones, for the emergency responder in the field, and for the disaster managers coordinating efforts from afar, the rapidity and accuracy of the flow of information and decisions will mean the difference between death or life and the quality of that life. Radio and TV, mobile and satellite phones; ham radio sets; SMS systems, e-mails and the Internet—these ICTs all have a role to play in disaster preparedness. At a time of crisis, communication

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

systems not built on terrestrial wired communications can prove invaluable, especially when land-based systems are destroyed.

For example, many emergency communication systems use satellite phones and satellite radios either as back up or one of the means for two-way communication during disasters as these technologies will remain functional when terrestrial networks fail. Satellites are also used to monitor and forecast impending disasters. And when disasters hit an area, satellite imagery is often the only way to view what is happening on the ground. These space-based ICTs are critical to saving lives—they contribute to an effective early warning system, and prompt response and recovery.

More recently, with the growing popularity of Web 2.0 tools, they have been used as a mechanism for the coordination of response and recovery initiatives. Hundreds of blogs emerged in the first few days following the 2004 Indian Ocean tsunami. These were used for providing instantaneous situation reports, information sharing, locating missing persons and fund raising. This trend has been evident in all major disasters following the 2004 Indian Ocean tsunami.

Following Typhoon Ondoy in the Philippines in September 2009, volunteers from the Philippines and across the world came together to provide, organize and disseminate information online through sites such as Facebook, Multiply, Plurk and Twitter. People turned to these sites for up-to-the minute reports regarding what was affected, what was needed, what resources were available, and as aid began arriving spontaneously, what was coming and when. Affected organizations and individuals used the site to post requests for assistance, while volunteers and other individuals and organizations responded with the goods or human resources needed. This was possible because although the storm cut power, telephone and water supply in many areas, Internet connections were generally not affected.¹⁴⁹

Also in the Philippines, what started as an initiative by a local Web developer who volunteered his time to set up a Google Maps page to document flood updates and persons needing rescue was quickly supported by major organizations such as GMA and ABS-CBN news networks, who embedded the map in their respective news sites; and by Google who helped make the page more visible by putting the link to it below the keyword search box at the Google Philippines home page. Google software engineers, staff from the two news networks and willing Filipinos pitched in by improving the capabilities and interface of the map facility. By then, the site had become a central hub of information regarding the latest developments with the relief efforts. Other noteworthy initiatives that have emerged from the typhoon are Rescue InfoHub Central using Google spreadsheet and Bayanihan Online that aggregated relevant tweets from Twitter. This Philippine case has also shown successful examples of online fundraising. PhilippineAid.com and Txtpower.org have raised significant funds for the Philippines National Red Cross.¹⁵⁰



Youth In Action 10. Ushahidi

Ushahidi is an open source platform that combines existing applications such as SMS, Twitter and Google Maps to collect information from sources like text messages, blog posts, videos, phone calls, and pictures, which are then mapped in near real time. It can be used to plot everything from disasters to wars. Unlike older forms of crisis-mapping software, Ushahidi is advanced enough to paint an accurate portrait

149 John Mark V. Tuazon, "Disaster Management 2.0", *Computerworld Philippines*, 6 October 2009, <http://computerworld.com.ph/disaster-management-20/>. See also <http://newsinfo.inquirer.net/inquirerheadlines/nation/view/20090928-227233/Netizens-help-victims-via-social-network-sites>.

150 Christine Apikul, "ICT for Disaster Risk Reduction in Asia and the Pacific: An Overview of Trends, Practices and Lessons", in *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>.

of events while remaining incredibly user-friendly and easy to build on. The end result is a crisis map that provides humanitarian actors on the ground an overview of the situation. Even in a country like Haiti, where technology is sketchy at best, Ushahidi saved countless lives. Ushahidi-Haiti was established two hours after the January 12 earthquake by volunteers based at Tufts University. Soon after, a short code (4636) was created for incoming text messages and spread via local and national radio stations. Witnesses could text information about what they were seeing or experiencing. If the message was actionable, for example: “there are people trapped in a building located on Border and Smith,” then a volunteer would map the GPS coordinates and provide the information to rescue teams on the ground. Often the text messages were in Creole but Ushahidi worked with some 10,000 Haitian-American volunteers across the United States, who translated every text message within 10 minutes.

To get involved with initiatives of Ushahidi, see <http://www.ushahidi.com/get-involved>.

Source: Jessica Ramirez, “‘Ushahidi’ Technology Saves Lives in Haiti and Chile”, Newsweek, 3 March 2010, <http://www.newsweek.com/blogs/techtonic-shifts/2010/03/03/ushahidi-technology-saves-lives-in-haiti-and-chile.html>.

One can work out a comparison of each and every ICT and its effectiveness, and find that each has both advantages and disadvantages to use. And there are many more such efforts to use ICTs to address the consequences of disasters. However, much depends not on the technologies but the use they are put to—the human element that can make the difference between successful use and dismal failure.

As an effort toward capacity building for the preparedness of countries in the Asia-Pacific region, the International Oceanographic Council of UNESCO has brought out “Tsunami Teacher”¹⁵¹ a Web-based learning package for both specialists and lay persons on disaster awareness, prevention, relief and rehabilitation. And there are many more such efforts to use ICTs to address the consequences of disasters. However, much depends not on the technologies but the use they are put to—the human element that can make the difference between successful use and dismal failure.

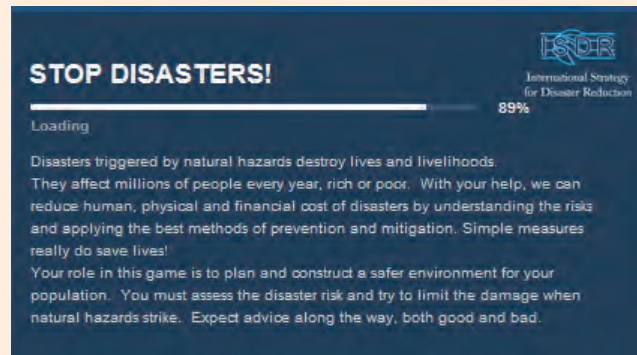
In order to effectively use ICTs for disaster risk management, it is necessary that developing countries make efforts for the collection, aggregation and provision of timely, accurate, reliable and consistent information. Effective use of ICTs depends on the establishment of systems such as a national and cross-border (spatial) data infrastructure and information clearing houses, standardization of the flow of information and protocols, drills and practice, and the establishment of effective collaboration between agencies engaged in disaster risk reduction.

151 Tsunami Teacher, <http://ioc3.unesco.org/TsunamiTeacher/>.



Youth In Action 11. Play the Stop Disasters! game

Figure 22. Screen shot of Stop Disasters! website



UNISDR has an interesting simulation game on its website called *Stop Disasters!* Racing against time and with a limited budget, you will be asked to try to protect lives and property using different risk reduction options against five disaster scenarios: earthquake, flood, hurricane, tsunami and wild fire.

If you are ready to play, go to <http://www.stopdisastersgame.org/en/playgame.html>.

Summary

In recent years, the world has been rocked by a series of environmental disasters ranging from tsunamis and earthquakes to rising sea levels and mean temperatures. Many of the vulnerable countries are in the Asia-Pacific region. There is an increasing awareness that proactive measures have to be taken to minimize the effects of environmental degradation and climate change. Without this, sustainable development cannot take place.

Given that the Asia-Pacific region is also one of the fastest growing in terms of ICT development and deployment, the use of ICT platforms for data analysis, management, information and knowledge sharing and decision support cannot be underestimated. While issues of cost, access, capability, relevant content and technical support will fundamentally determine the success or failure of this mechanism to ensure sustainable development, it is clear from existing experience that ICTs have the capacity to provide a major opportunity to address environmental and climate change issues.

The value of ICT as a platform for information and knowledge sharing is demonstrated by many successful case studies and these highlight the potential of this enabling technology.



Practical Exercise

Draw two columns.

In the left hand column, list, in a descending order of priority, the major environmental concerns that face your country. Make a second list of the potential natural disasters (earthquakes, landslides, hurricanes, floods, tsunamis, etc.) that your country is vulnerable to.

In the right hand column, list, in a descending order of priority, solutions that you would offer to address the environmental and disaster challenges. These solutions could be at a national, regional, city, community and even individual level.

Having made these two lists, and having read the material in the previous three sections, draw another table with three columns. In the left hand column, list the ICTD interventions that would be useful in implementing the solutions for each of the challenges (environment and disaster) that you would suggest. In the middle column, match the direct ICTD intervention with the challenge. In the right hand column, match the ICTD intervention and the challenge with the group of stakeholders you consider should be involved in implementing the ICTD solution.

What do you find? Assisted by your professor, discuss the various challenges and ICTD options with your classmates.

Now come out with a consolidated list of challenges, ICTD interventions and stakeholders.



Test Yourself

1. In time of disasters, which ICTs have advantages for communicating to the outside world?
 - a. Fixed line phones
 - b. Television
 - c. Mobile and wireless systems
 - d. Newspapers and other print media
2. GIS stands for:
 - a. Government information systems
 - b. Geographic information systems
 - c. Growth indicators and systems
 - d. Government internal systems
3. Green ICTs refer to:
 - a. Using renewable energy resources for providing more efficient and safe power to computers
 - b. Using ICTs that produce comparatively low levels of carbon emissions
 - c. Reducing the effect of hazardous computer junk by recycling
 - d. All of the above

4. Reducing the dependence upon fossil fuels would go a long way in reducing the effects of:
 - a. Greenhouse gases
 - b. Carbon dioxide emissions
 - c. Climate change upon small island communities
 - d. All of the above

5. Sustainable development is:
 - a. A high growth rate that reduces the number of people living in poverty
 - b. Increasing the use of green ICTs
 - c. Pattern of resource use, that aims to meet human needs while preserving the environment
 - d. Where both the poor and the rich grow together



CHAPTER 5.

ICTD APPLICATIONS IN GOVERNANCE AND PEACE

A number of studies have proven the positive correlation between governance and growth. Kaufmann and others¹⁵² have shown how “per capita incomes and the quality of governance are strongly positively correlated across countries.” Similar findings have also emerged from studies done by the Asian Development Bank Institute.¹⁵³

Most major international donors and developing country governments now recognize that stable government with well-managed public institutions are essential for the improvement of the living conditions of the poor and to combat poverty. There is ample evidence from several countries that demonstrates 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 a growing recognition 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. For governments, even the process of revenue collection and management becomes simpler with good governance.

5.1 e-Government and e-Governance

The two terms, “e-government” and “e-governance” are often used interchangeably in discussions of how governments are managing their relationships with the citizenry through the different applications of ICTs. 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 and land records. 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. And e-governance can evolve into participatory governance if it is well supported with the appropriate principles, objectives, programmes and architectures.¹⁵⁴

Some countries in the Asia-Pacific region such as Hong Kong, Japan, the Republic of Korea and Singapore rank very highly on the e-Readiness Index¹⁵⁵ and already have sophisticated e-government mechanisms. In these countries, much of the business of governments is carried out electronically. Module 3 of the *Academy of ICT Essentials for Government Leaders* module series, provides a detailed exploration of the way in which the Korean government has transformed itself by using ICTs. The module gives an overview of e-government, including key elements and concepts, principles and types of applications. It discusses how an e-government system is built by providing detailed analysis of exemplar systems and identifying design considerations.

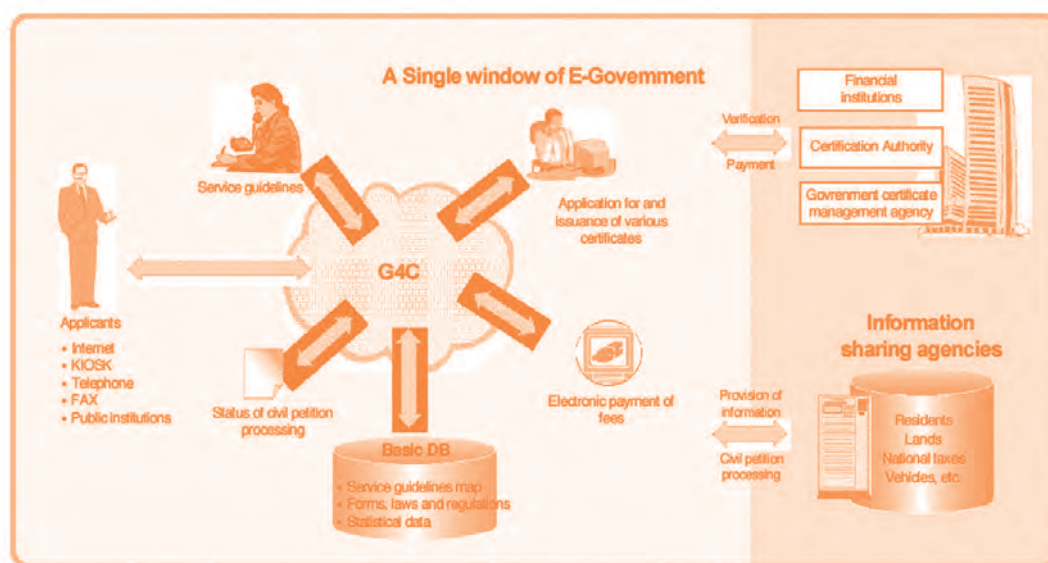
152 Daniel Kaufmann and Aart Kraay, *Governance and Growth: Causality which way? - Evidence for the World, in brief* (Washington, D.C., World Bank Institute, 2003), p. 1, http://www.worldbank.org/wbi/governance/pdf/growthgov_synth.pdf.

153 Dilip Kumar Roy, “Governance, Competitiveness and Growth: The Challenges for Bangladesh”, ADB Institute Discussion Paper No. 53, August 2006, <http://www.adbi.org/files/2006.08.dp53.governance.competitiveness.growth.bangladesh.pdf>.

154 Thomas B. Riley, *E-Government vs. E-Governance: Examining The Differences In A Changing Public Sector Climate*, International Tracking Survey Report, No. 4 (London, Commonwealth Secretariat, 2003).

155 e-Readiness is the ability to use ICTs to develop one’s economy and to foster one’s welfare. An e-Readiness Index is a tool to measure the capacity of a population to use ICTs by looking at how many people have the necessary skills and by identifying how ICTs are currently used. See <http://en.wikipedia.org/wiki/E-readiness>.

Figure 23. Single-window e-Government



Source: NCA, e-Government in Korea (Seoul, 2002), p. 39, <http://unpan1.un.org/intradoc/groups/public/documents/APCITY/UNPAN023903.pdf>

On the other hand, countries such as Pakistan and Mongolia rank low on the e-readiness index and have few e-government applications in place. An overview of e-governance applications in the Asia-Pacific region would indicate that most of the countries are just at the beginning of the process and only a few government services are computerized.¹⁵⁶

Bhatnagar in his review of 20 e-governance interventions in the Asia-Pacific region, states that:

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. 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 private sector and build [public-private partnerships] 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.¹⁵⁷

It is surprising that despite the low penetration of Internet in most of the countries, the popular ICT-based service delivery model is through an online Web portal. 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.

¹⁵⁶ Subhash Bhatnagar, *Paving the Road towards Pro-poor e-Governance: Findings and Observations from Asia-Pacific Case Studies* (Bangkok, UNDP, 2006), <http://www.apdip.net/projects/e-government/capblg/casestudies/Overview.pdf>.

¹⁵⁷ Ibid., p. 2.

Some of the best known of these services are the Computer-Aided Administration of Registration Department (CARD), Bhoomi's online delivery and management of land records, and e-Seva project to provide integrated G2C services. The citizen grievance redressal mechanism, State Wide Attention on Grievances by Application of Technology (SWAGAT), in Gujarat, India reported in case 18 is another example.

Figure 24. A rural Internet kiosk in Africa



Source: Crystal Watley Kigoni, "Rural Internet Kiosk Documentary", GAID, 16 November 2009, <http://un-gaid.ning.com/profiles/blogs/rural-internet-kiosk>.

In Mongolia, the Mongolian Taxation Authority documented the problems in bringing e-government to the poor. Some of these included infrastructure and connectivity, language and illiteracy, human capacity within governments to perform different tasks, stimulating weak demand, top-down planning and administration, choosing the right ICTs, and lack of effective monitoring and evaluation frameworks (see case 17).

Other e-government applications in the Asia-Pacific region are in various stages of planning and implementation. In Cambodia, for example, the Government Information Administration System was established to improve the quality of resident, land and vehicle registrations, put in place an electronic approval system, improve administrative services and generate revenue for the government. A subsequent project, the Provincial Administration Information System was developed to extend this model to 10 provinces with more than 160 organizations nationwide, rolling out the applications and providing e-mail, Internet access and VoIP services to all connected organizations

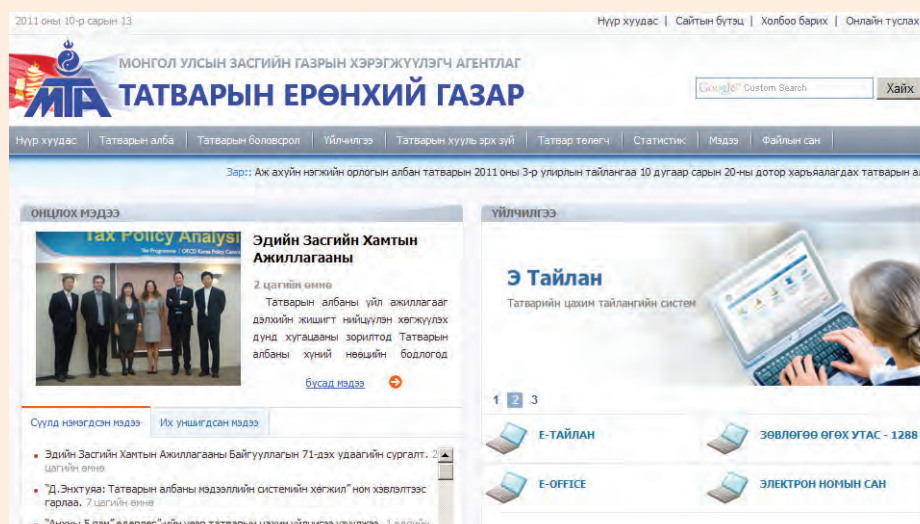


Case 17. Mongolian Tax Authority

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.

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. The rest without access risk being left behind. One way to address the access issue is via Internet and information centres.

Figure 25. Screenshot of Mongolian Taxation Authority website



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

In another example of improving governance, a legal information system called “AZ-LIS” has been established in Azerbaijan with the support from USAID.¹⁵⁸ The system makes the entire body of Azerbaijan’s governing law available to the public. End-users can access the database, both over the Internet and on CD-ROMs. The system is searchable over a user-friendly interface. The project, now operational and under the Ministry of Justice, includes both database development as well as extensive capacity building of personnel involved in the maintenance of the database. Lessons learned from this project are important because they demonstrate the criticality of completeness and accuracy of information as an essential precondition to success. A convenient and reliable access to a country’s laws is essential for development.

Both China and Thailand have taken steps to develop e-government programmes that address the needs of the vulnerable and the poor. An interesting initiative called One Tambon, One Product or OTOP for promoting e-commerce in rural areas of Thailand has not been very successful in the absence of other inputs such as design and the lack of logistic facilities to

158 Charles E. Shapiro and Kenneth A. Yates, “Establishing A Sustainable Legal Information System In Azerbaijan: A Case Study”, *The Electronic Journal of Information Systems in Developing Countries*, Vol. 46, No. 2 pp. 1-33 (2011), <http://www.ejsdc.org>.

move products to markets. Although the temptation to use ICTs is very great, it is sometimes necessary to use other technologies and to understand supporting interventions to exploit the full potential of ICTs. In China, video conference technology to interview migrant workers is an innovative idea that saves costs and wage loss for the poor. The Chinese application puts the social problem rather than the technology first when looking for a solution.

The e-government applications briefly described above are examples of G2C services, which focus on the supply side—to improve internal deficiencies and quality of service provision. 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 focused on interactions with citizens and businesses to achieve development goals.

5.2 ICTs, Citizen Engagement and Social Accountability

e-Governance services involve the interaction between the citizens and the democratic processes such as online public hearings, electronic voting, feedback systems, complaint registration, signature campaigns and participation in decision-making.

In terms of actors and relationships, e-governance is using ICT to create “a wealth of new digital connections”:

- Connections within government – permitting “joined-up thinking”
- Connections between government and NGOs/citizens – strengthening accountability
- Connections between government and business/citizens – transforming service delivery
- Connections within and between NGOs – supporting learning and concerted action
- Connections within and between communities – building social and economic development¹⁵⁹

e-Governance (government to citizen engagement) is one of the most effective ways of combating corruption in a society. Electronic voting can dramatically change the results in elections as the extent of electoral corruption is curbed. Public access to information enables citizens to engage with issues; when this is done online, it expedites the process of citizen participation. When all government procedures and processes are available for public scrutiny online, institutions such as media, citizen groups and civil society organizations can engage in discussion and even serve as watchdogs for government action or inaction.



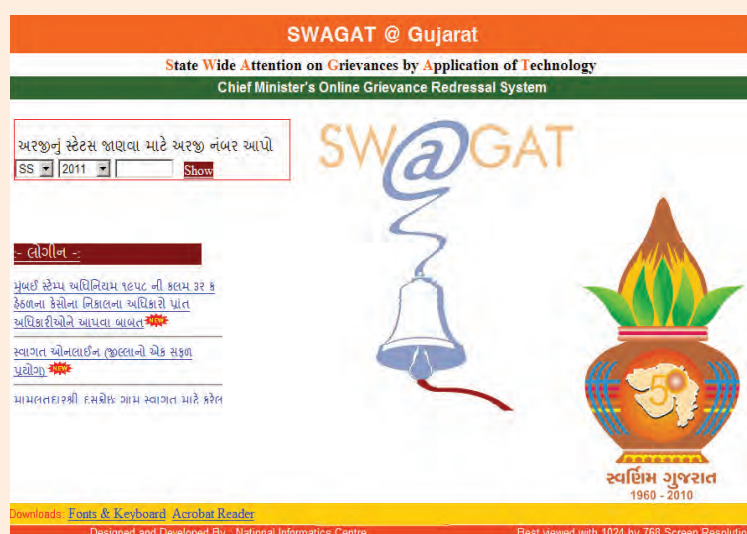
Case 18. Statewide Attention on Grievances by Application of Technology (SWAGAT), Gujarat, India

SWAGAT is an online grievance redressal mechanism, pioneered by the Government of Gujarat. Prior to implementing SWAGAT, the Gujarat government had experimented with a Grievance Cell in 1998 with little success. The grievance cell is a place that is part of every department where citizens can go to for their complaints. However, most grievance cells in the government were non-functional. The idea was that on a particular day of each month (SWAGAT day) citizens could air their grievances, which would be resolved within a fixed time and in some cases with the direct intervention of the Chief Minister.

¹⁵⁹ Richard Heeks, “Understanding e-Governance for Development”, iGovernment Working Paper Series Paper No. 11, Institute for Development Policy and Management, University of Manchester, 2001, p. 2, http://www.sed.manchester.ac.uk/idpm/research/publications/wp/igovernment/documents/igov_wp11.pdf.

With SWAGAT, the system is based on an ICT platform to speed up the information flow reduce the cost of the service, as a manual system would involve transportation of the physical files and so forth.

Figure 26. Screenshot of SWAGAT website



An independent evaluation through field visits reveals that the system is working well, possibly because of the involvement of the Chief Minister as the local champion.

Sources: SWAGAT, <http://swagat.guj.nic.in>; and expert evaluation carried out by Administrative Staff College of India, Hyderabad.

e-Procurement

The introduction of automated procurement systems reduces human intervention, ensures objectivity, brings transparency, increases efficiency and standardizes the tendering process. Removing supplier and buyer interaction during pre-bidding and post-bidding stages ensures anonymity and objectivity in the receipt and evaluation of tenders, and significantly curbs opportunities for corruption. To ensure transparency, tender documents containing all details are hosted on a website and can be downloaded by interested suppliers free of cost, from the day of publication of a tender. At any time in the tender process, an e-procurement system generally allows a bidder access to all necessary information, including names and details of competing suppliers, price quotations, evaluation results and action taken by the concerned government agency.

In both India and the Philippines, implementation of the new automated system has vastly improved the procurement process, reducing inefficiencies and opportunities for corrupt practices, increasing transparency, and consequently public trust in the system. By standardizing the procedures and making all information accessible, the process is open to scrutiny by the public. Crucially, it has also improved the government's capability to manage their procurement, and therefore improved their capacity to deliver public services.¹⁶⁰

160 K. Bikshapathi, P. RamaRaju and Subhash Bhatnagar, "E-Procurement in Government of Andhra Pradesh, India", The World Bank, 30 March 2006, <http://go.worldbank.org/W7W2AC3GS0>; and see India's e-procurement system, <http://www.eprocurement.gov.in> and the Philippines e-procurement system, <http://www.philgeps.net>.

Overall, 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 services. The websites can promote online discussions and online voting on specific issues so that decision-making is more participatory. The websites can also help concerned agencies track public grievances and respond to citizen complaints and issues more effectively. 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.

Citizens, in turn, can interact with both public leaders and government officials; draw attention of public issues to the officialdom; 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.

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

5.3 ICTs and Peace¹⁶¹

One of the most important features of the digital age is the use of new ICTs to build digital citizenships—“netizens” as digital citizens are sometimes called. Cultural differences could be a source of conflict that affects the use of new media to make powerful collaborations among online communities across societies, and within the same society. The Arab Spring of 2011 is sometimes referred to as an ICT-enabled expression of people’s expectations from their rulers.¹⁶² ICTs were not the cause, but when conditions existed, ICTs were effectively used by Internet savvy citizens to mobilize support.

The present century is one of information and knowledge. The use of ICTs for the creation of terror and conflict¹⁶³ has to be combated with the same “weapons”—using ICTs for protecting humanity from such abuses and for peacebuilding efforts.

ICT for Peace¹⁶⁴ is a new and emerging area of engagement and is very broadly defined at present. It includes the varying types of activity that are carried out in relation to armed conflict, including conflict prevention and management, peace operations, humanitarian relief and disaster assistance, and post-conflict peacebuilding and reconstruction.

Looking at how ICTs have been used globally for peace, one comes across a variety of initiatives on a continuum of peace and conflict related activities. They range from pre-conflict activities such as early warning systems and field operations in support of peacekeeping; and activities for post-conflict reconstruction and consensus building.

Although humans will always be at the centre of analysing information and data relating to peace, ICTs can assist in building early warning systems. A number of initiatives have built on this to improve early warning and provide access to timely information.

161 This section is drawn from the publication: Daniel Stauffacher et al., *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>.

162 Rohan Samarajiva, “ICTs & the Arab Spring”, LIRNEasia, presentation made in Colombo on 3 May 2011, http://lirneasia.net/wp-content/uploads/2011/05/SLPI_May11.pdf.

163 There is sufficient evidence in the public domain to show that ICTs, especially GPS and mobile telephony, were used extensively during the terror attack on Mumbai in November 2008.

164 For more information see ICT for Peace Foundation’s website at <http://ict4peace.org>.

ReliefWeb,¹⁶⁵ a service of the United Nations Office for the Coordination of Humanitarian Affairs (OCHA), is the 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.

Figure 27. Screenshot of ReliefWeb’s homepage



Source: ReliefWeb, <http://reliefweb.int/>.

OCHA also manages the Integrated Regional Information Network (IRIN),¹⁶⁶ an independent news service reporting on humanitarian crises. IRIN produces updates, analysis and alerts on developments in about 70 countries. The information is drawn from (and provided to) a network of United Nations agencies, NGOs and international organizations, national authorities, donors, human rights organizations, political parties, regional institutions, churches, academia, businesses and the media.

Initiatives for ICT-enabled early warning outside of the United Nations system include Alertnet,¹⁶⁷ a project of the Reuters Foundation that focuses on rapidly developing humanitarian emergencies and on early warning of future emergencies.

There are a large number of players actively involved in the implementation of various aspects of peacekeeping during conflict situations. High profile operations such as Afghanistan attract a large number of NGOs. There is an essential need for the coordination of activities to fill gaps and avoid duplication of efforts. Managing operations in such conditions of conflict is a complex business involving the sensitive areas of military-civilian coordination and the management of differences in vision and mandates of different organizations. This very complexity increases the need for more widespread use of ICTs. Modern humanitarian operations have been made possible by ICTs, and it is now difficult to imagine an operation without that technology.

As conflict seems to end, attention turns to the more complex processes of reconstruction. Without basic security, it can be difficult to promote social reconciliation, establish the rule of law or a government capable of providing services, and encourage economic activity. Physical

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

166 IRIN, <http://www.irinnews.org>.

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

reconstruction must move alongside social reconstruction and reconciliation, which must take place without creating situations that might cause new conflicts. Reliable information dissemination may allow the reconstruction and reconciliation to avoid such pitfalls.

Post-conflict reconstruction is a challenge to the international community, particularly when combined with a nation-building mandate, such as in Timor-Leste, where the United Nations Security Council devised a unique mandate. For the first time in history, it took total control of a country, with all executive, legislative, judicial and even military power vested in its appointed administrator, who ran everything from the power stations and fire departments to radio, TV, and a United Nations newspaper.

ICTs have the potential to enhance post-conflict reconstruction processes, although that potential has barely been tapped. For example, effective communication can disseminate the terms of a cease-fire agreement to warring factions and local communities, clarifying the situation and building support; or raise awareness of war crimes tribunals or truth commissions, increasing common understanding of the processes necessary to support the rule of law. ICT should also be a focus area for reconstruction, since basic ICT is essential for the management of a modern state. After an immediate post-conflict situation when ICTs can be used for short-term purposes, the role of ICTs cannot be differentiated from their larger role in the development process. Longer term development needs meaningful deployment of ICTs.

ICT-based information campaigns to promote reconciliation can take many forms—to 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 goodwill that will propel the peace-building process forward instead of exacerbating differences between people and communities by bypassing those elites and elements that seek to promote conflict instead of peace.



Youth In Action 12. Forgotten Diaries

Forgotten Diaries 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.

You can get involved with this initiative in several ways. See <http://www.forgottendiaries.org/en/get-involved/>.



Points To Remember

- Because governments are charged with the primary responsibility of governance, there are many ways and many sectors, other than those relating to basic services, in which governments are engaged in the use of ICTs for development.
- These include, but are not limited to, disaster risk reduction; climate change abatement, improved service delivery through e-government; preservation of cultural heritage and diversity; and the promotion of peace.
- Governments try to reach out to citizens directly through portals to provide services; they also use technologies such as GIS for environmental protection and reducing disaster risks.
- In times of disasters, ICTs have a critical role to play in disaster awareness, mitigation, relief and rehabilitation activities.
- As management information systems for government in project implementation, ICTs have been demonstrated time and again, to reduce corruption, improve service delivery and ensure transparency and accountability of government services.

Summary

In this section on the applications of ICTs in different development sectors, the effort to highlight some case studies has been made. By no means is the list of case studies exhaustive of the rich variety that exists in the Asia-Pacific region. Each application in each sector has its own uniqueness in terms of the way in which ICTs have been deployed; and in each, there are opportunities for improvement.

All the case studies have highlighted, in one way or another, the role that ICTs can play as tools that governments can deploy in their development programmes to accelerate growth. 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 information sharing, outreach and monitoring of key efforts.



Practical Exercise

Go to the national website of your country and examine:

1. If all ministries and departments have their own portals.
2. Select one department of your choice and list the public services provided by the department.
3. Assess the services in terms of –
 - a. Availability of information that you wanted
 - b. Ease of use
 - c. Interactivity of the site
 - d. Its various features (drop down menus, FAQ section, public disclosure, etc.)
4. Make a list of additional features you would want to include.
5. Make a list of all the content and the features you would include in a “digital story” about the cultural richness of your country, town and village.



Test Yourself

1. The use of ICTs for procurement services:
 - a. Increases corruption in procurement processes
 - b. Reduces corruption and increases transparency
 - c. Is wasteful expenditure on ICTs for something that is going well anyway
 - d. Leads to none of the above
2. The use of e-governance by a government creates:
 - a. Improved service delivery
 - b. Increased citizen demand for government benefits
 - c. Better performance that leads to better development outcomes
 - d. None of the above
3. “Netizens” are:
 - a. Citizens who use the Internet to express their views on public issues
 - b. Digital natives
 - c. Citizens who build networks
 - d. None of the above
4. Which of the following is not part of an ICT for Peace effort:
 - a. Early warning systems
 - b. Drones
 - c. ReliefWeb
 - d. OCHA

5. The difference between e-government and e-governance is:

- a. The former uses ICTs to deliver services, the latter does not
- b. e-Government is the process, e-governance is the outcome
- c. Both
- d. Neither

CHAPTER 6.

ICTD APPLICATIONS IN CULTURE AND TOURISM

Throughout history, societies have expressed concern for the preservation and promotion of their cultures, historical monuments and documents. With the advent of media and technology, societies have expressed serious concerns on how media and technologies impact upon cultures. 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 fundamental imbalances in the flow of information and knowledge were identified and extensively discussed in the UNESCO report *Many Voices One World*.¹⁶⁸ The report was a watershed in that it highlighted the dominance of the economically strong media houses in the collection and distribution of information and culture products. The report called for greater cooperation among countries of the South and resulted in a non-aligned media movement.

While the advent of ICTs has changed the unequal relationship somewhat, the concerns for the protection of culture have remained the same. In a run up to the WSIS meets, Asia-Pacific countries chalked out these concerns. The Tokyo Declaration¹⁶⁹ on Asia-Pacific Perspectives to the 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.”¹⁷⁰

If the imbalance in the flow of information and knowledge is seen as a threat to cultural heritage preservation, it is also increasingly evident that ICTs can be transformative tools for preserving and protecting culture and cultural diversity. For instance, the preservation of architectural ruins, paintings and sculptures by way of digitized copies is now possible. Preserving traditional archives in analogue form takes up a lot of space, are expensive to maintain, research is often cumbersome and sometimes valuable documents—images and photographs, audio recordings, and video clips—get misplaced, damaged or destroyed.

6.1 ICTs and the Preservation of Cultural Diversity

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

- Digitization – The documentation and conversion to digital form existing cultural resources, and the creation of digital products—videos, animations, tutorials, booklets and interactive websites that outline the histories and cultures.

168 International Commission for the Study of Communication Problems, *Many Voices, One World: Communication and Society, Today and Tomorrow towards a New More Just and More Efficient World Information and Communication Order* (Paris, UNESCO, 1980), <http://unesdoc.unesco.org/images/0004/000400/040066eb.pdf>.

169 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.

170 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>.

- 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 many. Digitization enhances access to culture products such as photos, videos and manuscripts to many users faster and easier, both on location and through the World Wide Web. Often hidden and hard-to-reach materials, archeological sites and documents can be digitized and made publicly available, allowing access by many viewers at the same time. Digitized materials serve as surrogates to the originals; and digitization can help 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 also serve 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.¹⁷¹

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.

Bhutan is one country where the preservation of cultural heritage is part of its national development policy, best illustrated through its commitment to GNH.¹⁷² Bhutan is also part of the Annual Bibliography of Indian Archaeology (ABIA) global network of scholars co-operating on an annotated bibliographic database for publishers covering South and South-East Asian art and archaeology. The database is fully searchable online and is freely accessible.¹⁷³

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 the set up of 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 diasporas 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.¹⁷⁴



Case 19. centerNet

centerNet is an international network of digital humanities centres where documents in digital form are stored. Since its inception in April 2007, centerNet has added over 200 members from about 100 centres in 19 countries. In Asia, partners in this global network include centres from China, Japan, the Republic of Korea and Taiwan.

171 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, the Philippines, 19-21 October 2005, http://paarl.wikispaces.com/file/view/Digital_Initiatives_in_Archival_Preservation.pdf.

172 See Case 1 in this primer.

173 For more details, see Ramesh C. Gaur, "Digitization and Digital Preservation of Indian Cultural Heritage: Multimedia Digital Library Initiatives at IGNC, New Delhi", presentation slides, http://www.ignca.nic.in/PDF_data/kn_digital001_pdf_data/T4d_Digital_Preservation.pdf; and the ABIA Project, <http://www.abia.net>.

174 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>.

Figure 28. Screenshot of centerNet’s homepage



In Taiwan, the Dharma Drum Buddhist College’s Hopkins Tibetan Treasures Research Archive hosts a range of digital resources including over three thousand hours of oral history on scholarly and cultural aspects of Tibetan Buddhism, along with thousands of hours of lectures on Tibetan Buddhism that can be used to train Buddhist monks.

Figure 29. Screenshot of Dharma Drum Buddhist College’s homepage



Sources: centerNet, <http://digitalhumanities.org/centernet/centers>; and Dharma Drum Buddhist College, <http://haa.ddbc.edu.tw/index.php>.

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 helps others in making travel decisions, as well as helps 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.

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 participation¹⁷⁵

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.



Youth In Action 13. Tell your story

Singapore's Prime Minister Lee Hsien Loong at the opening address during the 2011 launch of HeritageFest, a community trail project by the National Heritage Board said: "Home means you must have some memories, you must have shared experiences and you must have some sense of where we came from, why we are here what it means to us... we will tell the stories about it to the younger ones and the next generation... we will connect to one another, connect to our parents and past, and to our children and future."

"Wow I thought. Yes, that's it. That's what we do. That's what Digital Storytelling is all about. That's what we want to bring to society, to schools, to individuals, to communities, to Singapore... We want to see storytelling become a movement. And I don't mean the 'once-upon-a-time' fairy tales but the stuff that life and memories are made of—the stories of our lives, the shared memories that make us who we are and bind us as a family, as a community."

This an extract from a blogpost by aurelia on 19 July 2011 on the Digital Storytelling Asia website. Digital Storytelling Asia is a Singapore-based social enterprise that aims to create awareness and promote the Digital Storytelling movements in Singapore and beyond. Find out more and start telling your story at <http://digitalstorytellingasia.com>.

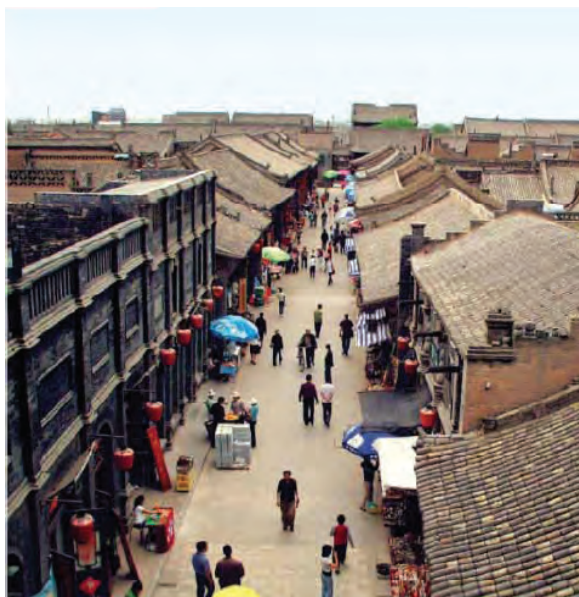
6.2 ICTs and Rural Tourism

The use of ICTs to promote rural tourism is another way of preserving and promoting local cultures while at the same time providing economic boosts to rural economies. Extensive and intensive rural tourism can be promoted through ICT applications. Rural tourism can move from being a marginal to being a main economic activity and have spill off benefits for agribusiness and rural development. It gives an opportunity for the farmers to profit from tourism directly

¹⁷⁵ 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.enamecenter.org/files/documents/Know-how%20book%20on%20Cultural%20Heritage%20and%20ICT.pdf>.

besides generating new markets for the agrarian products in the region. Activities revolving around rural tourism can be streamlined to support sustainable development and hence, it can be user-friendly and environmentally-friendly.

Figure 30. A preserved city centre in China



Source: Katharine Sierra, "Leveraging Cultural Heritage Assets for Local Economic Development", World Bank presentation, 2009, http://siteresources.worldbank.org/INTCHD/Resources/430063-1250192845352/LeveragingCHAssetsforLED_KSAnnualMeetOct12009.pdf.

Rural e-tourism is largely individual or small business oriented and may or may not have a mass appeal unlike mainstream tourism promoted by countries' tourism development boards. Budget and other constraints are bound to exist, yet the creation of a single website on the local community and the creation of digital products such as blogs, audio-visual presentations and digital stories could help rediscover and promote unknown heritage sites such as ancient historical monuments, galleries, museums, theatres and other sites into mainstream tourism. While those in ruins are rescued and renovated, unknown heritages like old castles, houses and villages may be rediscovered.

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 case study in Bario, Sarawak, Malaysia¹⁷⁶ highlighted the impact of an ICT telecentre at a remote location in integrating tourism into the local community's economic growth. The results indicated that ICTs were able to increase the number of visitors. The study also demonstrated the important dimensions that contributed to tourists' satisfaction so that future ICT efforts can be focused on them. The findings revealed that most of the visitors were aware of Bario because of its publicity through the website.¹⁷⁷

176 Roger Harris, "Tourism in Bario, Sarawak, Malaysia: A Case Study of Pro-Poor Community Based Tourism Integrated into Community Development", Asian Encounters, 25 November 2010, <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>.

177 A. A. Mohammed, et. al., "ICTs and Tourists' Satisfaction: A Test on a Rural Tourist Destination", *e-Review of Tourism Research*, Vol. 8, No. 5 (2010), pp. 123-135.

Summary

Both large governments and small communities can equally benefit from applying ICTs to meet their specific requirements. Countries that are concerned about the potential loss of their cultural heritage with the advent of globalization can: use ICT systems to digitize their manuscripts and documents; create digital stories about their archaeological heritage; and/or capture on audio the speeches of their spiritual and other leaders. While capture and storage of digitized culture resources prevent their destruction; dissemination of these resources through Web-based and offline systems can enhance and promote national culture and identity. Cultures can make sure that others in the world see them as they would like to be seen.

Communities can build on their local heritage by using Web-based systems to promote tourism. In turn, this leads to the growth of the local economy through increased employment as well as services provided.



Practical Exercise

Go to any search engine on the Internet and search for information about your local community.

1. Make a list of all the features that are given.
2. Make a list of all the additional features that you think will improve the site.
3. Build the content for a local community e-tourism site, by listing all the information that you would like to see on the website.



Test Yourself

1. A long-term impact of creating a website for a local community would be to:
 - a. Increase visibility for the community and help rural tourism by promoting the cultural heritage of the area
 - b. Provide income generation activities for the community
 - c. Provide good quality citizen services and citizen engagement
 - d. All of the above
 - e. None of the above
2. A “digital story” for use in a community website will provide the user with:
 - a. A vicarious tour of the countryside
 - b. A sense of familiarity and introduce interest in travel and tourism
 - c. Information on the local cultural heritage
 - d. All of the above
 - e. None of the above

3. The Tokyo Declaration drew attention to:
 - a. Environmental damage and climate change
 - b. Tsunami disaster management strategies
 - c. Rich cultural diversity of the Asia-Pacific region
 - d. New ways of addressing the 2008 economic crisis

4. Rural e-tourism is usually:
 - a. A national effort
 - b. An effort by a local community
 - c. An effort to increase local participation in tourism activities
 - d. An effort to protect local culture from outsiders

5. Web 2.0 applications:
 - a. Are not suitable for rural e-tourism
 - b. Only allow a few to participate in the system
 - c. Enhance the quality of rural tourism through interaction
 - d. Are none of the above

Further Readings

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Grimshaw, David J., and Shalini Kala, eds. *Strengthening Rural Livelihoods: The impact of information and communication technologies in Asia*. Ottawa: IDRC, 2011. <http://idl-bnc.idrc.ca/dspace/bitstream/10625/45947/1/132419.pdf>.

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SECTION III – MANAGEMENT

Learning Objectives

The learning objectives of this section are to introduce learners to:

- The issues and challenges in the implementation of ICTD programmes and projects
- Various key elements of each of the challenges
- Key challenge in project management
- The value of change management in ICTD project management
- The basics of ICTD project evaluation

Learning Outcomes

After completing this section, learners will be able to:

- Understand why ICTD projects are different from other development projects
- Understand the reasons why ICTD projects may succeed or fail
- Understand the importance of integrated planning as a process in ICTD projects
- Understand elements of managing partnerships, time and people
- Apply the basics of ICTD project evaluation methodologies

Introduction

Some development projects succeed, others fail. The successes are reported widely and go on to become “best practice” cases. The failures are filed away and rarely reported. Since failed projects are not analysed and reported widely, it is difficult to derive lessons from unsuccessful development projects and to apply these lessons to future interventions.

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.¹⁷⁸ 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.¹⁷⁹ 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.

178 Tim Rainey, “Why do so many public sector ICT projects fail?” [publicservice.co.uk](http://www.publicservice.co.uk/feature_story.asp?id=7622), 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>.

179 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>.



Case 20. The National Data Bank Project: An expensive lesson for Bangladesh

The National Data Bank Project is one of the earlier ICTD projects in developing countries. The project was planned to provide a broad range of data and information support to many levels of stakeholders both inside and outside Bangladesh. The project aimed to link twelve ministries and divisions with scope for further network connections to the planning cells of all other ministries/divisions. The network was based on ATM/Fast Ethernet protocols using fibre optic or VSAT connections; client/server architecture was set out for the system; and a relational database management system plus other applications were to form the software chosen for the project.

The focal stakeholder in the project was the Statistics Division of Bangladesh's Planning Commission, but the network aimed at providing facilities for input and output of data for a range of stakeholders—government ministries and officers, private and NGO sectors within Bangladesh and overseas.

Despite efforts to get the project going, no database was established, and no storage of statistical data is visible in any part of the intended project. The project failed and was closed.

An assessment on the project revealed that the failure of the project was due to inadequacies in terms of human resources, capacity constraints, lack of leadership and commitment, and absence of effective partnerships, stakeholder engagement and collaborative decision-making, in addition to time and cost overruns, rationality in procurement and recruitment processes. Essentially, project failure here could be attributed, not to technology, but to project management skills.

Source: Adapted from eGovernment for Development, "Success/Failure Case No. 24 – The National Data Bank Project: An Expensive Lesson for Bangladesh", <http://www.egov4dev.org/success/case/ndb.shtml>.

The website <http://www.egov4dev.org> carries a large repository of case studies of both successful and failed ICTD projects. A close study of the resources on the website shows that most projects in ICTD have failed, not only because the technology solution was inappropriate, but because of a lack of understanding of why ICTD projects are different, and what the issues and challenges in managing ICTD projects are.

It is important to recognize several factors that make ICTD interventions unique.

First, ICTs, which include all media of communication, work in a public space, seem the fashion of the day and are constantly in public view. As a result, there is more publicity about these efforts, and often there is an outcry when an intervention fails.

Second, there is a hype surrounding ICTs with world leaders, politicians, entrepreneurs and development professionals jumping on the bandwagon in support of their use in development. This puts upon ICT and development professionals a greater responsibility and accountability for both successes and failures.

Third, because of their speed of delivery and their reach, both successes and failures are publicly visible, resulting in an additional responsibility for appropriate, meaningful, and successful use.

Fourth, the content of ICTs has widespread influence on society, with changes spilling over to other parts of an organization or community often with unpredictable results. This results in an uncertainty about outcomes and impacts.

Finally, all efforts and initiatives in the use of ICTs for development are multidisciplinary in nature. It means that the use of ICTs is a team effort, with partnerships and collaborations as its underpinnings and foundation. Such a team effort implies the convergence of technologies, of different social partners, and of disciplines as different as engineering and rural sociology.

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. Once such a decision to use ICTs has been made, it is then necessary to examine how ICTs are integrated into a project cycle. This is what makes an understanding of ICT planning so essential. There a number of concerns to be addressed here and these are discussed in the following chapter.

Section II began by providing an understanding of two different kinds of ICTD interventions—ICT-driven or ICT supported. This was done by providing cases of sector specific initiatives in using ICTs for development. In this section, the effort is to understand the process of planning and managing ICTD projects, irrespective of how they are conceived, because careful planning can ensure a greater likelihood of success. Planning is critical 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 has developed a framework and a checklist for the two types of ICT interventions mentioned earlier. Questions asked in simple terms will yield clarity to the planning process.

Box 11. A good practice guide for the design of ICT-driven projects in developing countries

Key components of a good practice guide to the design of ICT driven projects in developing countries		
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?	Managing risk: 'What unexpected events or situations might arise?' and 'What should be done to manage these?'

Source: Richard Curtain, *Information and Communications Technologies and Development : Help or Hindrance?* (AusAID, 2004), p. 6, <http://www.developmentgateway.com.au/jahia/webdav/site/adg/shared/CurtainICT4DJan04.pdf>.

Addressing these questions up-front in consultation and collaboration with all partners and stakeholders will help planners and implementers avoid the pitfalls that have led to the failure of so many ICTD projects.

There are other ways to assess and check whether ICT projects for organizational efficiencies and effectiveness are worth pursuing. For example, the Treasury Board of Canada has institutionalized the Business Transformation Enablement Program that provides “a business transformation toolkit enabling rigorous strategic planning and integrated strategic design across governments supporting interoperability and integration.” The programme aims to “help departments and agencies improve the reliability and consistency of transformation across governments with a more thorough, standardized approach for program and service alignment and business design that promotes design efficiency and reusability, as well as for transformation project planning and implementation.”¹⁸⁰ Using similar assessment tools help uncover certain factors that will evaluate the readiness of ICT programmes and projects within government agencies, NGOs and other development organizations.

This section addresses various issues in ICTD project management and research. While all the issues are interconnected, they have been separately discussed for better understanding. All the issues discussed are equally important because lack of attention to any single issue can derail an ICTD project.

180 Treasury Board of Canada, “Business Transformation Enablement Program (BTEP)”, Government of Canada Web Archive, http://www.collectionscanada.gc.ca/webarchives/20071125180244/www.tbs-sct.gc.ca/btep-pt0/index_e.asp.

CHAPTER 7.

ISSUES IN PROJECT MANAGEMENT

Lessons learned from specific ICTD interventions¹⁸¹ all point to critical factors that must be taken into account during ICTD planning. First, initiatives should be explicit about their development goals and how they will impact on the beneficiaries.

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 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, content, relevance, language and usability.¹⁸² By taking care of the interests of the local stakeholders, it ensures that goals are aligned and a common vision and partnership built up.

Fourth, ICT solutions should be sustainable and designed to last. The choice of technologies for connectivity; computer hardware and software elements; and security systems to protect both the ICT systems and the data from hacking, viruses and other security breaches are critical.

Fifth, a strong political commitment from the government, backed by a multi-stakeholder partnership, reduces the burden on each partner. Such a commitment must be backed by a budgetary allocation that is adequate both in quantity and in the nature of its distribution. 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 up scaling of successful pilot projects. The private sector and NGOs can partner with government to contribute their expertise and resources, and in the case of NGOs, help to facilitate community participation.

Sixth, it is necessary to ensure that ICTD projects are process-oriented and not duration-specific or merely target-driven. One of the problems with most development projects, especially if they are donor-funded, is that they operate with certain fixed time-frames and lay down specific targets that have to be met. While these are planning constraints, it also has to be recognized that if ICTs are to be used effectively as development tools, they have to be used in a long-term sustained manner.

Seventh, it is the user, not the content producer or delivery agency, who has to determine the extent and nature of benefit he or she will derive from technology. Sometimes, by the time the project starts to show dividends, the fixed time frame is over, donor support withdrawn and the project flounders. Thus, it is also important for governments or project initiators to ensure the sustainability of ICTD projects as early as the conception or the initiation stage of the project.

Three major issues impacting on project success or failure will be discussed below. These include the importance of policy and governance, project cycle management, and building partnerships for ICTD.

181 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>.

182 A usability gap between the usability of a website and the intended results of the company or individuals that developed the site often exists.

7.1 Policy and Governance¹⁸³

A decision to use ICTs as part of the development process is itself not a simple one and should not emerge out of wishful thought or incomplete information. ICTs should be used because they will be an effective input. There are many factors that contribute to making an ICT intervention “effective”.

Most countries in the Asia-Pacific region have a development policy in place. These are reflected in constitutional commitments, in National Development Plans, as in the *Afghan National Development Strategy: Prioritization and Implementation Plan 2010-2013*¹⁸⁴; and in PRSPs. These plans are often prepared in consultation with various groups of stakeholders in a society—including government, academia, donor and funding agencies, and civil society bodies such as NGOs.

Many countries also have IT policies in place. In the Asia-Pacific region, many of these were in place by the beginning of the twenty-first century. An IT policy usually describes a country’s perspective and plan of action for introducing and applying ITs, and it could be concerned with the political, legal and technological aspects of integrating IT into the mainstream of society.

An ICTD policy and framework for action, however, is different. An ICTD policy specifically articulates the perspective and plan of action desired and designed by the government for deploying ICTs to achieve development goals. It may be possible to have programmes and projects applying ICTs without any stated policy in place. However, to rationalize and streamline the use of expensive ICTs, and ensure their meaningful and appropriate use, a proactive policy, with a vision, strategy and plan of action is a must. An example is India’s National e-Governance Plan.¹⁸⁵

An ICTD policy and framework cannot be developed independently or in isolation. It would need to fit into the larger economic and development policy of a nation; and it would have to be done in stages, taking into account telecommunications, hardware and software perspectives. ICTD policymaking would also have to be dynamic and evolve as national development policy dimensions and thrust areas change over time, and as innovations and technological developments and capabilities take place.

Box 12. Steps in formulating ICTD policy and strategy

1. Outline a vision statement and state a short/long term scenario for ICT development. This should include measurable outcomes or benchmarks over a given time frame. It may, therefore, be important to conduct visioning exercises for the purpose.
2. Assess the current situation based on consultations, research, facts and figures, perception and observations. (This activity will give you a clearer perspective of where you are and will guide you on the efforts that may be required from your end given the goals you want to achieve.)
 - 2.1 Review existing policies and plans, legislation as well as proposed policies and policy directions. There are also other ICT-related issues that may have to be considered. These include information access, telecommunications policies and regulations, frequency and radio regulations, e-commerce and e-government policies.

¹⁸³ An extensive discussion on policy and governance is given in Emmanuel C. Lallana, *Module 2: ICT for Development Policy, Process and Governance*, 2nd edition, *Academy of ICT Essentials for Government Leaders* module series (Incheon, UN-APCICT/ESCAP, 2011), <http://www.unapcict.org/academy>.

¹⁸⁴ See <http://www.cfr.org/afghanistan/afghanistan-national-development-strategy-prioritization-implementation-plan-2010-2013/p22679>.

¹⁸⁵ See http://india.gov.in/govt/national_egov_plan.php.

2.2 Consider regional context, including agreements on free trade, etc. that could impact on policy formulation.

3. Undertake consultations that are representative and ensure that marginalized sectors are included, such as women, the poor, rural dwellers, youth, and the handicapped. It may also be necessary to prepare a stakeholders' plan that shall include a schedule and methodology of consultations. These include focus group discussions, roundtable meetings, online consultations and exchanges. Consultations must be ongoing.

4. Draft an action plan (for actual implementation). This plan should include a proposed list of projects, projected outcomes and indicators of success, intended results and their justifications, risk assessment and mitigation, cost and other detailed resource requirements. The plan should also provide a schedule of implementation. It may also be critical to give an explanation/rationale for the priorities set.

5. Designate institutional arrangements for implementation. The institution should be responsible for the strategy and action plan. In many cases, this agency or organization is associated with or attached to a high-level government decision-making body, which has the authority and full support of government.

6. Put in place monitoring and evaluation mechanisms. It is important that indicators of success are established, shared, commented on and agreed upon through an open and consultative fashion.

Source: Adapted from Richard Labelle, *ICT Policy Formulation and e-Strategy Development: A Comprehensive Guidebook* (Bangkok, UNDP-APDIP, 2005), <http://www.apdip.net/publications/ict4d/ict4dlabelle.pdf>.

There are many dimensions to an ICTD policymaking process. In addition to developing a national framework for ICTs on the one hand, and national development goals on the other, the link between ICTs and development has to be established in national policy. An ICTD policy is not something that governments anywhere in the world would develop from scratch. In almost all countries, there is a history of regulatory practices governing telecommunications with well-established institutions and agencies. Thus, the drafting of an ICTD policy would have to be written taking existing policies, regulations and practices into account and preparing a policy that considers all existing norms. Therefore, there is a need to find the right balance between the demands and requirements of different stakeholder groups—the state, the state's development strategy, the market, and the civil society.

When we look at the Asia-Pacific region, we find a great diversity in policy approaches. In some countries, such as Afghanistan, Cambodia and Viet Nam, the thrust is on developing IT infrastructures and expanding connectivity to promote access, while also developing ICT competencies to compete in the international market. In other countries, such as China, there is a thrust on developing and expanding ICT markets.¹⁸⁶

The governance of the system within a given country, that is the manner in which ICTD is organized and is managed is also a very important part of ICTD. Good IT governance ensures that expectations for IT are met and IT risks are mitigated.¹⁸⁷ Governance is important because of:

186 Rajesh Sreenivasan and Abhishek Singh, "An Overview of regulatory approaches to ICTs in Asia and thoughts on best practices for the future", in *Digital Review of Asia Pacific 2009-2010*, Shahid Akhtar and Patricia Arinto, eds. (New Delhi, Sage, Montréal, Orbicom and Ottawa, IDRC, 2010), pp. 15-24. <http://www.digital-review.org>.

187 IT Governance Institute, *Board Briefing on IT Governance*, Second Edition (Illinois, 2003), p. 7, <http://www.isaca.org/Knowledge-Center/Research/ResearchDeliverables/Pages/Board-Briefing-on-IT-Governance-2nd-Edition.aspx>.

- The need to carefully balance national priorities in development and the diverse needs and expectations of various national and international stakeholders—citizens, markets, industry
- Scarce financial and human resources
- The increasingly global community and marketplace

Generally, an ICT governance framework consists of: (1) a set of principles; (2) a decision-making hierarchy; and (3) a tailor-made suite of reporting and monitoring processes.¹⁸⁸ In many Asia-Pacific countries, there is usually a Ministry of Information and Communication Technology. Other countries have also created independent or autonomous telecommunications regulatory authorities/commissions¹⁸⁹ to govern ICTs growth and use; and to monitor or regulate ICTs.

The set of principles or norms that will guide the way ICTs are governed include the following:

- Include fixation of responsibilities for ICTs
- Ensure that ICT plans fit current and ongoing needs
- Ensure that ICTs are chosen and used in the right way, for the right reason and appropriately
- Determine fitness for purpose
- Ensure that ICTs conform to external and internal norms in terms of existing policies (whether these are in relation to ethics and IPR, or in terms of laws on freedoms, pornography, obscenity, etc.)
- Ensure that ICT use respects the needs of all of the people and is “inclusive”

Decision-making hierarchies establish the specific protocols and procedures for use and the order in which a hierarchy or upward ranking of decision-making is essential. This may consist of internal committees, expert groups and decision makers at different levels of the decision-making hierarchy in the government or regulatory agency.

Monitoring and regulation to ensure that all players observe the “rules of the game” whether it relates to investments and procurements, prioritizing expenditure, minimizing and eliminating corruption in the processes is part of the monitoring and regulatory function.

The varying levels of development, and the diversity of policy approaches and experiences in the Asia-Pacific region are such that there is a need at this stage to discuss various issues in ICTD project management. They include technology, human capacity building, applications and content, ethics, copyrights and IPR, citizen engagement, and social accountability. These issues form the basis of the discussion that follows.

7.2 ICTD Project Cycle¹⁹⁰

A project, distinguished from routine work, refers to a progression of activities aimed at meeting clearly specified objectives, to be achieved within a set budget and timeline—a clear beginning and an end of the activities in what is called a project cycle.

188 National Computing Centre, “IT Governance”, *ITadviser*, Issue 53, January/February 2008, <http://www.ncc.co.uk/article/?articleid=13836>.

189 A list of such key institutions can be found in Sreenivasan and Singh, “An Overview of regulatory approaches”, pp. 15-16.

190 Details on ICT Project Management is available at: Maria Juanita R. Macapagal and John J. Macasio, *Module 7: ICT Project Management in Theory and Practice*, 2nd edition, *Academy of ICT Essentials for Government Leaders* module series (Incheon, UN-APCICT/ESCAP, 2011), <http://www.unapcict.org/academy>. The relevant section of the module is extracted here in order to serve as an introduction to the topic.

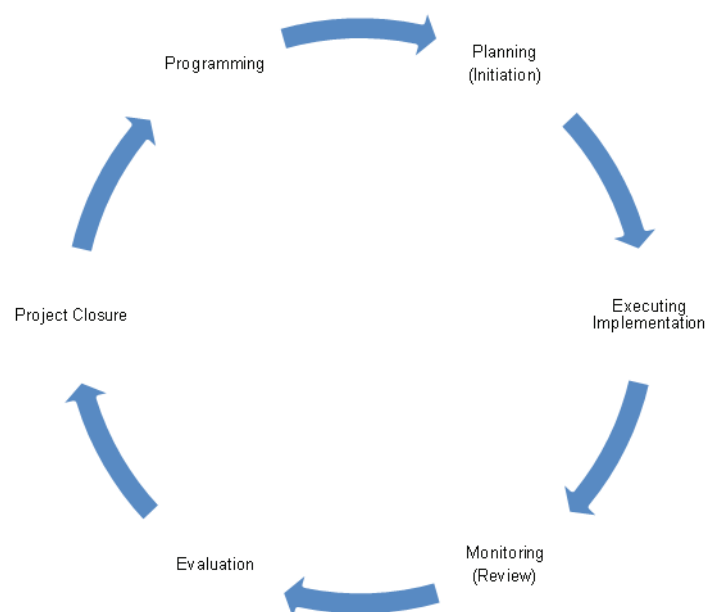
Introduction to the Project Management Cycle

A project goes through various stages in a cyclical process called a project management cycle. Basic to project management are the following project cycle phases or stages:

- **Programming** is the process by which programme of actions are identified and put into a coherent plan based on (national or local) policies, agenda, strategies and objectives, and cross-cutting themes for consideration in the development and planning processes of projects.
- **Initiation and Planning** is the most important part of the project process. It is in this process where the project environment is examined, and where reasons and the assumptions of the project are defined. It is here where the scope, requirements and the parameters for the resources—time, costs and people—including risks are identified. It is the process where all the knowledge areas in the project are designed. This is the part where the map is drawn, and where the captain of the ship will be charting the course of its voyage.
- **Implementation** is the project process where all the plans are executed. This is also the phase where the goal is to manage the list of activities required to produce the deliverables that contribute to achieving project objectives. In implementation, it is also important to ensure that control mechanisms are working—that the ship continues to sail along the charted course towards its intended destination.
- **Monitoring** is the process of checking that all plans (inputs and outputs) and quality standards are being met. Progress and monitoring reports are important to detect and manage the risks areas.
- **Evaluation** measures the impact of the project and how it has contributed to larger goals (for instance the programmes at the national or local levels of government). The findings and results will serve as the basis for future planning and programming activities.
- **Project Closure** is when the project activities have wound down, and when deliverables, including reports and financial obligations and disbursements are met and accepted by respective stakeholders.

Figure 31 shows the project management cycles (phases).

Figure 31. The project management cycle



Source: Courtesy of the European Commission, *Aid Delivery Method: Volume 1 – Project Cycle Management Guidelines* (Brussels, 2004), http://ec.europa.eu/europeaid/multimedia/publications/documents/tools/europeaid_adm_pcm_guidelines_2004_en.pdf.

Each stage of the project has markers or milestones to indicate that the stage has been completed. The milestones are defined by the delivery of outputs or outcomes expected. In IT parlance these milestones are also called “checkpoints”.

Project Cycle Management is a term used to describe the management activities and decision-making procedures used during the life-cycle of a project (including key tasks, roles and responsibilities, key documents and decision options). Many organizations, including bilateral and multilateral aid groups, make use of the project cycle management tools and processes.¹⁹¹

Users indicate that project cycle management helps ensure that:

- Projects are supportive of overarching policy objectives of the country and of development partners
- Projects are relevant to an agreed strategy and to the real problems of target groups/beneficiaries
- Projects are feasible, meaning that objectives can be realistically achieved within the constraints of the operating environment and capabilities of the implementing agencies
- Benefits generated by projects are likely to be sustainable¹⁹²

ICT-driven projects, which apply the use of ICT as a strategy to include software, hardware and integration initiatives, use different terms in project management. The cyclical approach is also used and planning is shown as a very important process. There are many review activities that check the outputs/products, processes and resource usage against plans. The processes are cyclical in the sense that each version of a product becomes part of the environment within which the next version is developed.

ICTD project management is based on ICT solutions to meet defined organizational and service strategic needs. It also introduces processes and methodologies that are supported by ICTs.

¹⁹¹ European Commission, *Aid Delivery Methods Volume 1: Project Cycle Management Guidelines* (Brussels, 2004), p. 17, http://ec.europa.eu/europeaid/multimedia/publications/documents/tools/europeaid_adm_pcm_guidelines_2004_en.pdf.

¹⁹² Ibid.



Questions To Think About

It was learned earlier from the previous units that ICTD projects are expected to impact on human development and on people's lives, especially those in the marginalized sector of developing societies. What difference can project management make to effect change in the lives of people? What can be done for this to happen?

Initiating Sustainable Projects

Three major issues have to be taken into account in determining the effective use of ICTs: accessibility, costs and functions. In developing countries, there are still serious issues related to limited access. Building community-based telecentres have been seen as one way of addressing issues of access.

The second major consideration is costs. Even though the costs of equipment and connectivity are dropping dramatically in all countries, costs remain a major factor.

Thirdly, determining what function or purpose the ICT intervention will serve is also important. Functions are determined at the planning stage through formative research or a needs assessment to understand the needs and expectations of the project beneficiaries. Essentially, this stage of planning refers to the collection of information on the:

- Demographic factors such as age, gender, marital status, occupation, education level and income of beneficiaries
- Motivational factors such as the purpose for which beneficiaries will use the ICTs and what they want that the ICTs provide for them
- Resource factors such as when, where and how beneficiaries will use the ICTs, who will pay, what access they have to the ICTs, and what human support they need in order to use ICTs more effectively

In an ideal situation, it is only when all of this information is available that one makes a beginning. But reality is far from ideal; and when there is not enough time and resources to collect this data; other sources of information such as the census data and expert consultations are used to obtain this information.

An ICTD project must be anchored from a goal that is consistent with a strategic vision of a development programme. The project in itself must be strategic to impact change. It must be clear how the project contributes to the goals and objectives of a national programme. From a menu wish list of project options, project managers need to ask what project will have a greater contribution (high impact) with the least cost given a realistic schedule.

There is a need to conduct a feasibility study to make sure that the appropriateness and the timing of this project is right, that there are reasons for having this project. It will require the identification of the driving forces, resisting factors, and other aspects that will be useful in predicting successes/failures (one may use the force-field analysis to see where the project may be at risk).¹⁹³ Overall, the feasibility study should be able to answer the following questions:

- Does the project conform to the development and environmental objectives and priorities of a specific country and/or region?
- Is the project technically and scientifically sound, and is the methodology the best among the available alternatives?

193 Andy Bruce and Ken Langdon, "Managing For Excellence", Dorling Kindersley Ltd., 2009, p. 299.

- Is the project administratively manageable?
- Is there adequate demand for the project's outputs?
- Is the project financially justifiable and feasible?
- Is the project compatible with the customs and traditions of the beneficiaries?
- Is the project likely to be sustained beyond the intervention period?¹⁹⁴

Prioritizing desired project options is important as there are many project ideas and approaches that can be undertaken. From the list of options, consider value and costs, and function and performance of the projects (the more complex the project the more important to seek the opinion and participation of stakeholders).¹⁹⁵ Through this process it will be important to know, among the wish list projects, what can bring more value and impact given limited time, budget and resources.

Project initiation is like a landscape study and an overview of the project. It articulates the project's goal, which defines the desirable change, and the benefits that the project will bring as well as examines the ideal scenario that it will create. The goal must be defined in precise terms to avoid vague results.

Likewise at this stage, objectives are set. It must be able to define the purpose, specifically:

- What is going to be done (general activities tasks)
- What are the targets (outputs)
- How long it will take (time frame)
- How much resources will be used (resource limitations)
- How much it will cost (budget proposed based on estimates and cost benefit analysis)

It is at this stage that constraints and project risks are already identified and assessed. It is also at this stage that the important stakeholders are brought together starting with the project sponsors, the project manager, the core team, and other people who will be closely involved in the project, as well as those who will be directly and indirectly affected by the project. One of the tools that are helpful in identifying stakeholders is the stakeholders' analysis.

Stakeholder analysis is a commonly used tool to identify all of the groups and individuals who have a stake or interest in the success or failure of a project or activity. It is one of the tools used in the Logical Framework Approach in the project initiation phase. IT business projects also conducts stakeholders analysis, although the coverage is more limited than the social development environment.

Figure 32. Stakeholder analysis sample template

Who are the potential stakeholders in this project?	What are their potential roles (e.g. influencers, sponsors, users, champions)	What are their problems/ needs in relation to the project idea?	What could be the expectation/ interests of each respective stakeholder regarding this project?	What are the weakness/ constraints of each stakeholder identified?	What could be the potential contribution (positive or negative) of each stakeholder in the project?	What are the consequences of their contribution in the project?
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¹⁹⁴ Colin Bruce and R.W. McMeekin, *The Project Cycle – An Introduction to the Stages of Project Planning and Implementation* (monograph handout, 1981).

¹⁹⁵ Bruce and Langdon, "Managing for Excellence", pp. 324-333.

It is important to find out what key stakeholders think about the vision and scope of the project before any agreement is struck. Consultations with stakeholders help the project management team avoid impractical or unworkable plans. The vision and scope of the project must be clear (SMART objectives¹⁹⁶) and most importantly the project must address the needs of the stakeholders. At this phase, commitments, specifically budget and resources, to the project must be secured by getting the approval from the project sponsors.

Moreover, the feasibility of the ICTD projects must always include in the planning a pilot or a trial run of systems applications or solutions to ensure the usability, scalability, flexibility, reliability and security of the designed systems.



Case 21. Multimedia centres for farmers and health workers in Ghana

In Ghana, social indicators of development are generally very low. Life expectancy is 58 years. The economy is characterized by extensive and unbridled liberalization; agriculture and industry, particularly local industry, have remained stagnant in the best of years and recently there is a declining trend. This has had serious and debilitating implications for poverty reduction. The country's HDI is 130 out of 169.

The Association of Church Development Projects (ACDEP) operates in partnership with a member network of about 40 mainly church-based NGOs (stations) in the rural areas of Northern Ghana. Communication and access to relevant information is low among these NGOs and poses a major challenge to them. The ICTD project intended to contribute to the enhancement of the functions of the ACDEP Secretariat.

Supported by Catholic Organization for Relief and Development and the International Institute for Communication and Development (IICD), a **needs assessment** was carried out to determine the information needs of the stations and how these could be addressed using ICT. The most important findings were the following:

- Access to development information by field level staff was very limited.
- The drive to seek new information and knowledge by staff was generally limited largely due to the lack of access and/or high cost (including time and distance) of obtaining this information.
- There was a low level of ICT knowledge and skills among development staff.
- There was a high level of interest and desire for new development information for their work with rural communities in the areas of health, agriculture, small-scale enterprise development, community mobilization, small-scale credit management, and gender among others.
- There was poor communication between ACDEP members and the Secretariat, thus affecting implementation of joint and agreed activities.

After the needs assessment, a two-year project **proposal** was drafted and combined with a **feasibility study** in 2006 at 26 member stations. The study mainly aimed to check if the stations were ready to embrace change with the support of ICT.

196 SMART Objectives are Specific, Measurable, Attainable, Realistic and Time-bound.

The ACDEP project's main objective was to strengthen the partnership between the ACDEP Secretariat and the involved stations; and between ACDEP with Government and the donor community. The specific objectives were to:

- Use ICT to meet communication and development information needs of ACDEP members
- Improve decision-making
- Facilitate the use of ICT

The target groups (users) of the project were working in the area of agriculture, health, advocacy, gender and reproductive health, and market access (for rural producers and processors).

The project was implemented in May 2008. Planned outputs towards meeting the objectives included developing the ACDEP Secretariat as the hub of the network and the multimedia centre; and establishing information centres at five pilot station. The project also aimed to develop a replication model that could be used by the rest of the ACDEP members in Northern Ghana.

A Project Implementation Team at the ACDEP Secretariat was formed. The implementation started with the procurement of ICT equipment. Three computers, a printer, a scanner, an LCD projector and a digital camera were procured for the ACDEP Secretariat. Two computers, a modem, a printer, a scanner, an LCD projector, a flash drive and a digital camera were provided to each member station. Some of the stations were off the electricity grid, so special attention was given to their energy needs.

The five pilot stations were strengthened not only by providing them with equipment and connectivity, they were also given audio-visual documentation tools and their capacity built so that each station could create their own content and resources to enhance their services to the community. The original plan was to create a strong Documentation and Publication unit at the Secretariat that would provide the stations with additional audio-visual resource material that could easily be stored and retrieved, but that did not materialize.

In 2009, a **monitoring review** was conducted to assess and report on what had been done:

- All five stations were operational although one had a break-in and had to start all over after equipment was stolen.
- Staff members acquired basic to intermediate ICT skills and were able to communicate with others.
- Stations were able to collect agricultural and health information for their communities and stored this in a digital resource portfolio.
- At the station level, monthly forums were established to share information and experiences.
- Communication between stations and Secretariat had improved, although connectivity remained an issue at all five stations.
- Communication between stations and district assemblies (local government) clearly improved.

A user satisfaction survey was conducted for years 2009 and 2010. Overall, between 15 and 74 per cent of the respondents expressed strong satisfaction with the various services provided.

But not everything had been achieved. The implementing agency took stock on the lessons learned to re-plan the succeeding year and after an **evaluation** was conducted, the agency designed the Phase 2 of the project.

Source: Norbert Apentibadek and Martine Koopman, "Multimedia centres for farmers and health workers: Lessons learned from the Association of Church Development Projects (ACDEP)", IICD Learning Brief, January 2011, <http://www.iicd.org/about/publications/multimedia-centres-for-farmers-and-health-workers-in-ghana>.

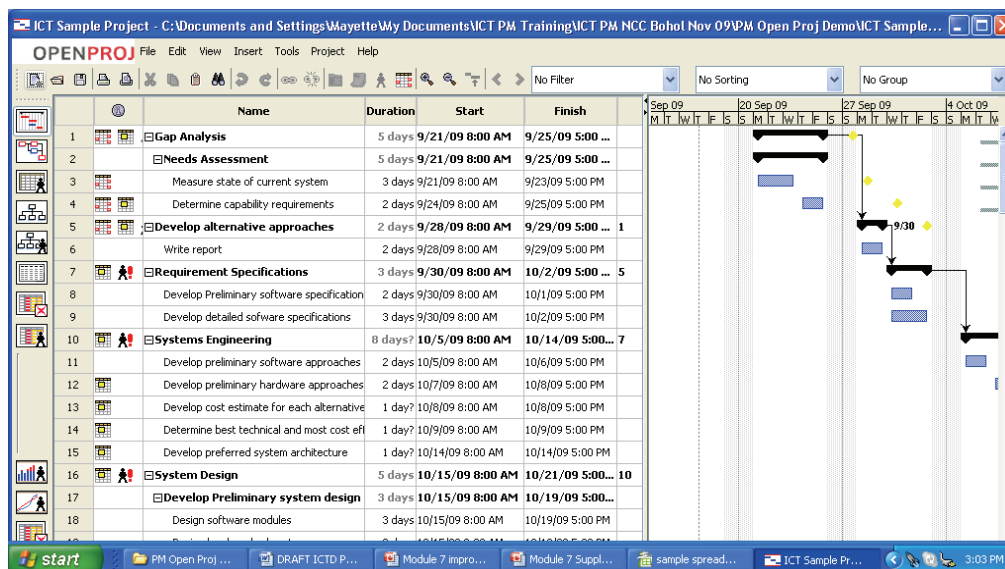
Planning the Project

The planning phase involves the process of developing the blueprint of the project. Project planning must consider the various control aspects of the project activities and tasks in the context of the needs vis-à-vis the influence of external and internal environment.

Project Disciplines. The areas of discipline (also termed as knowledge areas in prominent management guides)¹⁹⁷ are:

- **Project Scope** –The objectives and all of the work required to complete the project successfully. The scope puts the limits of the project; those tasks that are included and those that are not. Project scope is best articulated in the development of the specific requirements viewed as the strategic and tactical conditions in order to fill in the gaps or to actualize opportunities for improvement and development.
- **Schedule/Time** – The duration of the project and the estimated time when tasks will be completed. The Work Plan must include the timing and the time frame that a task can be done. Tools that help manage time include Gantt charts,¹⁹⁸ schedulers and precedence diagram method. Issues and problems in schedules and project time frame could include project delays caused by laws on procurement or unavailability of required resources.

Figure 33. WBS and Gantt chart: Sample of a FOSS application for project management



197 Project Management Institute calls the control aspects as knowledge areas in their Project Management Book of Knowledge; OGC's PRINCE2 manual, some of these are called components or processes.

198 A Gantt Chart is a timeline chart that is used in project management to show the project's schedule. You can see individual tasks, their durations and the sequencing of these tasks. You can view the overall timeline of the project and the expected completion date. As the project moves forward with actual performance updated, the Gantt Chart will adjust simultaneously displaying an up-to-date project schedule with new start and finish dates for tasks and the original baseline of your plan.

- **Cost** – The project value and the management of funds/budget allocated that will be spent for project activities, tasks, use of resources and services. Project managers need to manage and track the budget/costs well for the project to finish on time.
- **Human Resource** – The people (individuals, teams, contracted professionals) who will be involved in the project. Competency, attitudes and behaviour towards development, conflicts and change are some of the factors that must be considered in the selection of human resources for the project.
- **Stakeholders** – The individuals and groups who are involved, affected and may benefit directly or indirectly from the project. Knowing and understanding the different types of stakeholders and their level of participation in the project is crucial to the result of project intervention and acceptance of change in the organization or in a community.
- **Communication** – The information and the messages that need to be disseminated and put across to manage change and expectations. Inadequate information and communication can sometimes cause conflicts or pressures in the project.
- **Procurement** – The process of acquiring goods and services, infrastructure and equipment that are needed by the project to meet the goals, objectives and project deliverables. Delivery schedules, sourcing requirements, unavailability of required resource, and policies (laws) on procurement are but a few factors that could serve as stumbling blocks of the project.
- **Quality** – Includes quality standards and criteria that ensure relevance, feasibility, effective management and sustainability. In the planning process, the types of quality measurements, assurances and control techniques must be identified as measures to check the project outputs and deliverables.
- **Risk** – The collective term for uncertainties from the internal and external project environment that pose threats, limitations and obstacles to the achievement of project goals and objectives. Assumptions and risks critical to the project must be established as early as the initiation phase to assess the level of impact to the project. And they must be monitored throughout the project life.
- **Integration** – The process of coordination of project plans to create consistent, coherent tasks and documentation. It includes synchronization of project activities, tasks, quality assurance and document requirements.

All of the above requires specific plans and measures to ensure that the initiatives are focused towards the achievement of its goals and objectives. Thus, the detailed plan must be an amalgamation of the following specifics:

- **Project rationale or the business case** – What needs will the project address?
- **Project scope** – How will the project be undertaken?
- **Goals** – What outcomes are expected?
- **Project objectives** – What are the outputs and targets that the project must deliver?
- **Organizational Plan** – Who will do the work?
- **Stakeholders** – Who are other people involved in the project including the users and the beneficiaries?
- **Systems design** – Functional and non-functional requirements of the systems applications based on the needs of the user
- **Work Plan** – Timing and progression of each work package or tasks
- **Budget** – Revenue (funds) and costs that include items of expenditures
- **Communication Plan** (including the Change Management Plan)

- Quality (Standards and Assurance) Plan
- Resource and Procurement Plan
- Risks Plan
- Integration (Project Management and Implementation) Plan, which will include the Documentation, Monitoring (performance measurements) and Evaluation and Audit Plan, and the Project Closing Plan.

Activities, Tasks and the Work Plan

In the planning stage, the project management team finds it useful to list and group work activities and tasks by categories and levels (Work Breakdown Structure [WBS]). From this listing, the schedule, the resources and the costs of the project are identified. From the listing, one can also check for discrepancies, duplications and gaps in the plan.

Risk Assessments and the risk plan. The project schedules must be realistic and take into consideration external and internal conditions and factors of the project environment. Political, social, economic and cultural aspects of the environment will definitely have an impact on the project. Likewise, the internal organization where the project originates will also affect and influence the project's development and implementation. To help the project implementation team anticipate these factors that will influence the project positively and negatively, a risk assessment as early as the initiation phase should be undertaken, and continuously validated and observed during the planning and implementation processes.

Figure 34. Risk profile



Source: Nick Jenkins, *A Project Management Primer or a Guide to Making Projects Work Volume 2* (2006), p. 31, <http://www.exinfm.com/training/pdfiles/projectPrimer.pdf>.

Project resources. In the detailed plan, it is imperative to examine and undertake the estimation of the use of resources, which include the personnel, services, infrastructure, equipment and other use of facilities, including the modes of commitments and the selection of costing methods.

The project resources—personnel and contracted professional and service requirements—must be estimated in terms of their level of effort. How many days will a resource need to achieve a task or an activity?

One of the issues in committing resources for ICTD projects is the mode of procurement and acquisition of services. Should the required services be done in-house or should it be outsourced? The organization undertaking the project must be able to make a good assessment of its capability and capacity of undertaking the project. Moreover, in making concessions project managers must not forgo required tools and services that the project team really needs; and if resources are scarce the managing team must consider alternatives.

Project cost. The project budget and cost categories are based on the list and levels of activities (WBS), the Gantt chart, the network analysis and the resource plan. The latter provide data on the resources for project execution. For example, the conduct of an ICT literacy training activity will require computer equipment, systems or software application, and use of classroom facilities. These are costs that must be categorized in the activity and included in the budget. Based on the activity duration, it will be important to identify and quantify the units, the quantity per period, and the estimated unit costs. The calculation of project costs will be easy if the unit costs and required quantity are determined based on project activities.

The cost elements of the project are reported in a budget. In preparing budget proposals, fund receipts (as income or revenue) and expenditures are the general cost headings reported. Revenue funds represent the amount of financial assets and in-kind contribution used as support sources of the project, while expenditures/expenses are all of the costs anticipated to occur during project execution.

In the planning phase details of the projection of specific amounts must be calculated based on the different periods of the project activities. The main categories for project costs are direct costs and operational costs. The former refers to costs related to specific activities (e.g. organizing and conducting the computer literacy training), while the latter refers to the internal administration activities (e.g. personnel salaries, utilities, rent and other administrative expenses). Units, quantity per period and estimated unit costs are the three elements that are needed to calculate costs associated with any of these categories.¹⁹⁹

A cost-benefit analysis must be prepared to show the proposed project's "bottom line". The main interest of project sponsors is: Will the project bring in enough benefit to cover or justify operating expenses? Will the funds provided for the project be commensurate with the benefits that will be derived from the project?

As a safety measure in preparing the project budget, contingency planning must be included to cover for losses, e.g. potential delays, losses in exchange rates, and other potential project threats. Thus, the contingency plan must also review the project's cost-benefit analysis.

ICTD project funds can be sourced from national governments, international development organizations (bilateral – country to country agreements and multilateral agencies), local or international financial institutions (e.g. banks, ADB, World Bank), and contributions from individuals, groups or other social institutions (e.g. NGOs, church organizations). Support can be in the form of internal sourcing, grants, loans, private-public partnerships (e.g. Build Operate Transfer), and other forms of contributions, or a mixture of all these. Institutions and organizations that are already veterans to development work have standardized methods of requesting for project proposals, reporting systems and templates, and financial systems in place. Project proponents and partners must familiarize themselves with the funder's policy framework and management procedures. Having different fund sources could create some problems if the set ways of various partners are not harmonized.

Development of Performance Measurement and Project Documentation

As early as the planning phase, the performance measurement and reporting framework for tracking performance must be set. The project manager and the team must agree with partners on a set of results that will be monitored by primarily using a set of indicators.

The project can first set a modest baseline data collection. The baseline provides the ground for monitoring. For example in tracking ICT literacy training programmes, the initial baseline must

¹⁹⁹ Besim Nebiu, Ildiko Simon and Cerasela Stancu, "Preparing Project Proposals", Regional Environmental Center for Central and Eastern Europe, 2002.

be able to assess the level of competency of the potential trainees or participants of the training. It can also find out the demographic characteristics of the potential trainees and participants, as well as their different levels of literacy prior to the project interventions. From the baseline, progress can be tracked from the data that will be extracted during activity implementation as against the targets set. The data must be analysed from information so as to identify variances and emerging problems. Reporting on performance against expected results and agreed upon indicators must be established. For large projects, data management is necessary to integrate data from the performance measurement framework.²⁰⁰

Documentation requirements of the project must be planned and prepared to facilitate project tracking and assessments. It includes reporting templates on all the disciplines described above. Documentation will facilitate the building of knowledge in the organization.

Details on how the project will be evaluated and closed also need to be planned out. In effect, the planning stage prepares not only for project implementation but also the other remaining phases of the project: monitoring, evaluation and closing stages.

Project management software applications (proprietary or FOSS) for project documentation are available in many project management websites. An example of a freeware is the PROJECT in a Box Community Edition,²⁰¹ an application based on the PRINCE2²⁰² project management reference standards. Other project management sites are offering templates free of charge but only for the use by government, NGOs and students of project management.²⁰³

Once the detailed plans are discussed, outlined and drafted, they must be validated with key project stakeholders (sponsors, management team and beneficiaries) to complete and finalize the plan. Once finalized, the plans need to be approved and any partnership agreements signed off in order to begin project implementation.

The planning stage ends once the project plan is approved. Nevertheless the planning process does not cease to end because there are many factors in the project environment that can influence the project to change some of its course. This will be discussed further in the section on project monitoring.

Implementing the ICTD Plan

Project leadership: the project manager. In implementing the plan, the Project Manager must be able to lead and work with a project team. The Project Manager who is at the helm of the project operations must be a competent leader, able to understand and build the team. The Project Manager must also examine his or her roles and responsibilities as the leader of the project and the team in relation with other key stakeholders. The Project Manager must be a team player, able to inspire and motivate. She or he needs to be pragmatic, a good communicator, results-oriented, a conflict negotiator, and has timely approach to interventions.

200 Strategic Planning and Policy Division, CIDA Asia Branch, "Is a Project Being Managed for Development Results? Integration of RBM Principles in Project Monitoring: A Guide for Self Assessment and Monitoring", January 2000, pp. 9-24.

201 See Project in a box, <http://www.projectinabox.org.uk/community.asp>.

202 PRINCE2 or the Projects in Controlled Environments approach is one of many project management approaches. PRINCE2 was initially developed in 1989 as a standard for IT project management by the United Kingdom government. Since then the method has been enhanced to become a generic approach suitable for the management of all types of projects, and has a proven record outside both IT and government sectors.

203 See CVR/IT Consulting, http://www.cvr-it.com/Confirm_NonProfit.php.



Practical Exercise

Aside from those mentioned above, what other leadership qualities and functions do you think a project manager must have?

On a sheet of paper, each member of the class should make a list. Then stick each person's list to a bulletin board and find common elements of leadership and functions. After you find the common ones, list the differences among the class. Following a class discussion on the various lists, summarize on a sheet paper what leadership qualities and functions are essential, desirable and not necessary.

Project team and the project management office. Supporting the project manager(s) are the project team members who are directly involved in the management of activities. The Project Manager must ensure that the team understands the project mandate and scope. Team members are recruited at the initiation and planning phases of the project cycle. Project team members must have the special skills needed to make the project a success. Choosing the right people for the right tasks and activities, and ensuring that the team members and the project manager(s) work well together as a team are key in a project. Establishment of a project management office is necessary if the project is long term, huge and complex.

The project stakeholders. As discussed previously, stakeholders include those who are affected by the project outcome, whether negatively or positively, and those who can affect the outcomes of a proposed intervention. Development projects usually identify two types of stakeholders: the primary stakeholders and the secondary stakeholders. Primary stakeholders are people and groups who are ultimately affected by the project. Secondary stakeholders are intermediaries in the process of delivering services to the primary stakeholders. In addition, there are external stakeholders who are not formally involved in the project but who may impact or who may be impacted by the project activities.²⁰⁴

The World Bank (1996) outlines the following guiding questions to help identify key project stakeholders:

- Who might be affected (positively or negatively) by the development concern to be addressed?
- Who are the voiceless for whom special efforts may have to be made?
- Who are the representatives of those likely to be affected?
- Who is responsible for what is intended?
- Who is likely to mobilize for or against what is intended?
- Who can make what is intended more effective through their participation or less effective by their non-participation or outright opposition?
- Who can contribute financial and technical resources?
- Whose behaviour has to change for the effort to succeed?

There are many stakeholders in a development project. The most critical ones are: the project owner, the project sponsor, the project "champions", the project manager, the project team, and the influencers.

Aside from the project team, who are the other project stakeholders?

204 Marilee Karl, "Monitoring and evaluating stakeholder participation in agriculture and rural development projects: a literature review", SD dimensions, FAO, November 2000, <http://www.fao.org/sd/PPdirect/PPre0074.htm>.

The project sponsors are major supporters and, in most instances, the “political endorsers” of the project concept. The project manager and team must be aware of the interests and vision of the project sponsors and ensure that they support the project.

Development projects in developing countries are mostly funded by bilateral or multilateral donors. Bilateral donors include the Australian Agency for International Development (AusAID), the Canadian International Development Agency (CIDA), IDRC, SIDA, the Swiss Agency for Development and Cooperation and USAID. Multilateral donors include ADB, United Nations agencies and the World Bank. Donors usually have a “say” in the projects that will be developed and implemented. Aside from financial assistance, they could also provide technical assistance and other resources such as equipment (hardware) or software that will be used in project implementation. Typically, donors have their own policy frameworks and management systems that will influence the direction and operations of projects.

Projects may be fully funded by a donor organization, or funded jointly with other donors. Most donors require counterpart funding from the project owners. For instance, bilateral projects (i.e. government-to-government projects) require the government benefiting from the project to allocate counterpart funding for particular project expenditures. This could be in the form of time of government employees who will be involved in the project, capital outlay for equipment, or space for the project management office.

The more sponsors there are in a project, the more varied the systems and expectations are. When there is variety among stakeholders, the project team will find it more challenging to translate targets dictated by donor organizations for execution in the local context.

Project champions are project advocates or people who will support the project all the way. Although not members of the project team, the champions strive to help the project succeed. Champions are identified at the project definition stage. Champions are influential, proactive and able to manage relationships and bridge gaps for the project. They are leaders in the organization or community.

Government projects are usually championed by an individual with a high position or a group of high government officials from the implementing agency who is convinced that the project is the “way to go”. This person or group will provide the informal leadership and the charisma for the project to flourish in the organization. The absence of this person or group makes it difficult for a project to take off or to survive. The role of the champion is to represent the project’s importance and value to the organization.

At the community level, the project champions must be known and respected within the community and have good connections. They must have confidence in the project and the passion to generate support for the project from others in the community. They must have the skill to make a sales pitch for the project when needed.

Project beneficiaries or product users. In some applications “customer”, “end-user” and “owner” are synonymous as these are persons or organization who will utilize the product of the project. In e-government projects, the project owners are the performing organization, i.e. the persons in the enterprise who are most directly involved and affected in implementing project tasks. The project owners will determine the final “users” of the initiative. Such users could be a unit in the national government or a local government, a community, or an NGO. The success, usability and sustainability of projects depend on the projects’ consideration of who the owners and users are.

Project influencers are individuals or groups who, although not directly related to the acquisition or use of the project’s output, can positively or negatively influence the course of the project because of their position in the organization or in the community.



Youth In Action 14. Are you a good project manager? Take a test.

A good project manager knows him/herself—his/her skills, strengths and weaknesses. A sample self-assessment tool that you can use to gauge or benchmark your strengths, attributes and general skills in management is provided by Gary Evants, CVR/IT Consulting, at <http://www.cvr-it.com>. Once you have registered at the website, download the self-assessment tool through http://www.cvr-it.com/PM_Templates/.

7.3 Change Management

When any new concept is introduced, there are vested interests ranged for and against the innovation. There is always a difficulty in explaining the concept to different stakeholders and in gaining their support. As you know, the introduction of ICTs into the development process is not simply about introducing technology. It implies a major reform of a system or government that has to move from a slow and meandering paper, file, visits and meetings oriented system to one that is speedy, responsive and transparent. Governments accustomed to working in secrecy and away from the public gaze can find it difficult to accept change and reform. The challenges that need to be addressed are as much of processes as they are of changes in attitudes and management styles. The use of ICTs actually places many challenges in change management into sharp focus.

Change management (defined in various ways)²⁰⁵ is attendant to project management. It is already a science in itself because it has principles, a body of knowledge, skills, practices and processes that can be applied to the “people side of change” to achieve the required outcomes of a change project or initiative.²⁰⁶

Project leaders and the team must be aware that changes will occur during the entire course of the project. The team will highly benefit from a project impact analysis prior to the detailed planning at the initiation phase. The impact analysis has to focus on how the project—as a concept, as an output or as a product—affects the people, the systems, and other aspects of the organization.

It was introduced earlier that when ICT projects involve transforming organizational systems, it will necessarily interact with other systems. Thus, business processes (or procedural ways of doing things) in the organizations will likely be altered since ICT systems are put in place for the value of its more efficient outcomes.

When businesses processes and systems are altered, consequently, these will affect the operators (users) and the people availing of the systems’ services. People behave differently to changes, like new projects. As a rule of thumb, we say that in reality people resist change. Such must be handled well and the project management team might as well be primed to expect various resisting reactions from people.

ICTD projects in government designed to streamline business processes or re-engineer systems may or may not be easily welcomed by people within the organization. A project team can be

205 See various definitions at Change-Management-Coach, <http://www.change-management-coach.com/definition-of-change-management.html> and <http://www.change-management.com/tutorial-defining-change-management.htm>.

206 Ibid.

made ready and equipped once they have studied the possible impact of the new system to the organization and they have planned how to address the change scenarios. Thus, unfriendly or negative reactions may be diffused, while positive reactions may be enhanced and used to rally the project within the organization. If changes are not anticipated in the project, risk factors become high and troublesome for the project.

ICTD projects in a community setting will all the more require a conduct of the impact assessment and other social change management studies (e.g. area planning that will study community structures, systems and policies and how the project will affect the culture of the community).

When changes occur during the project implementation, these must be monitored to control and ensure that risks are minimized and mitigated. It is important to:

- Know the magnitude of changes that will be brought about by the project
- Review all the issues raised by the project team and the users
- Check risks and assumptions

The project team must assess whether the behavioural outcomes are resulting in rejection or acceptance or conditional acceptance of the project.

Some of the interventions that are found useful (depending on the behavioural reactions and magnitude) are:

- Human processes – such as a good communication plan, giving useful and beneficial information and involving those who are directly affected
- Skills building – providing people with training activities, support services and user-friendly manuals
- Use of leadership strategy where policies are created or reviewed to suit the change conditions for sustainability, e.g. to assure people of their jobs
- Providing or clarifying mandates, and role modeling
- Providing resources when inadequate
- Providing insights and changes in terms of job designs or user-friendly programme



Case 22. The Philippine e-Procurement System

The Project

The Philippine Government Electronic Procurement System (PhilGEPs) started as a USD 400,000 two-year pilot project in 2000, funded by CIDA. The purpose of the project was to: (1) increase transparency in the procurement process; (2) improve the efficiency and effectiveness of the procurement system; (3) improve the capacity and increase the competency of the Procurement Services, the agency that handles the procurement system in government; and (4) improve policies and regulatory framework to support the system.

However, by the end of the project, the pilot system only consisted of: (1) the electronic bulletin board where agency procurement opportunities were posted; (2) the supplier registry that holds the database of registered suppliers; and (3) the electronic catalogue of the price list of commodities that can be acquired without bidding.

Although the system fell short in addressing the efficiency and economic objectives of the procurement system, among the results reported in 2006 included: (1) passage

of law—the new Government Reform Act in 2003 (Republic Act 9184) designated PhilGEPs as the single portal for all government procurement notices; (2) feedback from stakeholders (suppliers, NGOs, donor groups) supported the increase in transparency within the procurement system; and (3) government savings were estimated to reach more than USD 700,000 from the cut down in expenditure on government's newspapers advertisement, and a reduction in the costs of goods and services supplied to government.

The next phase of the project featured online payment, virtual store and electronic bidding submission. The five-year project cost was pegged at PHP 250 million with partial assistance from ADB and the World Bank. In addition to supporting the development of the various components in the e-procurement system, the project also took into account user acceptance testing, and training activities including training-the-trainers programmes and the design and production of e-learning materials to sustain the training effort.

Today, the Government of the Philippines considers PhilGEPs to be the bridge and source of information on the procurement of common goods, civil works and general support services. It is now being upgraded to conform with the many and varying requirements of time and clients. The government already claims that over half a million pesos has been saved since the time PhilGEPs has been in operation at the national level.

In 2011, the Philippine government plans to roll out PhilGEPs at the local government levels.

Behind the Scenes

From the time the project was implemented, the project team had to deal with a lot of organizational and external change management issues with the stakeholders. Here are some of the issues that were experienced in the project:

- At the organizational level, the team had to deal with many issues including anxieties manifested by the employees of the agencies. Most of the anxieties were borne out of fear that people in the agency will lose their jobs when the agency becomes fully automated.
- Other issues with stakeholders included the difficult arrangements and communication with outsourced systems builders who were not only from private companies, but were engaging foreign systems programmers and service providers.
- Supplier and customer buy-in was another issue that the project team had to meet head on. Not many of the suppliers and customers were familiar with the new law and the e-procurement system. They would prefer the manual system rather than the new electronic system.

The project team together with its donor partners included change management perspectives, studies and action plans in their operational plans. They had to painstakingly implement the plans, and learn from the experiences as they carry out their day-to-day tasks and encounters with the stakeholders.

Some of the major change management activities undertaken by the team required the strengthening of their communication plans with stakeholders. For the employees within the agency, they had to conduct several dialogue sessions at different levels. With the

service providers, they had to make use of cross-cultural communication strategies while they learned how to be firm with their decisions and the manner these decisions were communicated. Furthermore, with their suppliers and government customers, they had to segment their clientele and created training modules for each group. These activities were conducted over a long period of time as their implementation strategies evolved and as they learned the attitudes and behaviours of their stakeholders.

Sources:

ADB, "Republic of the Philippines: Strengthening the Philippine Government Electronic Procurement System", Technical Assistance Report, March 2009, <http://www.adb.org/documents/tars/phi/42537-phi-tar.pdf>.

Alma Buelva, "Government e-procurement effort gathers storm", *The Philippine Star*, 16 August 2002, <http://www.philstar.com/Article.aspx?articleId=172276&publicationSubCategoryId=71>.

Philippine Information Agency, "DBM to launch E-Procurement system by 3rd quarter 2011", press release, 29 January 2011, <http://www.pia.gov.ph/?m=7&r=NCR&id=14211&y=2011&mo=01>.

Procurement Service, "History", http://www.procurement-service.org/psdbm/index.php?option=com_content&task=view&id=12&Itemid=27.

Accountability, Transparency And E-Governance: Concepts And Experiences In The Philippines, paper prepared for the Regional Forum on Reinventing Government in Asia, Seoul, Republic of Korea, 6 September 2006, <http://unpan1.un.org/intradoc/groups/public/documents/un/unpan024441.pdf>.

Author's personal communication with project team.

7.4 Building Partnerships for ICTD

A recurrent theme in this primer has been the importance of the involvement of different stakeholders and players in the ICTD space. 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, service providers, civil society organizations and NGOs, and finally the users, citizens, and beneficiaries of development.

The older perspective of donors and governments as "giving aid" to developing countries has been replaced by a strong belief that development and development outcomes can be delivered only through a grand alliance and partnership of various stakeholders working together. This perspective finds reinforcement in Goal 8 of the MDGs that specifically charges the global community to "create a global partnership for development with targets for aid, trade and debt relief." Within Goal 8, the sixth target explicitly speaks of including the private sector as a partner in the development process.

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 knowledge, do not necessarily come with the perspective of social and change processes that development requires. Neither government nor ICT specialists have the ability to reach deep into poor communities the way that NGOs and civil society organizations do. And project management skills in an ICTD setting are even harder to find.

Partnerships are not only about governments, the aid sector and private institutions coming together. The beneficiaries are major stakeholders and partnerships with the community through a process of citizen engagement and social accountability needs to be developed. Development projects put a premium on the participation of stakeholders in every stage of the project. Studies suggest that stakeholders' participation will increase the chances of product ownership and sustainability. Furthermore, international development organizations acknowledge findings in

project evaluations that those projects with limited successes or have failed were those projects who limited or have failed to involve stakeholders in the design and implementation of projects and programmes. Thus, a participatory and demand-driven approach increases the success rate of ICTD activities.

Participation is both a means and an end. As a means, it is regarded as a process by which people cooperate and collaborate in the development and implementation of projects. In the long run, participation will result in people's empowerment and self-reliance; these are end-results intended and expected from development projects.

Local Ownership and Capacity Development

For projects to be sustainable, they must be locally owned and accompanied by human and organizational capacity development. Physical access is just one element of effective ICT access and use. Local ownership and capacity development will ensure that individuals, communities and organizations can use and maintain ICT systems and gain the full benefits from their use.

In *Community-based Networks and Innovative Technologies*, Siochru and Girard refer to ownership or taking ownership as “a process of internalisation of responsibility for a development process and its outcomes, and therefore a willingness to invest considerable effort and resources. Ownership is generally regarded as a prerequisite for sustainability of a development action.”²⁰⁷



Case 23. An irrigation and communication technology network in Peru

One community owned network that is helping to connect rural Peru is in the Chancay-Huaral valley, a largely coastal agricultural region north of Lima. Owned by the district's irrigation commission, an organization that represents all farmers in the valley, the network uses WiFi technology to link 13 communities in the valley.

Initially conceived as a project to provide specialized agricultural information to facilitate communication among organizations in the community and to provide Internet access, the community reoriented it to serve their most pressing communication need—telephony. As of early 2005, VoIP telephony has been used to link the communities and to make international calls, the latter being especially popular because of the high rate of migration from the region. Ironically, while community members can speak with family members in the United States and Europe for only a few cents a minute, regulatory hurdles have prevented them from interconnecting with the national grid in order to make a call to a government office in Lima. While the easiest way to resolve the interconnection problem might be to sell the network to the national operator, Telefonica, the idea has been rejected as it would not provide the kind of service the community wants.

Source: Abridged from Seán Ó Siochrú and Bruce Girard, *Community-based Networks and Innovative Technologies: New models to serve and empower the poor*, Series: Making ICT Work for the Poor (New York, UNDP, 2005), p. 25.

207 Seán Ó Siochrú and Bruce Girard, *Community-based Networks and Innovative Technologies: New models to serve and empower the poor*, Series: Making ICT Work for the Poor (New York, UNDP, 2005), p. 19.

Citizen Engagement and Social Accountability

The social contract between governments and citizens in a country requires that, in return for the support of the citizenry through the payment of taxes, government is obligated to provide responsible and responsive governance especially in the provision of public services, in areas such as those identified in the MDGs. Of interest here is the use of ICTs to deliver these services and there have been some widely acclaimed successes, for example e-Seva,²⁰⁸ where government has done well.

The conventional and established approach to provision of services can be called the “supply side”. At the other end of supply is the “demand side”, or in ICTD terms, the beneficiaries or the users of the ICT-based services. Without the engagement of both ends of the spectrum of supply and demand, the cycle of provision and use of services is incomplete.

ICTD projects have been criticized for their high rates of failures. There are many reasons why ICTD projects may fail; but one of the most important reasons is that many ICTD projects, built top-down by donors, governments and agencies, are not designed in a participatory way with citizens and beneficiaries involvement in the design and decision-making processes. As a result, projects fail to achieve local ownership and finally have problems both of sustainability and continuity. Citizen engagement has been one of the key factors identified as a reason for success in ICTD projects.

In a very broad sense, social accountability is a process used to hold government accountable to the people. Social accountability is based on the recognition of a participatory approach in which citizens, civil society organizations, and other stakeholders are both consulted and involved in decision-making processes in services that affect their lives. The link between ICTs and social accountability therefore lies in the power of ICTs to make reliable, timely and accurate information available to the people to make good judgments and informed choices in the decision-making process. Easy access to information for civil society, citizens and other stakeholders also helps in evaluating a process or a public service based on the given indicators, and in a manner that is people-centric and addresses their concerns and priorities.

The ICT technologies available as social accountability tools include Web-enabled applications, SMS and other services available on mobile phones, call centres for grievance redressal, electronic kiosks, voice mails and other interactive voice recording services, among others.

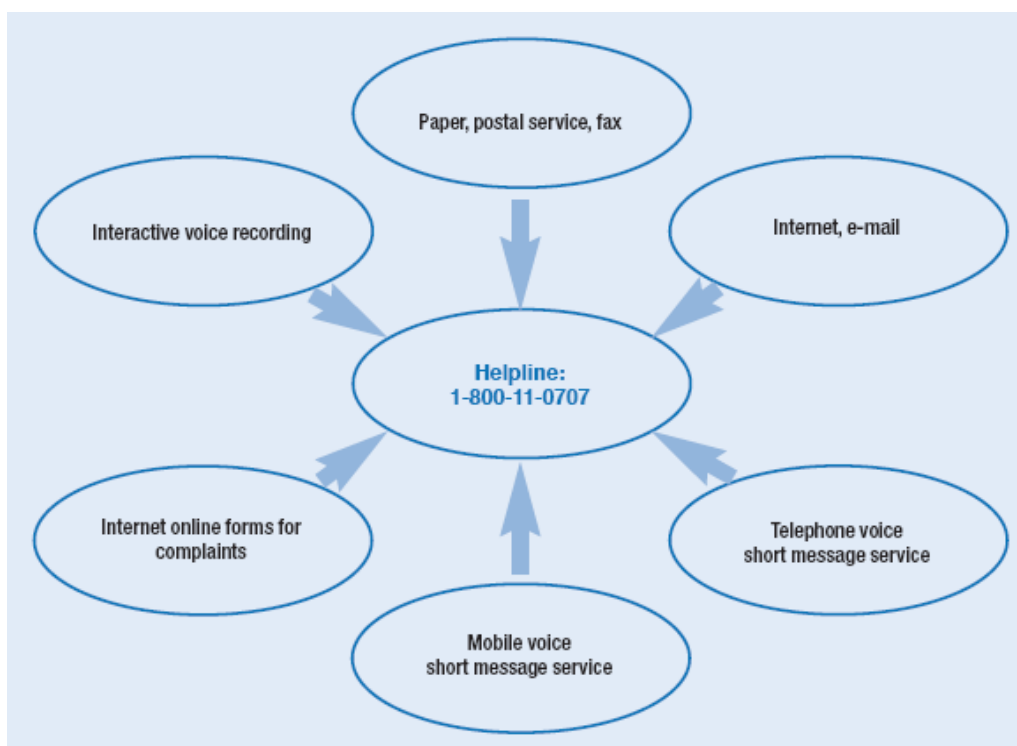
Citizen engagement and social accountability was mandated as part of law in the MGNREGA programme (see case 4). In the earlier description of the case, attention was drawn to the way in which ICTs have been effectively used by the government to manage such a large poverty alleviation programme. Figure 35 provides a diagrammatic representation of the incorporation of social accountability, through the use of ICTs, into the MGNREGA programme.

By using ICTs as social accountability tools alongside sustained awareness campaigns; capacity building for the target groups; introduction of accountability mechanisms; a social audit and public hearing; and the constant involvement of civil society and high-level government officials, the administrative efficiency and transparency of the programme has increased, while corruption levels have decreased dramatically.²⁰⁹

208 e-Seva, Government of Andhra Pradesh, <http://esevaonline.com>.

209 Rajiv Sharma, “Use of Social Accountability Tools and Information Technologies in Monitoring and Evaluation”, PREM Notes, No. 7, The World Bank Poverty Reduction and Economic Management Network, February 2011, p. 5, <http://siteresources.worldbank.org/INTPOVERTY/Resources/335642-1276521901256/PREMNoteME7.pdf>.

Figure 35. Social accountability and ICTs in the MGNREGA programme



Source: Rajiv Sharma, "Use of Social Accountability Tools and Information Technologies in Monitoring and Evaluation", PREM Notes, No. 7, The World Bank Poverty Reduction and Economic Management Network, February 2011, p. 3, <http://siteresources.worldbank.org/INTPOVERTY/Resources/335642-1276521901256/PREMNoteME7.pdf>.



Case 24. The Partnership Health of ICT Projects in Developing Countries

"There have been, generally speaking, for many years high expectations that information and communication technologies (ICTs) can make a contribution toward development. However this is not always achieved and, as has been found by several researchers, this unfavourable outcome is, amongst other things caused by partnership problems between partners."

The following are the findings from an evaluation study of ICT projects in Africa.

The study carried an extensive literature review of existing experience. The research was conducted in 10 projects involving multinational ICT companies, which were studied as separate case studies. The approach to the study was qualitative and the method chosen was case study analysis. Modes of data collection included study of secondary literature, such as case studies, administrative documents, and multimedia online resources. Archival documents were also checked.

For primary data collection, stakeholder consultations and in-depth semi-structured interviews formed the basic tools. Informed consent was taken and all interviews were recorded.

The results showed that problems with partner cooperation revolve around six core factors, namely:

- Driving force factors – where different partners have different understanding of the goals, purposes and process of the project. Problems arise when these differences are not acknowledged.
- Skills factors – where different partners have unrealistic expectations about local skills and knowledge on a variety of topics ranging from IT to management.
- Input-output factors – include difficulties that may arise as a result of unequal investments by partners (financial and human). Partners are not always explicitly aware of their mutual interests and potential mutual gains and risks in projects.
- Socio-cultural factors – where there are differences in the working ethos and working styles of different partners.
- Systems factors – where ICT systems designed for use in different agencies do not interoperate, and where the actual usage of implemented systems is different from the intended usage.
- Trust factors – include the absence of trust between partners, and promising more than can be delivered.

These were explained in the report and further research was recommended to understand the findings better.

Source: Summarized from A.J. Gilbert Silvius, Anand Sheombar and Jakobus Smit, "The Partnership Health of ICT Projects in Developing Countries", in *Pacific Asia Conference on Information Systems 2009 Proceedings* (Association for Information Systems, 2009), <http://www.pacis-net.org/file/2009/%5B93%5DThe%20Partnership%20Health%20of%20ICT%20Projects%20in%20Developing%20Countries.pdf>.

Several factors were identified as critical in a systematic review of ICTD partnerships for poverty reduction.²¹⁰ To summarize, the authors of the review identified the following as key concerns:

- Partnership building needs clear focus, shared goals, clear alignment on objectives, structure for the partnership agreement, clearly defined roles and responsibilities, accountability, transparency, ownership structure and ethical framework.
- Partnership implementation needs to incorporate issues related to expectations, organizational structures, timelines, flexibility and willingness to adapt to changing conditions, effective use of complementary skills and resources, leadership, regular interaction, communication and relationship building by partners based on trust, honesty, openness, mutual understanding and respect.
- Successful partnerships require awareness and understanding of the partnership environment, including sensitivity to local contexts and financial sustainability. A good understanding by all partners of the political, social and technology environments is also essential.

210 Marije Geldof, et. al., "What are the key lessons of ICT4D partnerships for poverty reduction? Systematic Review Report", February 2011, http://www.gg.rhul.ac.uk/ict4d/workingpapers/DFID_ICT_SR_Final_Report.pdf.



Points To Remember

- Managing ICTD projects is very much like managing other types of development projects. The same project management processes and project management cycle are involved, although some terminologies differ.
- ICTD projects must pay particular attention to managing change. In particular, the viewpoints of the stakeholders must be taken into account and their full participation in the process of project development and implementation must be encouraged. Users of the project deliverables in particular should ideally be involved from day one of the project.
- Any ICTD project requiring the efficient and effective delivery of services to its citizens must consider the disciplines, resource constraints—people, scope, time and cost—and the business process re-engineering. A careful review of the unit or the organization's system must be undertaken and the system should be modified to meet the objectives of the project.



Practical Exercise

The local government has developed a Web portal through which citizens can file their complaints and grievances relating to public utilities—water, sewage and electricity—online. However, even one year after the launch of the portal, government officials find that there are no users.

Examine the portal from the various ICTD project issues discussed so far in this section—policy and governance, technology and technology choices, content, human capacity building, change management, and project management issues.

Make a prioritized list of suggestions you would give to the local government to improve the Web portal; or

A list of reasons why the portal should be shut down and recreated afresh.

Form two groups in the class. One group will discuss the improvements to be made; the other will discuss the closure of the portal. Defend your choices in an open debate.



Test Yourself

1. Decision-making hierarchies in ICTD are meant to:
 - a. Reduce corruption in the system
 - b. Guide the way in which ICTs are governed in a country
 - c. Establish decision-making order in government
 - d. None of the above

2. To impact change, ICTD project must be anchored:
 - a. In the latest technological invention
 - b. Within government departments
 - c. Within the user communities
 - d. To the vision of a development programme

3. Project stakeholders include:
 - a. Those who are impacted by the project
 - b. Those who impact upon the project
 - c. Both (a) and (b)
 - d. Only the government

4. Effective use of ICTs for development is dependent upon:
 - a. Political will
 - b. Accessibility, costs, functions and interactivity
 - c. Both (a) and (b)
 - d. Neither

5. A “pilot run” in an ICTD project is:
 - a. Test run of all the systems before launch
 - b. Test run during the project period
 - c. Systems test at the end of the project
 - d. None of the above



CHAPTER 8.

CONTENT MANAGEMENT

Content is king and 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, there can be no hope of use. ICTD content poses the greatest of challenges, both for the developer and for the user. Content is part of the user experience that often determines the success or failure of any ICTD effort.

Content can be defined as any material, in text, audio-visual, film, still photographs and graphics (including graphs, charts and animations). It can also include narratives, interviews, dramatization, and any other form of matter that is used to populate the website, for example SMS, wikis and blogs. Very simply stated, we can: “define content broadly as ‘the stuff in your Web site.’ This may include documents, data, applications, e-services, images, audio and video files, personal web pages, archived e-mail messages, and more. And we include future stuff as well as present stuff.”²¹¹

Content development is a critical area that is often overlooked or given less importance in ICTD interventions. However, it is the most important. Currently, there is a lot of material already available on the Internet and in other places, but the bulk of the content is currently developed in English (English being the most common language of the Internet), and may be of little relevance to local conditions in developing countries. Common concerns raised by ICTD specialists in developing country contexts and projects often point 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. Furthermore, 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.

8.1 Content Issues and Content Development

Many other questions need to be addressed when planning the content aspect in ICTD interventions. For instance:

- Who are the users and what are their needs, i.e. what are the users’ profiles? What are their language needs? Who is the content suited for? Who are involved in the creation of content?
- What biases—social, cultural, economic, religious, linguistic, and gender—does the content address?
- Is the content realistic in terms of the community experiences? For instance, is it relevant in terms of the women’s experiences? Is it locally developed? And what share do the women have in developing their own content?
- How is the content organized?
- Is the content meeting information needs? Is it accurate? Is it up to date?
- How has the technology been modified to make it easy for the users to use, hear and understand?

211 Peter Morville and Louis Rosenfeld, *Information Architecture for the World Wide Web* (O’Reilly Media, 1998), p. 219.

- Is individual and group use built in and encouraged? Is locally produced content encouraged and used?
- Does the content encourage, promote, and facilitate interactivity and feedback?
- What support systems, such as ground-level facilitators and other materials, have been included and made available?
- What mechanisms are in place for correction and modification of the content?

Current developments in technologies and applications such as FOSS, Web 2.0 applications and mobile telephony address some of the inherent weaknesses of earlier efforts. They offer flexible responses to some chronic challenges that earlier efforts faced.

The first of the challenges is the issue of localization of content, including 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 requirements. 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.

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. Web 2.0 applications are based on the principles of user participation and user-generated content. They are open and encourage sharing, interactions and collaborations. Thus, if one combines FOSS software and applications and local language fonts with Web 2.0 applications including social networks, it is possible even for a village with minimum ICT skills to access, use, create and share content for his/her own needs and for community needs.

Figure 36. FOSS and Web 2.0 applications available for users to build their own content



Source: David M. Kennedy, "Copyleft and Web 2.0: Opportunities for Engaging Learners", presentation made at iCOOL2007: Pedagogical Script for ODL, 13 June 2007, slide 9, <http://www.slideshare.net/deekaay/copyleft-and-web-20-opportunities-for-engaging-learners>.

Mobile telephony opens up yet newer and more flexible opportunities for both content and services. With today's mobile phones coming with inbuilt capabilities for SMS and Multimedia Message Service (MMS), individuals can create simple messages and communicate individually or in groups with each other. In addition, with the rapid development of applications available for mobile (m-apps) a quick and easy mobile uptake is the preferred option for service providers. In developing economies, service providers and operators are developing mobile services such as mobile banking, remittance payments and mobile health services that take advantage of the lack of access by the poor to social infrastructure such as banks and hospitals.



Case 25. MMS and the women in Theni: Creating local content for local use

Theni is a poor, chronically drought prone district in Western Tamil Nadu, India. The people are poor, marginal farmers, who work on their small plots of land, while also seeking off-farm employment through India's MGNREGA scheme.

Everyday, between 2 p.m. and 2:30 p.m., 5,000 women members of the self-help group in Theni receive a voice mail over their individually owned mobile phones. The voice mail will give them information and knowledge about a range of issues, from local employment opportunities, free legal aid clinics, health and hygiene tips, and women's empowerment issues.

Figure 37. Theni women using mobile phones to communicate



Source: VIDYAL, <http://www.vidiyalingdo.org/ict.htm>.

How was this done? VIDYAL, the local NGO that facilitated the use of mobile phones for communication had little knowledge about the potential of the instrument. A chance experience of a political message coming over the mobile phone made the local NGO wonder if the mobile phone could be used to network and communicate to all members of the self-help group. A partnership was forged between the NGO, the women themselves and a mobile service provider. Under the agreement, the women members of the group each purchased a mobile phone and connection from the service provider and placed a minimum service subscription on it. The service provider agreed to send one voice mail message per day to the members. The voice mails in Tamil, the local language, were recorded by the self-help group leaders at a rudimentary facility at the NGO's office, sent via Internet to the mobile service provider who in turn blasted this voice mail to the membership list. This facilitated the horizontal transfer of knowledge, enabling local content production and dissemination.

The NGO has also created Village Knowledge Centres (telecentres) where the women and other villagers can go to access additional information.

An impact assessment by the author on the use of ICTs at Theni revealed that the voice mail is eagerly awaited every day. For the women of Theni, the voice mail is a friendly medium as it addresses the problems of both literacy and language. The mobile phone offers them a flexible and familiar way of accessing knowledge and content that is localized specifically to meet their relevant needs. The women will not trade their mobile phones even for gold.

Sources: VIDİYAL, "ICT based Life Long Learning (L3) Farmers and Knowledge Infomediary", <http://www.vidiyalngdo.org/ict.htm>; and personal visit for impact evaluation of the project by the author.

Despite the greater ease of use that current ICTs and new applications provide for a larger number of people to access and use, it would be erroneous to assume that it is possible today for even the illiterate village woman to use and harness ICTs for socio-economic development. Content development and management is a specialized skill, especially in an ICTD context, when an understanding not just of language, but also of different types of technical content becomes essential.

Content issues cannot be separated from issues of ethics, copyrights and IPR. These are briefly discussed here.

8.2 Ethics, Copyrights and IPR

This brief section on ethics, copyright and intellectual property issues in the use and study of ICTD is meant to serve as a quick introduction and a guide for students and readers so that they are aware of the key issues and debates, and that they are guided in their decision-making both theoretically and in the field when confronted with moral dilemmas. This section is considered very important, and students/readers are encouraged to read the various sources cited during the discussion for a greater understanding of the concepts.

In section 1.4 on Managing Human Development, it was argued that managing development was both a political and an ethical process. While political processes imply choices and the making of them, ethics deals with the philosophical foundations of such decision-making; of the values that underpin such decision-making that will enable the choice between good and bad options, between rights and responsibilities.

Ethics

Ethics is also concerned about the conduct of human beings. All scientific activities, including those in social sciences, and consequently development, are conducted with the participation of human beings or have an impact on human beings and/or the wider society as a whole. Therefore, development activities, with or without ICTs, cannot be free of ethical responsibilities and judgments.

The introduction of ICTs as inputs in the development process is also not free of ethical concerns. This is because ICTs are introduced into an existing culture, with its own identities, norms and values of what is "good" and what is "bad".

Essentially, the purpose of ethics in development is to ensure that certain common principles are observed in the day-to-day practice of development work. Within the realm of ICTD, it is also necessary to keep in mind and rigorously observe critical aspects of copyright and IPR.

Copyrights and Intellectual Property Rights²¹²

Everyone and anyone who has used their own intellect, hard work and creativity, feels entitled to the protection of the process and product of their labour. The idea of copyrights and IPR enshrines this principle that is part of many international agreements and conventions. Although copyrights and IPR may vary from country to country, there are some common standards applied worldwide.

Essentially, intellectual property refers to “creations of the mind: inventions, literary and artistic works, and symbols, names, images, and designs used in commerce.”²¹³ Intellectual property is divided into two categories:

1. Industrial property, e.g. inventions (patents), trademarks, industrial designs and geographic indications of source.
2. Copyright, e.g. literary and artistic works such as novels, poems and plays, films, musical works, artistic works such as drawings, paintings, photographs and sculptures, and architectural designs. Rights related to copyright include those of performing artists in their performances, producers of phonograms in their recordings, and those of broadcasters in their radio and TV programmes.

Ethics requires that intellectual property be respected and that the author or inventor receives the benefits from his/her property. Ethics are principles of conduct that cultures generally agree upon. There is no state coercion involved if you do not behave in accordance with the standards. However, in the case of IPR, law is backed by the power of the state to compel, to punish and coerce compensation of loss in case of violation.

Issues of copyright and IPR become even more important in ICTD as choices are made about proprietary and FOSS, and issues centre largely around the illegal use of proprietary software (called piracy) and illegal use of content (plagiarism). Both piracy and plagiarism are clear violations of both ethics and the law, and are punishable by legal action under laws of many countries.

This is where FOSS has clear advantages over proprietary software, as it has been created as a matter of freedom. If copyright exist to provide legal protection to authors of documents and software so that they cannot be used without permission, “copyleft”²¹⁴ provides a method for software or documentation to be modified, shared, and distributed, provided it remains free.

This does not mean that what is not covered by copyright is automatically free for use. Material for public distribution can also be protected under the Creative Commons,²¹⁵ a non-profit organization that 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). Under the Creative Commons, it is possible to ensure wide distribution of knowledge products while at the same time ensuring that the rights of the original authors are protected.

212 The contents of this section have been summarized from information available at the WIPO website. To learn more, students and readers are advised to go to the site, <http://www.wipo.int/about-ip/en/>.

213 Ibid. See also WIPO, “Understanding Copyright and Related Rights”, http://www.wipo.int/freepublications/en/intproperty/909/wipo_pub_909.html.

214 See <http://www.gnu.org/gwm/libredocxml/x53.html>.

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

The importance of ethics, copyrights and IPR cannot be understated for anyone studying and working in the field of development in general, and ICTD in particular. In development, the focus is on people, many of whom are poor and vulnerable to exploitation. Within a human development approach, with rights and social justice at heart, their human rights cannot be ignored or brushed away. With the realm of ICTD, the engagement, in addition to core development issues is with the use of hardware and software, and of content (proprietary and open)—all of which are governed by copyrights and IPR laws. Neither science nor society—the realm of social sciences—is value free; both are changing and evolving and converging in more ways than in technology alone. And as long as ICTD deals with both technologies and human societies, ethics will remain central to the discussion and will be a critical, if an invisible component of the quality of ICTD efforts.



Points to Remember

- Content can be defined as any material, in text, audio-visual, film, still photographs and graphics (including graphs, charts and animations). It can also include narratives, interviews, dramatizations, and any other form of matter that is used to populate the website, for example SMS, wikis and blogs.
- Content development is a critical area that is often overlooked or given less importance in ICTD interventions.
- Current developments in technologies and applications such as FOSS, Web 2.0 applications and mobile telephony address some of the inherent weaknesses of earlier efforts. They offer flexible responses to some chronic challenges that earlier efforts faced such as localization and relevance.
- Intellectual property refers to “creations of the mind” for which property rights are recognized. Intellectual property can be divided into two categories:
 - Industrial property, e.g. inventions (patents), trademarks, industrial designs and geographic indications of source.
 - Copyright, e.g. literary and artistic works such as novels, poems and plays, films, musical works, artistic works such as drawings, paintings, photographs and sculptures, and architectural designs.
- Emerging from the ICT revolution are efforts 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).
- Ethics requires that intellectual property be respected and that the author or inventor receives the benefits from his/her property.



Practical Exercise

In the normal course of their teaching duties at the local college, several faculty have reported finding pirated software improperly installed on the computers in the computer labs. Faculty also found that students have copied and pasted materials from various Internet resources into their own assignments and reproduced them as if they were their own. This, they find, is a common problem among their students. Before taking a decision on what should be done, faculty asks you, as students, for your inputs to decision-making.

List:

1. What are the ethical and IPR issues that the faculty are confronted with?
2. What are the steps that the faculty should take to address the ethical and IPR issues?
3. If you were the student who copied and was caught for plagiarism, what are the consequences you would expect?



Test Yourself

1. ICTD solutions should be designed to be:
 - a. Cheap
 - b. Sustainable and process oriented
 - c. Sensitive to local conditions
 - d. a and b
 - e. b and c
2. "Localization of content" means:
 - a. Making content culturally appropriate
 - b. Translating content to local languages
 - c. Both
 - d. Neither
3. Mobile telephony allows content to be shared through MMS even if a person is:
 - a. Not literate
 - b. Does not know English
 - c. Both
 - d. Neither
4. Software programs and applications, unless they are FOSS, are protected through:
 - a. International agreements and treaties
 - b. WIPO
 - c. Are not protected and can be pirated
 - d. Copyrights and IPR laws in each country

5. Which of the following statements related to Creative Commons licenses and copyright is incorrect?

- a. A copyright is a set of exclusive rights granted by a state to the creator of an original work.
- b. Creative Commons licenses aim to create a more flexible copyright model, replacing “all rights reserved” with “some rights reserved”
- c. People who use a Creative Commons license give up all of the rights to their creation
- d. Creative Commons licenses make online sharing and collaboration easier

CHAPTER 9.

TECHNOLOGY MANAGEMENT

There has been rapid growth in telecommunications infrastructure in the Asia-Pacific region between 2000 and 2010. Satellites can now connect the remotest locations and submarine fibre optic cables straddle the globe. Given the slow growth rate in fixed line telephones, mobile phones are the preferred form of communication and sometimes the only option in conditions where there are few or no fixed line telephones. The Asia-Pacific region boasts the highest growth rate in mobile communications and broadband Internet.

Such high rates of growth nevertheless hide the picture of uneven growth and intra-region and intra-country disparities. Two countries, China and India combined, account for more than 57 per cent of the growth in telecommunications.²¹⁶ Elsewhere, there is growth, but in a piecemeal fashion across the region, notably in airport lounges, transport hubs, government offices, businesses, cybercafés and hotels, particularly offering mobile and broadband connectivity.

The energetic expansion of broadband, however, has remained more of a phenomenon limited to the Asia-Pacific developed economies and a few others such as Indonesia, Pakistan and the Philippines. Huge intra-country disparities exist, with growth mostly concentrated in the affluent urban areas, and thinning out as one moves away from urban centres to rural locations. Lack of “line of sight” wireless communications towers and inadequate fibre optic cabling results in low and poor signal strength. Consequently, in rural areas and in those areas affected by geographic constraints such as distances and mountainous terrains, narrowband dial-up access continues to be the norm.

The digital divide continues to exist in terms of telecommunications infrastructure. This is a challenge that the developing countries in Asia-Pacific region will continue to face as they rush to catch up with the rest of the world, while also ensuring that the choices in telecommunications that are made by governments are “future proofed” (i.e. choices made keeping in mind the rapid advancement of telecommunications technologies, and the need to support expansion and scalability).

9.1 Technology Access

The telecommunications challenge is exacerbated by the problems of access. Access to ICTs means different things to different groups of people. For a government, it might mean providing access to Internet and mobile services, yet for villagers it might mean being able to get the right information at the right time. Both perspectives are equally valid, but placing them into a hierarchy enables clearer understanding (see figure 38).

²¹⁶ BuddleComm, “2010 Asia – Mobile, Broadband and Digital Economy”, April 2010, <http://www.budde.com.au/Research/2010-Asia-Mobile-Broadband-and-Digital-Economy.html>.

Figure 38. Access to ICT hierarchy



Credit: Rajnesh D Singh

Singh has elaborated that:

- Access to financial resources determines the ability to invest in the necessary skills, education and training to effectively use ICTs, purchase the necessary equipment and services, and maintain them.
- Access to basic computing skills is necessary to operate, understand and interact with ICTs.
- Access to a power source is necessary to power a computing device as well the communication infrastructure.
- Access to a computing device is essential to interact with and use ICTs.
- Access to Internet provision infrastructure is necessary to get connected to the Internet itself.
- Access to the Internet allows one to navigate and use the wealth of information and services available online. Cost of Internet access is also an important consideration here.
- Access to content allows one to find applications and services of interest and perhaps even to contribute the same.
- Access to localized content allows one to find applications and services in one's own language or dialect, and is of particular relevance to the developing world where a large part of the population may not read or write English, the dominant language of the Internet.²¹⁷

There are other challenges that have to be addressed and multiple issues to consider when taking decisions on the provisioning of access to ICTs. For instance, availability of a telecommunications signal via the mobile phone will not be useful for someone who does not own or have access to a mobile phone.

Providing access through telecentres and other access points is not the same as an individual or community having access. The fact that there is a local telecentre does not mean that there is access, if a woman has to walk four kilometres to use it or if women cannot leave their homes easily due to social and cultural factors. Thus, access is more of a social and cultural issue than that of technology alone.

Access is also determined by patterns of ownership and control. Often the choice of location of a telecentre is determined by questions of "safety", not accessibility. Where the technology is placed in a community setting also determines the social issues than underpin access. If the

217 Rajnesh Singh, *Module 4: ICT Trends for Government Leaders*. 2nd edition, *Academy of ICT Essentials for Government Leaders* module series (Incheon, UN-APCICT/ESCAP, 2011), <http://www.unapcict.org/academy/>.

technology is located in a local government office or school, what opportunities do the poor, often living on the marginalized fringes of the villages, have to access it? Can women and girls come as comfortably to the venue at any time convenient to them? If the telecentre is open at times when women's household duties take precedence, access is denied.

Moreover, if there is a 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 does that affect access to the marginalized?

In addition to the conditions of socio-cultural factors, poverty, illiteracy, time availability, mobility and relevance are key factors influencing access. If the capability of the ICTs to transcend the barriers to mobility and relevance can be harnessed effectively, then reach will translate into access and subsequently more "inclusive" ICTD.

To sum up, availability of telecommunications infrastructure is a precondition to the use of ICTD and must be addressed; while issues of access are based as much on technology factors as they are on the enabling environments (economic, social and regulatory) that has to be planned for. Otherwise, as found in a recent study in five states in India, Internet access in rural areas is at less than 5 per cent.²¹⁸

9.2 Technology Choices

The choice of delivery systems is important. These can be offline, as with multimedia CDs and DVDs, or online Internet-based applications. It is important to begin by saying what delivery systems are not. Creating an ICT product is not about developing a website for an institution. It is not just about digitizing sound or video and making it available on a disc or on the Internet. It is not about putting page after page of text on a website.

The major factors that determine choice of delivery medium are access and timeliness. For instance, if the ICTD intervention is designed to provide timely market prices to farmers, then obviously, farmers must have quick and ready access to the delivery medium and the information available on the medium should be completely up to date. This is why successful ICTD for agriculture interventions are moving from Internet-based platforms to mobile technologies where it is possible to provide both timely and relevant information to the farmer, right on his or her personal mobile phone where he or she has ready access.

Other factors that need to be addressed are ease of design and use. To arrive at the appropriate choice, results from the preliminary needs assessment conducted before the project launch is useful. For instance, information about access is needed. The very existence of telecommunications links or connectivity does not mean the user has access, if he or she faces an electricity outage or does not own a computer or mobile phone. So, the choice of delivery mechanisms and tools is not based on what the developer has, but on what the user has access to and can use easily without much effort or cost.

Managing time and human resources is an important part of planning and implementing ICTD projects. Usually, there is a tendency to spend a great deal of time in making choices of software and IT platforms. Yes, these choices are important as they are related to access, ease of use and complexity, but not as much as giving attention to content. It is very easy to design and establish a portal, but it is very hard to populate it with relevant, timely and useful content. So, in planning for the use of ICTs, a great deal of attention must be paid to content development.

218 This study is part of an ongoing research project entitled, "Community Empowerment through ICTs: Evidences from Grassroots in Bangladesh and India". The India section is being developed by the author.

9.3 Technology Costs

As with any other product development, ICTD development has both fixed and direct costs. Fixed or hidden costs are institutional and generally speaking, public funded institutions tend to ignore these as part of a costing process for developing the ICTD intervention. Direct costs are those in which there is clear and visible expenditure for the development or production of the ICTD intervention.

Decisions that are likely to affect costing depend on whether the institution chooses to produce the content in-house or to outsource it to a private provider or developer. For institutions that lack in-house expertise or are short on staff, it may be better to outsource the product development process to save valuable time while ensuring value for cost.

Development costs for ICTD interventions are high and there are few yardsticks by which to assess costing. Costs also vary from country to country, from one product to another and between different vendors and developers. Costs are also dependent upon the features that are to be included in the product; the greater the use of audio-visual and interactivity elements, the higher the cost.

Allocation of funds is also important. Fixed costs being taken as a constant, an equal distribution between content and product development is advisable. For instance, with USD 100,000 available for direct costs, spend about USD 50,000 on content development, and the balance on product development, packaging, testing and trial runs.

Again, there is no common yardstick for determining allocation. If content is readily available, more money can be allocated for development. On the other hand, if content has to be developed afresh, it is advisable to spend the necessary money, time and effort to develop good quality content. Because it is in the content and the interactivity features that the strength of the intervention lies.



Points To Remember

- Access is the single most important determinant when addressing technology issues.
- The major factors that determine the choice of delivery medium are access and timeliness. Other factors that need to be addressed are ease of design and use.
- As with any other product development, ICTD development has both fixed and direct costs. Fixed or hidden costs are institutional, generally speaking. Direct costs are those in which there is clear and visible expenditure for the development or production of the ICTD intervention.
- Development costs for ICTD interventions are high.



Practical Exercise

An NGO of senior citizens in your community asks you to help design a way in which they can effectively use ICTs to communicate with each other and with the world.

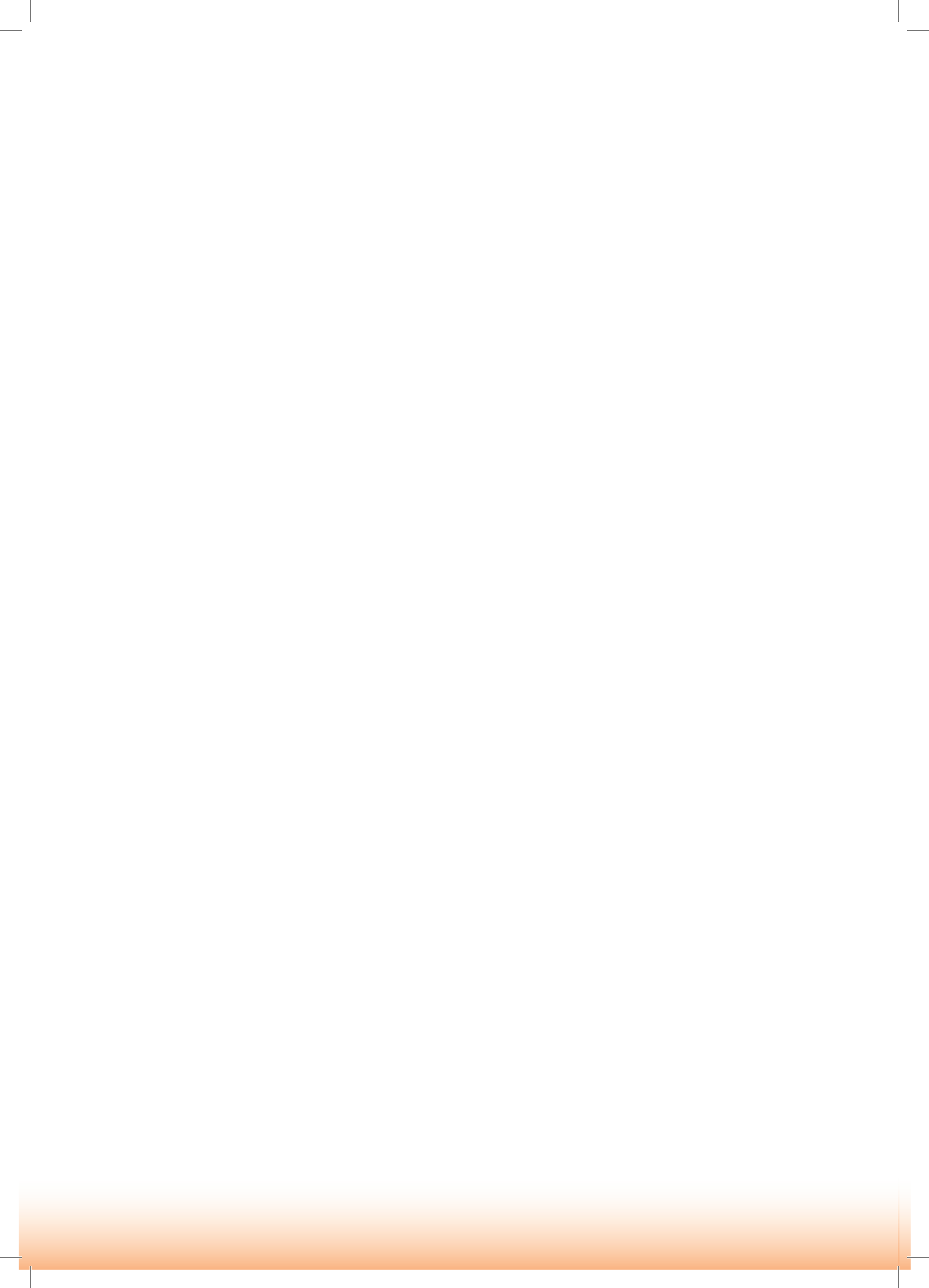
Make a list of questions you will ask them about their needs, and about technology access issues.

Based on the answers you receive, recommend a technology choice for them.



Test Yourself

1. Which of the following is NOT part of the access hierarchy?
 - a. Reach of a television signal
 - b. Ownership of a mobile phone
 - c. Being able to send e-mails
 - d. None of the above
2. Which of the following are necessary conditions for choosing a delivery medium?
 - a. Access and timeliness
 - b. Design and ease of use
 - c. Neither
 - d. Both
3. Which among the following would generally be a direct cost?
 - a. Building
 - b. Salary of employees
 - c. The computer and associated peripherals
 - d. Product development
4. As a thumb rule, what percentage of a budget should be allocated for content development?
 - a. 30 per cent
 - b. 40 per cent
 - c. 50 per cent
 - d. 60 per cent
5. What can you infer as a conclusion from this section on technology choices?
 - a. It is better to buy the latest available technology from the market
 - b. It is better to match user requirements to technologies
 - c. It is better to develop technologies suited to local conditions
 - d. None of the above



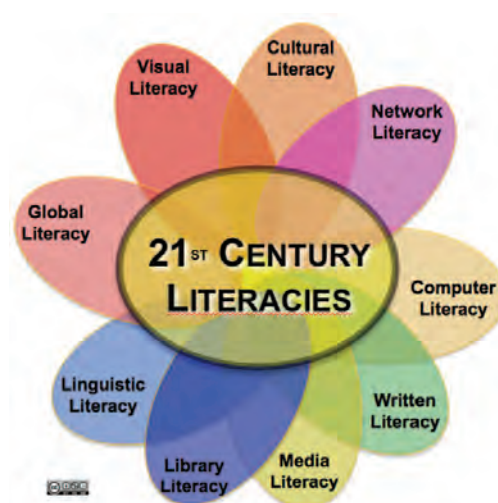
CHAPTER 10.

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.

The traditional understanding of literacy (reading, writing and arithmetic) has given way to a new understanding of what literacy constitutes and how it impacts on ICTD. This is for two reasons. The first relates to the changing nature of today's children and youth who are "digital natives", who have spent their entire lives surrounded by some media or another, whether it is radio and TV, or computers and mobile phones, to cite a few. They are familiar with and are comfortable with the tools of the new century. The second reason is that the tools of the present century, the digital ICTs, require a different set of literacies. The ability to search for and use information through ICT tools is more important than knowing how to simply use a computer. The ability to use a mobile phone with its visual cues and icons can be used even by an illiterate. The changing landscape of literacies is best described in figure 39.

Figure 39. Changing landscape: New literacies



Source: <http://www.eur.nl/ub/english/instruction/skills/informationliteracy>, used with permission from David M. Kennedy under a Creative Commons license.

This is not to say that there is little need for human capacity building for ICTD. One of the major lessons learned from ICTD project interventions over the past two decades is that:

Any technology will be insufficient if people do not understand how to put it to effective use as part of their lives or their work, either because they are not trained to use it, or they cannot imagine the possibilities for how they could use it. People will be encouraged to use ICT only when it is apparent to them that it will have a positive impact on their daily lives. Further, it is essential that people understand the broader potential for technology, so that users are empowered to innovate for themselves and use technology in creative ways that may not have been envisioned by the project or policy.²¹⁹

219 Bridges.org, "Real Access/Real Impact criteria", http://www.bridges.org/Real_Access.

This means that some basic ICT literacy is essential for effective use of ICTs and consequently, efforts have to be made to ensure that all citizens have basic competencies to succeed in using ICTs. The exponential growth of mobile phones with their ease of use have to some extent helped to develop ICT literacy and skills in the population at large; as also the reality of the younger generation having ICTs as part of their daily lives, have contributed to their proficiency in exploiting these tools for accessing information.

In section 3, when discussing the use of ICTs in education, a distinction had been made between ICT skills (i.e. developing specialist ICT skills to meet the country's ICT sector and economy needs); and ICT in education that addressed the issue of integrating ICTs into the educational process in schools and colleges.

Developing and retaining skilled users and professional ICT workforce is also essential for sustainable social and economic development. Further, the skills and competencies of those in the field of ICTD are even more essential as it is this skilled workforce that will successfully implement ICTD programmes and initiatives. ICTD human capacity building, therefore, goes beyond both broad ICT literacy and ICT in education, to creating a core set of competencies that today's and future government leaders, academics, researchers and ICTD activists need to make the most of the potential of the technologies.

Some assumptions about ICTD underlie the issue about human capacity development in this field. First, the debate is not about either development or ICTs. It is about both and how to use the latter to achieve the goals of the former. A second assumption is that while ICTs have generated considerable interest, the interconnections between development and ICTs are still not well understood by policymakers, planners, administrators or practitioners around the world. This is true at least in part because those working in developing countries are not necessarily familiar with the manner in which ICTs have been used in other parts of the world. Also, few development practitioners are highly trained in new technologies; and those professionals who understand technology, are unfamiliar about the potential of ICTs in addressing development problems of say, non-literate adults.

Capacity development is the "process by which individuals, groups, organizations, institutions and societies develop abilities (individually and collectively) to perform functions, solve problems and set and achieve objectives."²²⁰ All sectors of a society need capacity building, from the policymakers to the last beneficiary in a village. However, the responsibility of reaching the last person is that of the national polity through its various institutions. For international donor and technical assistance agencies, a capacity building responsibility is a moving target but usually ends at the point where national and local systems take over.

Two groups of people are usually left out of the debates on ICTD human capacity building:

1. The present set of government leaders and officials (both in the public and civil society sectors); and
2. Young people currently at tertiary levels of education and who will be the leaders of tomorrow in their respective countries.

220 Peter Ballantyne, Richard Labelle, Stephen Rudgard, "Information and Knowledge Management: Challenges for Capacity Builders", Policy Management Brief No. 11 (Maastricht: ECDPM, 2000), <http://www.chs.ubc.ca/lprv/PDF/lprv0075.pdf>.

10.1 Government and Public Officials

The first group of people consists of:

- Policymakers and Decision makers – Political enablers, policymakers, 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 as 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 deeply committed to the cause and possess an in-depth understanding of both ICTs and the contexts and conditions in which these are to be deployed and used. These will be the key persons whose training is part of a national capacity building activity.

Capacity building for this first group of people needs a sustained, institutional building approach to develop the core competencies in ICTD. This approach requires a combination of needs assessments, 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. The experience of APCICT in developing and rolling out the *Academy of ICT Essentials for Government Leaders* is a good example of systematic human capacity building in ICTD.²²¹

10.2 Capacity Building for the Future

Building human capacity for ICTD among the college and university going youth is necessary for “future proofing” the field of ICTD. At present, there are only a couple of academic programmes in the field of ICTD; these are in developed countries.²²² As ICTs continue to grow and develop at a rapid pace and governments increasingly use ICTs to meet their development, governance and social accountability obligations, there is a need to anticipate future developments in ICTD and to create learning programmes designed to address human capacity constraints in all sectors of society.

²²¹ See UN-APCICT/ESCAP, ICT Human Capacity Building for Development, ICTD Case Study 1 (Incheon, 2010), <http://www.unapcict.org/ecohub/ict-human-capacity-building-for-development-3>.

²²² A listing of course offerings in ICTD is available at Bytes for all, “Academic or training programmes offered on ‘ICT for Development’”, http://bytesforall.net/?q=programs_on_ICT4D.



Youth In Action 15. Enroll in the APCICT Virtual Academy

For those interested in how ICT can be implemented to improve livelihoods and empower society the APCICT Virtual Academy is an excellent resource. The Virtual Academy is an online distance learning platform that features a series of lectures from prominent scholars and policymakers in the field of ICTD. The video lectures serve to give a thorough introduction to key issue areas within ICTD discourse, which include, but are not limited to, the use of ICTs in disaster risk management, network security and privacy issues, and ICTD project management. There are currently 10 modules available in English, Bahasa Indonesia and Russian that you can go through at your own pace. Access to the Virtual Academy is free of charge. Currently passing the final quiz with score higher than 80 per cent for a module makes one eligible for an e-certificate, and passing all modules available under the *Academy of ICT Essentials for Government Leaders* programme will make one eligible for a printed certificate.

For course information and registration visit the APCICT website (<http://e-learning.unapcict.org>).

For those with limited or no Internet access, contact APCICT for a CD-ROM version of the APCICT Virtual Academy.



Points To Remember

- 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.
- Developing and retaining skilled users and a professional ICT workforce is also essential for sustainable social and economic development
- ICTD human capacity building, therefore, goes beyond both broad ICT literacy and ICT in education, to creating a core set of competencies that today's and future government leaders, academics, researchers and ICTD activists need to make the most of the potential of the technologies.



Practical Exercise

Some people say that ICTD is the general responsibility of IT specialists and engineers. Others argue that ICTD is the domain of social scientists.

Form two groups. One group argues the case for IT specialists; and the other group argues for social scientists.

At the end of a 30-minute debate, find and list five common aspects present in both arguments. Find and list five of the differences. Synthesize them to form a common understanding of what ICTD capacity building should contain. Share this with the rest of the class.



Test Yourself

1. “Digital natives” is a term used to describe:
 - a. First generation literates
 - b. Computer literate individuals
 - c. Young people who have spent their entire lives surrounded by ICTs
 - d. New communities that have just learned to exploit ICTD

2. “Future proofing” in ICTD means:
 - a. Providing for back-up systems in case of failure
 - b. Establishing laws for governing the system
 - c. Making wise choices keeping growth and change in mind
 - d. Using Moore’s law to determine technology choice

3. Human capacity building for ICTD is about:
 - a. Teaching people computer literacy
 - b. Developing a core set of competencies for this field
 - c. Teaching people how to use websites
 - d. Teaching people how to create content for websites

4. Literacy today means:
 - a. Knowing how to read and write and some arithmetic
 - b. Knowing how to use ICTs
 - c. The ability to search for and use information
 - d. Learning a software package

5. The debate about ICTD capacity building is:
 - a. About development or ICTs
 - b. About getting a degree in ICTD
 - c. About understanding development issues
 - d. About both ICTs and development, and how to use the former to achieve the goals of the latter.



CHAPTER 11.

ICTD PROJECT EVALUATION

Across all sections of this primer, one theme has underlined the discussion—that development is a people-focused concept; and the use of ICTs for 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 projects reported in an earlier section; and will also help the meaningful and appropriate use of ICTD solutions to address time, location and problem 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.

This chapter explores key concepts in the process of evaluating ICTD projects. It draws attention to specific ICTD-related variables that one must examine when evaluating ICTD programmes and projects.

11.1 Concepts in Evaluation

The first concept one must understand is that of the difference between “effects” and “effectiveness” and “impact”. Irrespective of the dominant paradigms of different periods in the study of ICTs:

- **Effects** can be defined as any change or reinforcement produced in the psychological framework of the individual. When this change or reinforcement occurs among a sufficiently large number of individuals, it is manifest as change at the societal level. Effect is best understood as a long-term change in societies as a result of exposure to and the use of ICTs on an ongoing basis. For example, changes in societal values, such as a small family norm, are often attributed to long-term sustained public health campaigns in public media.
- **Effectiveness** is the extent to which a given programme or project has achieved the intended aims and objectives.
- **Impact** is the long-term result of the effectiveness of a given programme or project. Impact is of four kinds: efficiency, effectiveness, innovation and risk.

In evaluating ICTD programmes and projects, it is necessary to look at “effectiveness” and “impact” rather than merely at the effect of the introduction of the ICT intervention.

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.
- Evaluation can also be helpful in identifying if the ICTD solution is scalable, replicable or produced best practices that can serve as normative standards.

Varied factors in different situations influence the success or failure of ICTD programmes and projects. But what is clear is that one basic factor that contributes to the success or failure is the investment in terms of time, resources and effort in collecting information through research and integrating the results of such research into planning, design, implementation and utilization.

11.2 Stages of Evaluation

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. Salient components of formative evaluation are:

- Feed forward research – Evidence collected here helps in understanding the target beneficiaries, their characteristics, their needs and constraints. Target beneficiary issues include levels of literacy and education, socio-economic status and gender constraints. Thorough feed forward research data is also collected on the access, availability and affordability of different ICTs in local settings; and the specific needs and expectations from the ICTD project. This information makes it possible to design a more effective ICTD project.
- Pilot or prototype testing – The purpose of testing the programme or pilot is to assess the product, content and the technical aspects—all from the beneficiary point of view. Here, the emphasis of the testing is specifically with how knowledge content and tasks are presented and organized, the structure, sequencing, navigation buttons, pace of content, interactivity and ease of navigation and use. Inputs from this testing will help in designing the ICTD solution more effectively to match the beneficiary requirements.
- Resource mapping – Is the effort to find out what systems are in place at the user end to enable extensive use of the ICTD solution. For instance, is there access to the Internet; are mobile phones readily available; is there a telecentre that can be used as a common facility; and what grass-roots organizations exist that can be helpful in taking the ICTD solution forward.

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 at regular intervals for several purposes.

- Assessing the performance of a programme or project is the first purpose. Data gathered are compared against the project objectives to suggest corrective measures that need to be taken if required. This presupposes a clarified purpose of and a systematic approach to data collection and use.
- Monitoring or process evaluation is also necessary to assess the quality and quantity of inputs and outputs; to cover aspects of finance and to determine if expected changes are taking place in the beneficiary community.
- A third purpose of monitoring or process evaluation is to assess the organization responsible for the programme or project. In some instances but not always, these persons may also be the beneficiaries. This is done because the success or failure of a project can be a result of many factors; many of these are usually to be found in the organizations charged with the delivery.
- Process evaluation may also be mandated by the funding agency. To give an example, the annual reports of progress on the achievement of the MDGs in national settings are essentially process evaluation to determine if the progress is on track.

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.”²²³

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, replicability, scaling up, or closing down.

Very often, summative evaluation is mandatory for government and donor-led initiatives and is often commissioned to an independent third-party monitoring and evaluation agency. Summative evaluation done by an external agency often adds credibility to the project’s impact and identifies areas of importance that might have been missed by those involved in the programme or project.

11.3 Approaches, Methodologies and Tools

The purpose of the evaluation determines the approach. These can be broadly classified into quantitative and qualitative approaches.

Quantitative approaches deal with measurements in numbers or as quantities. They are typical of the mainstream researches in social sciences, especially when generalizations have to be made from large-scale data collection. Quantitative approaches aim to test hypotheses, and usually to identify numerical differences between groups.

Qualitative approaches deal with how people understand their experiences (i.e. qualities). If we want to understand how cultures and contexts determine the use of ICTs, we would need to undertake qualitative research. Similarly, if we want to understand how gender relations

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

impact on the use of ICTs, we cannot do this through surveys using questionnaires. We would need to use qualitative approaches to gather in-depth information. If we want to understand what took place in the past, we would use the historical approach and would study existing literature and perhaps carry out some interviews with people who lived during the time and were part of what took place.

If we were interested in understanding cause-effect relationships and find out if indeed the ICTD intervention caused a certain effect, we would use quantitative methodologies such as the experimental method. If we want a deeper understanding of a problem in a specific community, we might want to use qualitative methodologies of case histories and case studies.

To obtain a more comprehensive understanding, we might, as is often done, use a combination of quantitative and qualitative approaches. The tools selected for any given evaluation must be in relation to the objectives of the evaluation, which in turn determines the methodologies. To state it simply, the approach to the evaluation consists of the objectives; the methodologies refer to the way in which we would go about the study; and the tools are the instruments we would use for data collection. Each impacts on the other in terms of the quality of the evaluation.

At the very beginning, it is important to be clear about the purpose and objectives of the evaluation effort. This will determine what should and should not be measured, how, and when. This is not always possible, but it is often useful to set evaluation measures around the real goals and objectives of a programme or project.

In determining the usefulness of the approach and the method to be applied, the basic criteria are: the depth of the studies and the consequent validity of the data; the quantitative nature of the data; and their relative cost against the effectiveness of the method.

11.4 Evaluation Methodologies

Several research methods are available for evaluation. These can be used singly and independently or in combination with each other. In fact, very often, a combination of methods is used in order to improve the quality, validity and reliability of the evaluation effort. Data collected using different methodologies are used by experts to triangulate (confirm findings) from various sources.

Quantitative Methodologies

The most typical kind of quantitative methodology is the sample survey that enables aggregate analysis,²²⁴ for example the inference of behaviour from an analysis of census data. Basically a head count, this kind of analysis provides information on population characteristics of a broad nature, useful for general understanding but inadequate for understanding specific behaviour. The cost of aggregate analysis is relatively low, but it may also be relatively low in accuracy and predictive power.

Field surveys have the great advantage of providing extensive quantitative data, enabling understanding of patterns of behaviour on a large scale from a relatively small sample of observations. But there are problems with using surveys. Situations of great variability such as heterogeneity of languages, styles of life, attitudes, economic and ethnic backgrounds, and other characteristics make the use of surveys difficult; and that too, in the absence of baseline information to help simplify sampling procedures. Macro-level surveys do not yield us the depth of information we require; and micro-level studies cannot serve as bases for generalizations. A second major disadvantage of the survey approach is that it requires a considerable amount of

²²⁴ Aggregate analysis is the study of variables/factors across large social systems.

pre-study knowledge as to what is relevant to ask, since the data, to be quantitatively compared, must be in easily codified categories.

In the search for cause-effect relationships, field experiments have been used quite extensively in developing countries. The experiment tries to incorporate the advantages of the laboratory conditions with the benefits of the field survey and case studies in a naturalistic setting. The major advantage of the uncontrolled field experiment is the same as that of all experiments, that is, it puts hypotheses to the ultimate requirement of field-testing. The main disadvantages are lack of control, or comparison with a community into which no changes are introduced.

Figure 40. Phases of ICT evaluation in business and ICTD

Phases of Impact Evaluation	Business IT (based on Zuboff, 1988)	ICT and Development
Early: quantifiable, tangible outputs	Automate: measure technical aspects of IT (rate of information flow, accuracy, timeliness)	Euphoria: quantifiable outputs (number of computers, number of users, rate of bandwidth consumption; teledensity; e-literacy rate; etc)
Intermediate: measurable, mostly tangible outcomes	Informate: IT production and project implementation	Instrumental: economic outcomes (income generation, business opportunities, etc)
Mature: unquantifiable, intangible impacts	Transformate: service perspective, intangible benefits (trust, loyalty, brand, etc)	Intangibles: aspirational outcomes (empowerment, self esteem & self worth; social cohesion & social fabric); citizen empowerment (relationship with governments); Individualised motivator factors (achievement, recognition).

Source: Ricardo Gomez and Shaun Pather, "ICT Evaluation: are we asking the right questions?", paper presented at the International Development Informatics Conference in Cape Town, South Africa, 2010, p. 9, http://faculty.washington.edu/rgomez/conferences/2010%20Evaluating_ICT%20IDIA2010%20Cape%20Town.pdf.

Qualitative Methodologies

Case history, and community and pilot studies provide whole histories of specific change, thereby yielding a rather effective basis for inferring interrelationships between different components of a process. Case histories and community studies have often been pioneering pieces of research in developing countries, helping us to understand problems and issues in-depth. However, because of their micro-level nature, generalizations to larger populations are next to impossible. Participant and non-participant observation techniques, in-depth interviews of individuals and focused group interviews of communities are often used as tools to gather insights that go beyond simple percentages and statistics.

Choosing the most appropriate method to do a particular task is not easy. It is wise to combine different methods and tools to give an added dimension to evaluation. It is not the intention here to go into a course on evaluation methods; therefore, attention now moves to evaluation of ICTD projects and what makes them unique.

Data Analysis Procedures

Making sense of the vast amounts of data collected through quantitative and qualitative approaches and tools and then ensuring that the analysis enables us to identify key problems and findings that are both accurate and reliable is no easy task. It is often at this stage of data analysis that most evaluation studies fail. When ICTD interventions are evaluated, there is a tendency to either focus only on the ICTs to the exclusion of all else; or sometimes ICTs are relegated into the background as all other factors seem to be important.

In social science and evaluation research, there is software available for sophisticated methods of data tabulation and analysis for both quantitative and qualitative research. Today, there is no need for the evaluator to get frightened or upset at the thought of statistics and math, which underpin much of social science research. What is important for the evaluation is to know what it is we want to evaluate, what methodological procedures will be followed; and broad principles to guide data analysis.

All of this means that data analysis procedures, whether through the use of statistics or through an analysis of case studies and interviews, have to be carefully understood and applied to ICTD programmes and projects.

11.5 Evaluating ICTD Interventions

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

To evaluate the ICTD intervention, we can ask a variety of questions that will explain different parts of the process. For instance, if we are evaluating the technology, we could ask questions relating to the following:

- Levels of hardware and software required at user end to effectively use the ICTD
- Are additional peripherals such as access devices, sound cards and graphic accelerators needed to run the application
- Is the product Web-enabled and offline; can it be delivered in different IT formats and through different media
- What is the cost of technology for the user
- What is the delivery mechanisms at the user end

To evaluate content and the user experience, some suggested questions may relate to:

- The information and content in terms of how much, and the level of understanding by users
- Language and literacy needed to use the content
- The way the content and tasks are presented and organized, including a review of the structure, sequencing, navigation, pace of content, interactivity, etc.
- The way media elements are used
- The way the navigation system is organized
- The presentation and packaging

In an extensive exploration of impact assessment of ICTD projects, Heeks and Molla²²⁵ have conducted an exhaustive analysis of existing approaches and frameworks to impact assessment of ICTD projects. The purpose here is not to duplicate the effort of Heeks and Molla; rather it is to supplement it with a different way of looking at ICTD evaluation. Whichever way chosen, research methods and tools must be chosen with care, focus and precision; enabling both general and in-depth data that will provide key answers to the key questions raised and the key objectives of the ICTD intervention.

Often, the most important part of the evaluation of ICTD projects—the evaluation of project management aspects—is left out of ICTD evaluation reports. Project management aspects are

225 Richard Heeks and Alemayehu Molla, "Impact Assessment of ICT-for-Development Projects: A Compendium of Approaches", Development Informatics Working Paper Series, Paper No. 36, Institute for Development Policy and Management, University of Manchester, 2009, http://www.sed.manchester.ac.uk/idpm/research/publications/wp/di/documents/di_wp36.pdf.

important as they have an overarching influence on the success and failure of the intervention. Yet, most of what is publicly available about projects, case studies and best practices are field reports based on evaluation of the effectiveness or impact on beneficiaries. There is very little documentation available in the public domain about processes, and realistic assessment of the results that include project management information.

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, and project monitoring and report preparation—all form important historical documentation that could describe success or identify causes of failure. These are areas where there is very little information; and which must be collected and preserved.



Case 26. Evaluating the Ningxia ICT Project in China

Earlier, in case 5, the Ningxia ICT project was described as a case of effective use of ICTs for agriculture and sustainable livelihoods. The ICT intervention was extensively mapped and evaluated to understand long-term impacts of ICTs on the rural community.

Situated within a sustainable livelihood development framework, the impact assessment used a variety of research methods—quantitative and qualitative—to assess impact. A literature review, followed by a survey, analysis of secondary data and document analysis, key informant interviews, and focus group discussions with project stakeholders formed the basis for data collection and analysis.

The sample survey was carried out on 628 households in 54 villages in 24 townships of nine counties in Ningxia province. The average number of villages in each county is six but varied according to the situation. The average number of households in each village is 10. The interviewees included various dimensions of age, gender, nationality, education, occupation and poverty.

Study results indicated that as a result of the building of ICT infrastructure, every village was connected and farmers had a new means of accessing information. The TV, village information centre, the village messenger and mobile messages were the main information sources for villagers, who reported that the project had made great contribution towards improving the quality of their lives. The impact assessment also revealed the impact upon human capacity building in the villages, the strengthening of social and financial capital, and reduced vulnerabilities.

The importance of this kind of impact assessment is that it provides insights that can be addressed when the project is upscaled or replicated. Lacunae can be addressed and improvements can be made.

It must be recognized that carrying out such impact assessment is a complex and even time consuming task, requiring a variety of knowledge, skills and competencies among the researchers. However, without such an assessment, it will be impossible to understand contexts and conditions that make for success or failure in ICTD projects.

Source: Nie Fengying, et. al., "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>.



Points To Remember

- Evaluation is an ongoing process and a very important part of all development projects, including those that have ICTs as part of the project.
- Evaluation can take place at a formative (before); process (during) and summative (after) stage of the project.
- Two major dominant approaches to evaluation of development projects are quantitative and qualitative. Each has different methodologies and tools.
- The two approaches can be used independently or combined together for a more comprehensive assessment.
- ICTD projects are different because they introduce a new factor, because they take place in the public view, and because huge investments of time and money are required.
- Documentation of all internal and external project activities is an important part of evaluation exercises as these processes sometimes explain success and failure.

Summary

This section on the evaluation of ICTD projects is intended to provide an introduction to the theme. Evaluation is an ongoing process and a very important part of all development projects, including those that have ICTs as part of the project.

There is a great deal of evaluation experience in development projects; but much less focus has been on ICTD projects, where formative, process and summative evaluations are necessary as feed forward and as inputs into future planning. Because ICTD are very different kinds of interventions that take place in full public view, and because they bring in very different elements such as technologies, contents and user experiences, they need additional evaluation aspects, as compared to conventional development project evaluations.

In ICTD projects, documentation of all internal and external project activities is an important part of evaluation so that a holistic picture of an ICTD intervention can be arrived at and we can better understand the role that ICTs play in development.



Practical Exercise

The practical exercise in chapter 7 provides a scenario where a local government has developed a Web portal through which citizens can file their complaints and grievances relating to public utilities—water, sewage and electricity—online. Yet, one year after the launch of the portal, government officials find that there are no users. The previous exercise asked you to make suggestions on ways to revitalize the portal.

Here the local government has approached you again and asked you to design a proposal to evaluate the portal.

List what you would identify as:

- The objectives of the evaluation
- The approach you would follow
- The tools you would use to collect data
- The kind of report you would prepare to advocate change in the way the project is handled



Test Yourself

1. ICTD project evaluation should be done:
 - a. Only at the end of the project
 - b. In the middle of a project
 - c. Before a project
 - d. Continuously from before the project to after the end
2. What determines the approach to an ICTD evaluation?
 - a. The methodology and tools available
 - b. Researcher skills
 - c. The purpose of the evaluation
 - d. Kind of data needed
3. Which, among the following, is not a quantitative tool?
 - a. An interview schedule
 - b. A case diary
 - c. A test
 - d. A questionnaire
4. ICTD evaluation is different from conventional development programme evaluation because:
 - a. The kind of questions that need to be addressed go beyond conventional evaluations
 - b. It is not different at all from any other evaluation
 - c. It is very costly
 - d. ICTD evaluations deal with technologies only

5. Often, our inability to understand success or failure in ICTD project is because:

- a. We do not understand the technology
- b. We do not understand development
- c. We do not document internal processes
- d. None of the above

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Useful Websites

Australian Development Gateway
<http://www.developmentgateway.com.au>

Builder AU
<http://www.builderau.com.au>

Business Transformation Enablement Program
http://www.tbs-sct.gc.ca/btep-pto/documents/2004/templates-gabarits/readiness-etatprep/readiness-etatpreptb_e.asp

Change-Management-Coach
<http://www.change-management-coach.com/definition-of-change-management.html>

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

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

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/>

OpenProj - Project Management
<http://sourceforge.net/projects/openproj/>

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



CHAPTER 12. CONCLUSION

The development discourse since the beginning of the new millennium has shifted away from its earlier moorings in economic growth to encompass a vision where the well-being of individuals and societies is the focus, rather than just an improvement in the GNP per capita in development. Perspectives of development today focus on issues that are:

- Inclusive – encompassing all groups of people in a society, not just the rich.
- Equitable – ensuring, through intentional strategies that poor, marginalized and disadvantaged communities participate in and benefit from decisions that shape their neighbourhoods and regions.
- Sustainable – a pattern of resource use that aims to meet human needs while preserving the environment so that these needs can meet the requirements of future generations.
- Quality – a focus on excellence rather than simply the delivery of development interventions.

The endeavour to achieve this vision of development is huge, especially in the developing countries of the Asia-Pacific region, challenged by adverse geographical realities of isolation, distances and varied demographics.

This is where the role of ICTs offers the greatest opportunities for governments to reconsider the ways in which conventional government institutions and processes can be transformed to govern better. Better governance can lead to better development outcomes.

ICTs themselves are situated within real social and political contexts and conditions. At the same time, the transformative capability of the ICTs has become a driver for change, and those countries that have understood the technologies and harnessed them to meet both growth and development goals are reaping the benefits of such transformation.

In the hands of the government, ICTs are powerful tools. In the hands of the poor, the ICTs have an empowering effect. And when the governments use ICTs to link to the poor, dramatic results occur. A mobile phone in the hands of a poor rural woman is the best symbol of the dramatic results that occur when ICTs are used to assist in development processes.

The use of ICTs to address issues of development is the newly emerging discipline of ICTD. Experience and learning from nearly two decades of experimentation has resulted in a better understanding of what works, what does not, and why in ICTD.

This primer is meant as a learning support for students and faculties in Asia-Pacific educational institutions to understand the linkage between ICTs and development goals. To do this, different concepts have been explored and different experiences narrated. Current understanding of development goals, processes and outcomes precedes a section where the terminologies of ICTs are discussed, highlighting both attributes and limitations of different digital technologies.

Following an understanding of the technologies and the development contexts, the effort has been to provide a sampling of the diversity of experiences in using ICTs in different sectors of development, including agriculture, education, environment and climate change, gender, governance, health, the preservation of cultural diversity, and peace promotion.

The effective use of ICTD is dependent on a large number of issues that need to be addressed when planning and managing ICTD projects. These issues and challenges are elaborated upon and wherever possible, case studies highlight field experience in addressing these challenges.



ANNEX

Glossary of Key Terms

Analog	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 analog representation of time. On the other hand, digital information is stored using a series of ones and zeros. Computers work only with digital data.
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.
Back office	A general term for the category of applications that support non-customer-facing, core enterprise functions. Examples include enterprise resource planning (ERP), supply chain management (SCM) and human resource systems.
Blog	A blog (a blend of the term Web log) is a type of website or part of a website. Blogs are usually maintained by an individual with regular entries of commentary, descriptions of events, or other material such as graphics or video. Entries are commonly displayed in reverse-chronological order.
Broadcast	Transmission of a radio or TV programme, or signal for public use.
Cable television	A system for delivery of television video and audio content via a wired network, employing either co-axial cable or fibre.
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	Refers to 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).
Computer file transfer	The movement of one or more files from one location to another. A collection of electronically stored files can be moved by physically moving the electronic storage medium, such as a computer, 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.
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.

Connectivity	A generic term for connecting devices to each other in order to transfer data back and forth. It often refers to network connections, which embraces bridges, routers, switches and gateways as well as backbone networks. It may also refer to connecting a home or office to the Internet, or connecting a digital camera to a computer or printer.
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, e.g. the mobile phone, can be the delivery channel for text, audio, video, e-mail, SMS and Internet browsing.
Copyleft	A type of license that attempts to ensure that the public retains the freedom to use, modify, extend and redistribute a creative work and all derivative works (i.e., works based on or derived from it) rather than to restrict such freedoms.
Corporate social responsibility	A concept where 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. It is also called corporate responsibility, corporate citizenship and responsible business.
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.
Cybercafés	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. (Refer to the definition of analog in this glossary to understand the difference between digital and analog)
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. The digital divide exists across international boundaries as well as within countries along various dimensions, such as socio-economic status (in which the poor cannot afford ICT products and services), literacy and education levels (affecting users' ability to read SMS and online content), and gender (where women tend to have less access to ICTs than men).
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. The amount of trade conducted electronically has grown extraordinarily with widespread Internet usage. While some use e-commerce and e-business interchangeably, they are distinct concepts.

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.
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-Learning encompasses using ICT for learning at all levels, both formal and non-formal, in-classroom and out-of-the-classroom, whether wholly or in part, for course delivery, interaction, evaluation and/or facilitation. e-Learning applications and processes include web-based learning, computer-based learning, virtual education opportunities and digital collaboration. Content is delivered via the Internet, intranet/extranet, audio or video tape, satellite TV, and CD-ROM. It can be self-paced or instructor-led and includes media in the form of text, image, animation, streaming video and audio.
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-Mail	A store-and-forward method of composing, sending, storing and receiving messages.
Facsimile or fax	An exact copy or reproduction transmitted electronically.
File Transfer Protocol (FTP)	A standard Internet protocol and the simplest way to exchange files between computers on the Internet. Like the hypertext transfer protocol (HTTP) that transfers displayable web pages and related files, and the simple mail transfer protocol (SMTP) that transfers e-mail, FTP is an application protocol that uses the Internet's TCP/IP protocols. FTP is commonly used to transfer web page files from their creator to the computer that acts as their server for everyone on the Internet. It is also commonly used to download programs and other files from a server to a computer.
First-generation learners	The first generation in a family to benefit from formal schooling.
Front office	The departments or offices in an organization or business that deal or liaise with the external public—customers, users, etc.
Human Development Index (HDI)	A composite statistic used to rank countries by level of human development.
Information literacy	The ability to recognize the need for information, and find, evaluate and use that information in whatever format it appears (e.g. print index, online database, Internet).
Interactivity	In computers, interactivity is the dialog that occurs between a human being (or possibly another live creature) and a computer program.
Interoperability	The ability of different ICT systems and applications from different vendors to communicate with each other across platforms. This includes the ability to exchange information and to use the information that has been exchanged.

Last mile	The final leg of delivering connectivity from a communications provider to a customer. The phrase is often used by the telecommunications and cable television industries. It is typically seen as an expensive challenge because “fanning out” wires and cables is a considerable physical undertaking. Because the last mile of a network to the user is also the first mile from the user to the world, the term “first mile” is sometimes used. To solve the problem of providing enhanced services over the last mile, some firms have been mixing networks for decades. One example is Fixed Wireless Access, where a wireless network is used instead of wires to connect a stationary terminal to the wire-line network.
m-Learning	The use of a mobile device to access and study learning materials and for communicating with the institution, tutors and fellow students.
Moore’s Law	Describes a long-term trend in the history of computing hardware based on the prediction that the number of transistors (hence the processing power) that can be squeezed onto a silicon chip of a given size will double every 18 months. Stated in 1965 by Gordon Moore, co-founder of Intel, it has proven to be amazingly accurate over the years.
Multimedia	The use of computers to present text, graphics, audio, video and animation 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 analog form to digital form before they can be used in a computer application.
Multimedia message service (MMS)	A standard for telephony messaging systems that allows sending messages that include multimedia objects (images, audio, video, rich text)
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.
Really Simple Syndication (RSS)	A family of web feed formats used to publish frequently updated works—such as blog entries, news headlines, audio and video—in a standardized format. RSS makes use of software that presents new additions to a website as list of subject headings or the first line or two of a news item, with a clickable link to the full article, blog posting or podcast. Thus, instead of the user having to browse websites for new information in which s/he is interested, an update of what is available is made available directly to the user as an RSS feed or news feed.
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.
Skype	Skype is a software application that allows users to make voice calls over the Internet. Calls to other users within the Skype service are free, while calls to both traditional landline telephones and mobile phones can be made for a fee using a debit-based user account system. Skype has also become popular for its additional features that include instant messaging, file transfer and video conferencing. Unlike other Voice over Internet Protocol (VoIP) services, Skype is a peer-to-peer (P2P) system rather than a client–server system, and makes use of background processing on computers running Skype software.

Social networking	The use of websites and communications and collaboration technology to help people find, form and maintain social relationships. Social networking websites allow users to be part of a virtual community. Features common to social networking sites include: profile page, friend networks, multimedia sharing (blogs, links, music, photos, videos), online gaming, instant messaging, status updates, and commenting.
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 which makes use of voice, video and/or data transmission.
Teledensity	A term commonly used to describe the number of telephone lines per some unit of the population (often per 100 people).
Web 2.0	Describes the changing trends in the use of web technology and web design that promotes participatory information sharing, user-centred design, interoperability, collaboration and creativity on the World Wide Web. Web 2.0 concepts have led to the development and evolution of web-culture communities and hosted services, such as blogs, folksonomies, social networking sites, video sharing sites and wikis. Although the term suggests a new version of the World Wide Web, it does not refer to an update to any technical specifications, but rather to cumulative changes in the ways software developers and end-users use the web.
Wiki	A web page, or set of pages, that can be edited collaboratively. The best known example is Wikipedia, an encyclopedia created by thousands of contributors across the world. Once people have appropriate permissions—set by the wiki owner—they can create pages and/or add to and edit existing pages. Wikis are a good way for people to write a document together, instead of e-mailing files to and fro. Wikis are typically powered by wiki software and are often used to create collaborative wiki websites, to power community websites, for personal note taking, in corporate intranets, and in knowledge management systems.
WiMax	Fixed wireless standard that allows for long-range wireless communication at 70 Mbps over 50 kilometres. The bandwidth and range of WiMax make it suitable for the following potential applications: (1) providing portable mobile broadband connectivity across cities and countries through a variety of devices; (2) providing a wireless alternative to cable and DSL for “last mile” broadband access; (3) providing data, telecommunications (VoIP) and IPTV services (triple play); and (4) providing a source of Internet connectivity as part of a business continuity plan.
Wireless Fidelity (WiFi)	A set of standards for facilitating wireless networks in a local area, enabling WiFi devices to connect to the Internet when in range of an access point. It is also the trade name for a popular wireless technology used in home networks, mobile phones, video games and more, and a mark of interoperability among devices adhering to the 802.11b specification for Wireless LANs from the Institute of Electrical and Electronics Engineers (IEEE). The term WiFi is sometimes mistakenly used as a generic term for wireless LAN.

Directory of International and Regional Organizations, Institutions and Agencies

- AAOU The Asian Association of Open Universities is a non-profit organization of higher learning institutions that are primarily concerned with distance learning and the application of ICTs in education. AAOU is based in Penang, Malaysia.
Website: <http://www.aaou.net>
Phone: +60-4-2180-333
- ABU The Asia-Pacific Broadcasting Union is a non-profit, non-governmental association of broadcasting organizations formed in order to promote the development of broadcasting in the Asia-Pacific region. ABU is located in Kuala Lumpur, Malaysia.
Website: <http://www.abu.org.my>
Phone: +60-3-2282-3592
- ADB The Asian Development Bank is a multilateral development bank dedicated to reducing poverty in the Asia-Pacific region through inclusive economic growth. Its headquarters is in Manila, Philippines.
Website: <http://www.adb.org>
Phone: +632-632-4444
- AIBD The Asia-Pacific Institute for Broadcast Development is an interregional intergovernmental organization servicing countries of the United Nations Economic and Social Commission for Asia and the Pacific (ESCAP) in the field of electronic media development. Its goal is to achieve a vibrant and cohesive electronic media environment in the Asia-Pacific region through policy and resource development. AIBD is located in Kuala Lumpur, Malaysia.
Website: <http://www.aibd.org.my>
Phone: +60-3-2282-4618 / -3719
- AMIC The Asian Media Information and Communication Centre is a non-profit organization that seeks to push forward the development of media and communication in Asia in order to achieve a higher level of economic, social, and cultural well-being. It pursues these goals by conducting research, training personnel and providing consultant services. AMIC is located in Singapore.
Website: <http://www.amic.org.sg>
Phone: +65-6792-7129
- APCICT The Asian and Pacific Training Centre for Information and Communication Technology for Development is a regional institute of ESCAP. APCICT's mission is to strengthen the efforts of the 62 member and associate member countries of ESCAP to use ICT in their socio-economic development through human and institutional capacity building. APCICT is located in Incheon, Republic of Korea.
Website: <http://www.unapcict.org>
Phone: +82-32-245-1700
- ASEAN The Association of South East Asian Nations is a regional organization that seeks to promote economic growth and peace in South-East Asia through intergovernmental cooperation. The Secretariat is located in Jakarta, Indonesia.
Website: <http://www.asean.org>
Phone: +62-21-726-2991, 724-3372

- CGIAR The Consultative Group on International Agricultural Research is a global partnership that unites organizations engaged in research for sustainable development with funders. CGIAR aims to reduce hunger, improve human health and nutrition, and enhance ecosystem resilience through high-quality international agricultural research, partnership and leadership. CGIAR is located in Washington, D.C., United States of America.
- Website: <http://www.cgiar.org>*
- Phone: +1-202-473-8951*
- COL The Commonwealth of Learning is an intergovernmental organization that encourages the development and sharing of open learning/distance education knowledge, resources and technologies among Commonwealth nations. It is currently headquartered in Vancouver, Canada.
- Website: <http://www.col.org>*
- Phone: +1-604-775-8200*
- EEA The European Environmental Agency is an agency of the European Union dedicated to providing sound information about the state of the environment and in doing so allowing governments to construct informed environmental policies. The EEA has its headquarters in Copenhagen, Denmark.
- Website: <http://www.eea.eu>*
- Phone: +45-33-36-71-00*
- ESCAP The Economic and Social Commission for Asia and the Pacific is the regional development arm of the United Nations for the Asia-Pacific region. ESCAP addresses a range of issues, from macroeconomic development to ICT for disaster reduction, and seeks solutions to these problems through intergovernmental cooperation. ESCAP is located in Bangkok, Thailand.
- Website: <http://www.unescap.org>*
- Phone: +66-2-228-1234*
- FAO The Food and Agriculture Organization of the United Nations seeks to combat world hunger by providing governments and farmers alike with expert knowledge in the field of agricultural management. It also serves as a global forum for discussing food-related issues. The FAO is located in Rome, Italy.
- Website: <http://www.fao.org>*
- Phone: +39-06-57051*
- GAID The Global Alliance for ICTs in Development is a United Nations approved initiative inspired by the MDGs. It takes as its mission the standardization and dissemination of ICTD know-how to policymakers around the world and the bringing together of key development organizations for knowledge exchange. GAID is based in New York, United States of America.
- Website: <http://www.un-gaid.org>*
- Phone: +1-212-963-5796*
- ICIMOD The International Centre for Integrated Mountain Development is dedicated to the preservation of the delicate mountain ecosystems of the Himalayas. Besides directly assisting mountain-dwelling people to adapt to climate change, they are also working with the many Asian countries that rely on downstream mountain resources. ICIMOD is located in Kathmandu, Nepal.
- Website: <http://www.icimod.org>*
- Phone: +977-1-500-3222*

- ICRISAT The International Crops Research Institute for Semi-Arid Tropics is a non-profit organization that conducts agricultural research for development in parts of Sub-Saharan Africa and Asia. The Institute's goal is to help farmers move past subsistence-scale farming and achieve inclusive market-oriented development. Its headquarters is in Hyderabad, India.
Website: <http://www.icrisat.org>
Phone: +91-40-3071-3071
- IDRC The International Development Research Centre is a branch of the Canadian government's aid programme that urges the implementation of technology in developing countries by providing funds for research, providing expert advice, and building local research capacities. The IDRC is headquartered in Ottawa, Canada.
Website: <http://www.idrc.org>
Phone: +1-613-696-2343
- IFAD The International Fund for Agricultural Development is a United Nations organization that endeavours to eradicate rural poverty in developing countries by making resources (financial, natural, and informational) more accessible to rural communities. IFAD is located in Rome, Italy.
Website: <http://www.ifad.org>
Phone: +39-06-54591
- IFC The International Finance Corporation, a member of the World Bank Group, endeavours to help people escape poverty by providing services to the private sectors of developing countries. These services include direct investments, providing advice, standard setting, and helping to create a business enabling environment. The IFC is headquartered in Washington, D.C., United States of America.
Website: <http://www.ifc.org>
Phone: +1-202-473-1000
- IMF The International Monetary Fund is an organization of 187 countries, working to foster global monetary cooperation, ensure financial stability, facilitate international trade and promote economic growth. The IMF monitors the world financial system and provides a forum for dialogue, in addition to advising and lending to countries experiencing economic hardship. The IMF is based in Washington, D.C., United States of America.
Website: <http://www.imf.org>
Phone: +1-202-623-7000
- infoDev infoDev is a donor subdivision of the World Bank. It is dedicated to supporting efforts in the field of ICTD. In addition to sponsoring research in the means and methods of ICTD, it also works with stakeholders to coordinate knowledge exchange and develop effective implementation programmes. infoDev is based in Washington, D.C., United States of America.
Website: <http://www.infoddev.org>
- IPCC The International Panel on Climate Change is a United Nations organization hosted by the World Meteorological Organization. Its purpose is to review and assess current climate change research and the socio-economic/environmental impacts that they imply. IPCC is located in Geneva, Switzerland.
Website: <http://www.ipcc.ch>
Phone: +41-22-730-8208

- IRRI The International Rice Research Institute is actively working towards reducing world hunger and achieving the MDGs through the development of high-yield rice varieties and crop management techniques. Its headquarters is located in Los Baños, Philippines.
Website: <http://www.irri.org>
Phone: +63-2-580-5600
- ITU The International Telecommunication Union is a branch of the United Nations that facilitates international cooperation in the realm of ICT by providing a forum in which international standards are established. In addition, ITU also advocates for the implementation of ICT in developing countries. Its headquarters is located in Geneva, Switzerland.
Website: <http://www.itu.int>
Phone: +41-733-7256
- OCHA The United Nations Office for the Coordination of Humanitarian Affairs aims to improve humanitarian assistance by enhancing decision-making and coordination between agencies through its dissemination of humanitarian information. OCHA headquarters are located in New York, United States of America and Geneva, Switzerland.
Website: <http://www.unocha.org>
- OECD The Organisation for Economic Co-operation and Development is an organization with the mission of promoting policies that improve the economic and social well-being of people around the world. This is achieved through the monitoring of global economic developments and the provision of a forum for economic cooperation. OECD's headquarters is located in Paris, France.
Website: <http://www.oecd.org>
Phone: +33-1-45-24-82-00
- Reuters Foundation The Reuters Foundation is a charity that aims to improve the rule of law and promote transparent governance by providing information and legal assistance to those in need. The Reuters Foundation main office is located in London, United Kingdom.
Website: <http://www.trust.org>
Phone: +44-20-7542-7015
- SAARC The South Asian Association for Regional Cooperation is a regional intergovernmental organization that promotes peace and economic cooperation among South Asian countries. SAARC's headquarters is located in Kathmandu, Nepal.
Website: <http://www.saarc-sec.org>
Phone: +977-1-422-1785
- SOPAC The South Pacific Applied Geoscience Commission, a division of the Secretariat of the Pacific Community (SPC), takes upon itself the goal of improving the livelihoods of the Pacific communities through the application of geosciences and technology. Its office is located in Suva, Fiji.
Website: <http://www.sopac.org>
Phone: +679-338-1377
- telecentre.org telecentre.org is a global programme, managed by telecentre.org Foundation, that supports the establishment and sustainability of grass-roots level telecentres. It also hosts an online library and holds classes on telecentre establishment.
Website: <http://www.telecentre.org>

- UN The United Nations is an intergovernmental organization dedicated to fostering peace and development through intergovernmental cooperation in addition to being the facilitating organization of the MDGs. The United Nations headquarters is located in New York, United States of America.
Website: <http://www.un.org>
- UNAIDS The Joint United Nations Programme on HIV/AIDS is an organization that combats the spread of HIV/AIDS and promotes universal access to HIV prevention and treatment. UNAIDS is located in Geneva, Switzerland.
Website: <http://www.unaids.org>
Phone: +41-22-791-36-66
- UNCTAD The United Nations Conference on Trade and Development promotes the integration of developing countries into the world economy by acting as an intergovernmental forum, conducting research and providing technical assistance to developing countries. Its headquarters is located in Geneva, Switzerland.
Website: <http://www.unctad.org>
Phone: +41-22-917-1234
- UNDP The United Nations Development Programme conducts capacity building operations in developing countries with the aim of improving peoples' economic and social well-being. It is also directly involved in coordinating efforts towards accomplishing the MDGs. UNDP's headquarters is located in New York, United States of America.
Website: <http://www.undp.org>
Phone: +1-212-906-5000
- UNEP The United Nations Environment Programme advocates and coordinates environmental sustainability and protection. Its headquarters is in Nairobi, Kenya.
Website: <http://www.unep.org>
Phone: +254-20-762-1234
- UNESCO The United Nations Educational, Cultural and Scientific Organization seeks to improve the general betterment of the human condition by promoting education, emphasizing the role of the sciences in development, and advocating intercultural dialogue. Its headquarters is located in Paris, France.
Website: <http://www.unesco.org>
Phone: +33-1-45-68-10-00
- UN-HABITAT The United Nations Human Settlements Programme seeks to ensure the sustainability of modern cities and towns by working with communities and governments to overcome the obstacles posed by rapid urbanization. Its main office is located in Nairobi, Kenya.
Website: <http://www.unhabitat.org>
Phone: +254-20-762-1234
- UNICEF The United Nations Children's Fund seeks to ensure that children are provided with the fundamental opportunities needed to lead rich lives and works in such areas as health, education, gender equality and child protection. UNICEF's headquarters is located in New York, United States of America.
Website: <http://www.unicef.org>
Phone: +1-212-686-5522

UNTPDC	<p>The United Nations Trade Point Development Centre is mandated with the development of the Trade Point Programme, which is an Internet-based system that will allow businesses worldwide to access competitive trade information and thus improve efficiency in global trade.</p>
The World Bank	<p>The World Bank is an international financial institution that consists of both the International Bank for Reconstruction and the International Development Association. The main function of the World Bank is providing financial support to developing countries through low interest loans, and interest-free credits and grants. Its headquarters is located in Washington, D.C., United States of America.</p> <p><i>Website: http://www.worldbank.org</i></p> <p><i>Phone: +1-202-473-1000</i></p>
WBI	<p>The World Bank Institute, a member of the World Bank Group, acts as a medium between people in developing countries, endeavouring to facilitate the knowledge exchange and capacity building needed for effective development. It is also an advocate of ICT, which it uses for its distance and e-learning programmes. The WBI's headquarters is located in Washington, D.C., United States of America.</p> <p><i>Website: http://wbi.worldbank.org</i></p> <p><i>Phone: +1-202-676-0858</i></p>
WFP	<p>The United Nations World Food Programme aims to combat hunger worldwide by transporting food to populations in need and providing relief in times of emergency. WFP headquarters is located in Rome, Italy.</p> <p><i>Website: http://www.wfp.org</i></p> <p><i>Phone: +39-06-65131</i></p>
WHO	<p>The World Health Organization, the coordinating authority for health within the United Nations system, is responsible for providing leadership on global health matters, shaping the health research agenda, setting standards, providing health-related policy options and monitoring global health trends. The WHO headquarters is located in Geneva, Switzerland.</p> <p><i>Website: http://www.who.int</i></p> <p><i>Phone: +41-22-791-21-11</i></p>
WIPO	<p>The United Nations World Intellectual Property Organization's mission is to safeguard public interest and contribute to global economic development through the establishment of an international intellectual property system. Its headquarters is in Geneva, Switzerland.</p> <p><i>Website: http://www.wipo.int</i></p> <p><i>Phone: +41-22-338-9111</i></p>
WTO	<p>The World Trade Organization is a forum for intergovernmental negotiations concerning trade relations and a facilitator of trade-related agreements and treaties. Its headquarters is located in Geneva, Switzerland.</p> <p><i>Website: http://www.wto.org</i></p> <p><i>Phone: +41-22-739-51-11</i></p>

Further Readings

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. 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 and Climate Change

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

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Answer Key for Test Yourself Questions

Chapter 1. UNDERSTANDING DEVELOPMENT

Subsections 1.1 - 1.4

- 1. C
- 2. D
- 3. B
- 4. A
- 5. A

Subsections 1.5 - 1.10

- 1. D
- 2. B
- 3. A
- 4. D
- 5. D

Chapter 2. INFORMATION AND COMMUNICATION TECHNOLOGIES FOR DEVELOPMENT

Subsections 2.1 - 2.4

- 1. D
- 2. B
- 3. A
- 4. C
- 5. A

Subsection 2.5

- 1. B
- 2. A
- 3. C
- 4. B
- 5. B

Chapter 3. ICTD APPLICATIONS IN CORE DEVELOPMENT SECTORS

Subsections 3.1 - 3.4

- 1. A
- 2. B
- 3. C
- 4. A
- 5. B
- 6. B

Chapter 4. ICTS AND SUSTAINABLE DEVELOPMENT

Subsections 4.1 - 4.2

- 1. C
- 2. B
- 3. D
- 4. D
- 5. C

CHAPTER 5. ICTD APPLICATIONS IN GOVERNANCE AND PEACE

Subsections 5.1 - 5.3

- 1. B
- 2. C
- 3. A
- 4. B
- 5. B

CHAPTER 6. ICTD APPLICATIONS IN CULTURE AND TOURISM

Subsections 6.1 - 6.2

- 1. D
- 2. D
- 3. C
- 4. B
- 5. C

CHAPTER 7. ISSUES IN PROJECT MANAGEMENT

Subsections 7.1 - 7.4

1. B
2. C
3. C
4. C
5. A

CHAPTER 8. CONTENT MANAGEMENT

Subsections 8.1 - 8.2

1. E
2. C
3. C
4. D
5. C

CHAPTER 9. TECHNOLOGY MANAGEMENT

Subsections 9.1 - 9.3

1. A
2. D
3. D
4. C
5. C

CHAPTER 10. ICTD HUMAN CAPACITY BUILDING

Subsections 10.1 - 10.2

1. C
2. C
3. B
4. C
5. D

CHAPTER 11. ICTD PROJECT EVALUATION

Subsections 11.1 - 11.5

1. D
2. C
3. B
4. A
5. C

About the Author

Usha Rani Vyasulu Reddi is currently an ICT for Development Consultant and a former Professor of Communication. Previously, she headed the Centre for Human Development at the Administrative Staff College of India in Hyderabad from 2007 to 2010. 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 ICTs 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. She is also an acknowledged international trainer, practitioner, and consultant in ICTD programmes and projects.

UN-APCICT/ESCAP

The United Nations Asian and Pacific Training Centre for Information and Communication Technology for Development (UN-APCICT/ESCAP) is a regional institute 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 with the focus on the following 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 members 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>

Additional UN-APCICT/ESCAP Programmes and Resources

The Academy of ICT Essentials for Government Leaders

<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.

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 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



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