BHUTAN INFORMATION AND COMMUNICATIONS TECHNOLOGY POLICY AND STRATEGIES (BIPS)

(UPDATE 1)

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Ministry of Information & Communications
Royal Government of Bhutan

CONTENTS

FOREWORD

Information and Communications Technology (ICT) is changing the way the world works, and will continue do so into the future. By its unprecedented power to move and process information, it is impacting on global trading patterns, culture and governance; in fact ICT impacts on every aspect of our society today. ICT is recognized as one of the most important tools to achieve our development objectives.

In order to harness ICTs for the benefit of Bhutan, the BIPS Report- a truly whole-of-Government effort, which represents a Bhutanese approach to the challenges of ICT, was developed and endorsed by the government in June 2004. The White paper approved by the government in 2003 became the basis for an inclusive and consultative process which involved stakeholders from right across the spectrum of Ministries, autonomous agencies and private sector. I thank the leadership of the former Minister for Information & Communications, Lyonpo Leki Dorji and all the stakeholders for their respective contribution in developing this very important document, which is the core for development of ICT and media in the country.

I am gratified that the co-operative spirit is well maintained even in the implementation process. Significant progress has been made by all the agencies in achieving the targets, as compiled under **_appendice 9 a_**. It clearly indicates the commitment of the agencies in harnessing the benefit of ICT for the Bhutanese society.

Taking into consideration the changing environment and the need to attach new/dynamic components, the BIPs document 2004 was reviewed, involving series of Multi-Sectoral Meetings. Such a consultative review process has contributed to the final production of the document **BIPS update 1**, which also took into account the achievements of the earlier targets/activities and addition of new ones, which are crucial for development of the sector and ultimate enhancement of Gross National Happiness.

I wish to thank all the agencies for their commitment in implementing the BIPS activities and in contributing to the review of this living document. I will continue to look forward for your support and co-operation.

In keeping with the cost-cutting measures adopted by the government, we have decided not to print hard copies, but post a soft copy of this document on government portal **_www.bhutan.gov.bt_** and the Ministry's website **_www.moic.gov.bt_**.

Through this revised BIPS document, I wish to remind and request all the key players to kindly review their achievements against the agreed targets and make concerted efforts to ensure their implementation.

Nandalal Rai
Minister for Information & Communications

1. EXECUTIVE SUMMARY

> *With people at the centre of development, Bhutan will harness the benefits of ICT, both as an enabler and as an industry, to realise the Millennium Development Goals and towards enhancing Gross National Happiness.*
>
> From the ICT White Paper, October 2003

The BIPS process involved stakeholders from Government, semi-government and the private sector. Five Committees were formed along the lines of the Digital Opportunity Initiative (www.opt-init.org), covering Policy, Infrastructure, Human Capacity, Content and Applications, and Enterprise. With inputs from open consultative workshops and previous ICT studies, the Committees formulated strategies and activities designed to progress Bhutan's ICT development.

Bhutan is a landlocked, mountainous kingdom with a small and scattered population. It has a rich cultural heritage rooted in Mahayana Buddhism, and a compact and competent Government. ICT is a relatively recent phenomenon in Bhutan.

Three overall policy objectives underpin the initiatives in the BIPS Report:
1. to use ICT for Good Governance;
2. to create a Bhutanese Info-culture; and
3. to create a "High-Tech Habitat".

The initiatives are aggregated under five strategic and logical headings.

Policy. Policy activities focus on making governance more efficient, transparent and inclusive, introducing a modern legal and regulatory framework, strengthening the relevant policy and regulatory bodies, and investigating ways to fund ICT and reduce the costs of ICT services.

Infrastructure. The infrastructure activities focus on implementing the liberalized and competitive infrastructure market, and increasing co-ordination between infrastructure providers, and ensuring that there is affordable, fast, secure, sustainable and appropriate ICT infrastructure throughout Bhutan.

Human Capacity. Human capacity activities are aimed at ensuring appropriate ICT awareness and skills from basic computer literacy to the high level technical skills to boost the ICT industry. Activities outlined in this area aim to improve the quality and coverage of training institutions, including through developing a Centre of Excellence to boost the quality and accredit ICT training institutes in Bhutan. A national ICT awareness campaign is another important element.

Content and Applications. To enable Bhutan to fully harness the benefits of ICT for its development, the activities include establishing the framework for e-business, using ICT to preserve our cultural heritage, enhancing quality and accessibility of health and education, improving local content, broadening our national media and web presence and supporting good governance.

Enterprise. Planned activities will boost the competency of the local ICT private sector, and provide business opportunities through outsourcing RGoB ICT work. Access to finance will be addressed, as well as a strategy to target export of ICT services and boost the application of ICT in non-ICT businesses.

The Report identifies a number of risks to successful implementation of the BIPS strategies and activities. National commitment will be crucial, as well as financial support from our donor partners. Ensuring appropriate human capacity to implement and manage the activities will also be important.

Implementation will be spread across various Government Ministries, agencies and the private sector. The newly-established ICT Units across all Ministry and autonomous agencies will be requested to monitor progress through a system of bi-annual progress reporting to the Cabinet.

Following is the summary of the progress update/achievements and review of the targets/activities based on the Multisectoral Review Meeting:

POLICY
Strategy P1. By 2010, use ICTs to make governance more inclusive, efficient, accountable and transparent

	Strategic Activities	Lead Agency	Timeframe	Status
P1.1	Establish policies on information-sharing between agencies	MoIC	2005	Policy endorsed by Government in 2006
P1.1a	Implement the Policy Guideline on Information Sharing	DoIM, DIT	2008	Ongoing
P1.2	Establish policies on ICT security	MoIC/DIT	2007	Information Management Security Policy submitted and approved by Cabinet. Other details are being worked out
P1.3	Encourage use of free and open source software	DIT	2008	Ongoing- Dzongkha localization open source development and backend server in place
P1.4	E-mail recognised as official government correspondence	RCSC, MoIC/DIT	2008	Ongoing -researching different technical possibilities
P1.5	Introduce 'e-Gazette' as official government publication of record	DIT, DoIM, National Library	2008	Ongoing
P1.6	Establish InfoComm & Media Division in each Ministry and major autonomous agency	RCSC, DIT, DoIM	2008	Ongoing (Upgrade ICT Units, if existing)
P1.7	Establish InfoComm & Media Section in all 20 Dzongkhags	RCSC, DIT, DoIM,DoLG, Dzongkhags	2009	Ongoing (Upgrade ICT Units, if existing)
P1.8	Each Ministry, autonomous body and agency to provide 75% of all possible public services using ICT	Cabinet, DIT, DoIM	2010	Ongoing - Labour-Net by MoLHR -Specific site created by ACC for reporting the corruption online and also forum for discussion created, working on a common platform for delivering e-services
P1.9	Streamline and automate business licensing processes including ICT businesses	MoEA, BICMA	2008	Ongoing The rules and regulations and the prescribed forms on

				trade license, import license, import registration and other useful related information are made available online.
P1.10	Establish system for online citizen polling on government policies and other public interest issues	All	2005	Completed - incorporated in the government portal
P1.11	Publish senior government officials' e-mail addresses	RCSC	2006	Completed
P1.12	Publish all public government reports online	Cabinet, Ministries, autonomous agencies	2006	Partly completed and is a continuous process
P1.13	Establish DIT as the focal agency for management of all ICT personnel in the country	RCSC	2008	DIT established as the focal agency vide RCSC circular no. RCSC/HRMD/26/2009/79 dated 11th February 2009

Strategy P2. By 2008, implement a flexible, 'light-touch'[1] and modern regulatory environment

P2.1	Finalise the Bhutan Information, Communications and Media Bill and introduce to the National Assembly	MoIC	2005	Completed (Enacted by the 85th Session of National Assembly 2006)
P2.2	Legislate for access to and dissemination of information	Judiciary, MoIC, OAG	2006	Completed- ICM Act takes care of it
P2.3	Enforcement of intellectual property legislation	MTI, Judiciary, Revenue & Customs, RBP	2007	Ongoing
P2.4	Establish a liberalised and competitive ICT market	MoIC	2007	Ongoing- Regime introduced,second mobile operator commenced operation since 2008
P2.5	Promote FDI in ICT industry development	MoIC	2007	Ongoing- licensed and implemented on a case by case basis. IT Park and BPOs. Revised FDI Policy takes care of it

Strategy P3. By 2008, strengthen ICT regulatory and enforcement capacity

P3.1	Recruit appropriate regulatory personnel and, train and re-train them regularly	RCSC, BICMA	2007	

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[1] A loosening of regulatory controls associated with free market policies.

P3.2	Provide competitive remuneration package for ICT regulatory professionals/specialists	RCSC, BICMA	2007	

Strategy P4. By 2005, investigate ways to fund and reduce the cost of ICT services

P4.1	Develop a plan for a National ICT Infrastructure Fund (NICTIF), taking into account the Universal Service Fund	MoIC	2005	Completed- Rules detailing the modus operandi of the fund is being formulated by BICMA as per the provisions of the ICM Act
P4.2	Explore ways of reducing cost of ICT hardware, software and services: - 'walled garden' of Bhutanese web content; - Demand aggregation initiatives.	DIT	2005	Internet and telecom tariff revised periodically

Strategy P5. By 2015, make ICT services accessible and affordable throughout Bhutan

P5.1	Enable access to public information deploying shared infrastructures	MoIC, BICMA, DoIM, DIT, Bhutan Post	2010	
P5.2	Promote universal service and individual citizen access to public information and services	MoIC, BICMA, DoIM, DIT	2015	Directives issued to BICMA to utilize USF to provide last mile connectivity, within 10th plan

INFRASTRUCTURE

Strategy IN1. By 2008, establish a competitive, level-playing and reliable ICT infrastructure market

IN1.1	License new operators and service providers	BICMA	2006	Implemented
IN1.2	Provide incentives for new ICT players to establish ICT businesses	MoIC, MoF, MTI	2008	Ongoing
IN1.3	Promote FDI in ICT infrastructure development	MoIC, MTI, MoF	2007	Ongoing
IN1.4	Establish a proper co-ordination mechanism to improve co-ordination among infrastructure providers	BICMA, MoIC	2007	Discussions on-going with DIT, BPC, BICMA, BTL

Strategy IN2. By 2015, ensure affordable, fast, secure, and sustainable ICT infrastructure throughout Bhutan

IN2.1	Support establishment of a nationwide ICT backbone infrastructure	MoIC, BICMA	2010	Discussion ongoing with BICMA, BPC, BTL
IN2.2	Develop a plan for a countrywide			

	connectivity to ICT infrastructure, including schools, Gewog centers and villages	MoIC	2005	Completed
IN2.2a	Establish a nationwide broadband network	MoIC, BICMA	2015	Work order issued to BPC to string OPGW to their transmission tower Institutional framework for implementing the plan is being worked out with BPC and other stakeholders
IN2.3	Establish Government-wide intranet connecting all agencies in Thimphu	DIT	2007	Completed
IN2.4	Extend Government-wide intranet to all Dzongkhag headquarters	DIT	2010	Ongoing – contingent to broadband master plan
IN2.5	Extend Government-wide intranet to all Gewogs	DIT	2013	Ongoing – contingent to broadband master plan
IN2.6	Establish a Community Information Center in every Gewog	DIT	2013	Ongoing
IN2.7	Establish at least 10 telephone connections in each Gewog	BTL	2007	97% completed
IN2.8	Explore ways of reducing cost of ICT hardware and software: - Open source software; - Re-cycling computers; - Substitute processors	DIT	2005	Ongoing
IN2.9	Establish a national Internet Exchange Point (IXP)	MoIC, BICMA	2009	Under study
IN2.10	Last mile access down to village level	MoIC, BICMA	2015	Implementation ongoing

HUMAN CAPACITY

Strategy HC1. By 2013, all ICT positions will be filled by well-qualified national staff

HC1.1	Draft National ICT HRD plan, incorporating : - RGoB and private sector training needs assessment; - developing ICT occupational profiles for RGoB positions; - ICT career paths for RGoB ICT professionals	DIT	2007	The draft is Completed
HC1.2	Initiate implementation of the National ICT HRD Master Plan	DIT, RCSC	2008	Implementation to commence during 2008-2009
HC1.3	Initiate enforcement of the Labour and Employment Act of Bhutan	MLHR	2006	Implemented
HC1.4	Establish DIT as the focal agency			Established vide

		ICT	RCSC	2008	RCSC circular no. RCSC/HRMD/26/2009/79 dated 11th February 2009
	for management of all personnel in the country				

Strategy HC2. By 2010, establish one ICT Center of Excellence in Bhutan

HC2.1	Identify educational partners in Center of Excellence	MoE, RUB	2007	Ongoing
HC2.2	Identify and establish linkages with regional and international institutions	MoE, RUB, MoIC	2007	Ongoing
HC2.3	Initiate research and development in ICT	RUB, MoE, MoIC	2009	
HC2.4	Establish a standard curriculum for skills required in the job market	MoE, DIT, MLHR	2008	Ongoing

Strategy HC3. By 2009, expand ICT institutes to other regions

HC3.1	Formulate strategies for Government intervention to encourage establishment of ICT institutes in other regions	MoEA, DIT, MLHR	2008	

Strategy HC4. By 2013, all students with basic education would have acquired basic IT and computer skills

HC4.1	Ensure infrastructure is in place in all HSS, MSS, and LSS	MoE	2013	Ongoing – Internet connection provided to 23 HSS utilizing the universal service fund
HC4.2	Ensure teachers are ICT literate through recruitment and training/re-training	MoE	2009	Ongoing
HC4.3	Develop standardised 'basic ICT literacy' curriculum for use in schools and other training institutes	MoE	2007	Ongoing
HC4.4	Implement use and adoption of open source software for use in schools	DIT, MoE	2010	Ongoing

Strategy HC5. By 2010, majority of Bhutanese will be aware of the benefits of ICT

HC5.1	Disseminate ICT-related programming through all available media	DIT	2006	Ongoing
HC5.2	Incorporate ICT skills into community learning centres and NFE program	MoE, DIT	2010	
HC5.3	Conduct a national ICT awareness-raising campaign	DIT	2005	Ongoing

CONTENT AND APPLICATIONS

Strategy CA1. By 2009, Bhutan will have the enabling framework to promote e-business

CA1.1	Establish an affordable local digital signature platform and an appropriate authority	DIT	2008	Piloting in DIT completed and will be extended to other Ministries and agencies
CA1.2	Create a mechanism for resolution of e-business disputes	MoEA, BICMA	2008	
CA1.3	Ensure payment methods exist to support online transactions, including: - Facilities to transfer funds within Bhutan; - Facilities to allow Bhutanese customers purchase online (e.g. Visa cards); - Facilities to allow Bhutanese merchants sell online (e.g. PayPal)	RMA	2009	Ongoing

Strategy CA2. By 2010, use ICTs to preserve and promote culture and heritage, and create appropriate local content

CA2.1	Develop and incorporate UNICODE-based Dzongkha computing into at least one operating platform	DIT	2006	Completed
CA2.2	Develop digital archive of significant Bhutanese and religious texts	MHCA, DIT. DoIM	2008	Development of tools ongoing in collaboration with University of Virginia
CA2.3	Develop digital archive of significant Bhutanese cultural content in sound and picture formats	MHCA, BBS, DoIM	2008	Ongoing
CA2.4	Avail online content to promote Bhutanese cultural heritage in support of tourism industry	MHCA, DOT, MoEA	2009	Ongoing
CA2.5	Encourage the creation of Bhutanese web content, including Dzongkha	DIT, DoIM, BBS	2010	Ongoing

Strategy CA3. By 2010, harness ICTs to enhance the quality and accessibility of education

CA3.1	Establish policy for recognition of online degrees	RCSC, National Qualification Authority	2008	
CA3.2	Establish e-learning nodes in Community Information Centers	MoE, MoIC, DIT	2010	Ongoing
CA3.3	Share educational resources throughout Bhutan: - Establish digital library of educational resources	MoE, RUB	2010	

	- Establish system for distance education			

Strategy CA4. By 2010, harness ICTs to enhance the quality and accessibility of health services

CA4.1	Strengthen telemedicine unit and linkages in BHUs, District Hospitals and Referral Hospitals	MoH	2010	Ongoing
CA4.2	Initiate telemedicine linkages with neighboring countries and international agencies to promote e-health	MoH	2009	Ongoing
CA4.3	Establish Health Information System	MoH, MoIC	2009	Ongoing- core team formalized and TOR drawn for each member. Finalizing the RFP
CA4.4	Promote continued Medical Education (CME) through Internet to doctors and other health workers	MoH, RIHS/RUB	2008	

Strategy CA5. By 2010, citizens will have real-time access to Bhutanese media

CA5.1	Extend FM radio coverage to all Dzongkhags	BBS	2005	Completed
CA5.2	Kuensel distributed on the same day in all Dzongkhags	Kuensel	2006	Achieved
CA5.3	Extend real-time BBS TV coverage to all Dzongkhags	BBS	2008	Completed
CA5.4	Expand private FM radio services in all Dzongkhags	Kuzoo FM, Radio Valley & Centennial Radio	2009	Kuzoo is available in all Dzongkhags, Radio Valley and Centennial Radio will also reach all Dzongkhags very soon
CA5.5	Private newspapers distributed on the same day in all Dzongkhags	Bhutan Times, Bhutan Observer	2008	
CA5.6	Extend real-time BBS TV coverage to all Gewogs	BBS	2009	Ongoing- 176 gewogs covered

Strategy CA6. By 2009, develop local content and applications to support good governance

CA6.1	Establish data interoperability standards	DIT	2007	Completed
CA6.2	Support the implementation of a national GIS system	National Land Commission	2007	Ongoing
CA6.3	Identify common usage applications	DIT	2005	Completed
CA6.4	Establish computerised ID system for citizens	MHCA	2004	Completed
CA6.5	Establish computerised ID system for companies	MTI	2008	Ongoing
CA6.6	Re-develop and re-launch	DIT, DoIM	2005	Ongoing and

	integrated RGoB web portal			continuous up-gradation
CA6.7	Ensure updated online presence for all Ministries, autonomous bodies and agencies, including making all public documents available online	All	2007	Completed
CA6.8	Publish online information relevant to the public including :	All		
	- Acts, rules and regulations	All	2005	Ongoing
	- Plans, goals, targets and progress	All	2007	Ongoing
	- Contracts, procurements and tenders	All	2008	Ongoing
CA6.9	Launch Citizen-Citizen portal	DIT	2009	Ongoing
CA6.10	Establish automated system for dealing with citizen complaints and inquiries	DIT	2009	Ongoing
CA6.11	Enhance HR Information System	RCSC, DIT	2008	
CA6.12	Develop a National Architecture for e-Governance/Government	DIT	2008	Waiting for World Bank Support
CA6.13	Develop e-Government applications to improve service delivery	DIT/All	2008	Agriculture Marketing system developed, BAFRA plant and livestock permit system developed, Security clearance system developed, Govt Office procedure automation system developed, Intra Gov Portal developed, Common integrated Police application developed. Hospital Information System - Finalizing the RFP, RCSC Zhiyog System – evaluating technical proposal, Education Portal- consultation ongoing

Strategy CA7. By 2008, develop a communication plan for the national disaster management system

CA7.1	Develop a communication plan/framework for the national disaster management system	DIT, MHCA	2008	Approached International Telecommunication Union (ITU) to assist Bhutan in developing a national disaster

				communication plan-awaiting for response from ITU

Strategy CA8. By 2010, develop a national e-waste management system for sustainable environment

CA8.1	Develop a national e-waste management system	NEC, MoIC	2010	Included in the draft Solid Waste Management Act

ENTERPRISE

Strategy E1. By 2008, increase competency of the local ICT industry

E1.1	ICT association strengthened to represent industry and increase competence	BCCI	2005	Ongoing
E1.2	Establish vendor certification guidelines to improve supply of ICT goods and services	DIT	2005	Completed
E1.2a	Implement vendor certification guidelines	BICMA	2007	Ongoing
E1.3	Establish professional forums to exchange knowledge between ICT professionals	DIT, BCCI	2008	Initiated
E1.4	Explore demand aggregation to reduce the price of common goods and services (e.g. business leased line Internet access, installment financing for ICT equipment etc.)	BCCI, DIT	2005	Ongoing

Strategy E2. By 2008, ensure outsourcing of all appropriate government works

E2.1	Conduct a baseline survey of current outsourcing practices	DIT	2005	Completed
E2.1a	Analyze the baseline survey of current outsourcing practices, make appropriate recommendations and undertake subsequent implementation	DIT, BCCI	2008	
E2.2	Conduct awareness on outsourcing by organizing business fairs and workshops for industry and government	DIT, MoEA, MLHR	2008	
E2.3	Review current tendering and procurement procedures and establish e-procurement system	MoF, DIT	2008	Ongoing
E2.4	Encourage outside professionals with greater focus on skills transfer	DIT, MLHR	2008	Ongoing

Strategy E3. By 2008, improve access to financial mechanisms for ICT businesses

E3.1	Promote foreign direct investment with high skills transfer components	MoEA, MoF, MoIC	2007	The endorsement of the revised FDI policy will create the

				necessary environment
E3.2	Investigate need for ICT business fund to support start-up enterprises	MoEAI, MoF, MoIC	2007	Ongoing
E3.3	Review existing tax environment for ICT businesses	MoEA, MoF, MoIC	2008	Ongoing
E3.4	Encourage the creation of private capital markets for investment in ICT businesses	MoEA, MoF, MoIC	2008	The endorsement of the revised FDI policy will create the necessary environment

Strategy E4. By 2009, export ICT services

E4.1	Establish pilot small-scale call centre to investigate viability	MoEA	2007	
E4.2	Establish pilot small-scale data warehouse for RGoB data to investigate viability	DIT	2008	Under study
E4.3	Investigate demand for ICT incubation services	MoIC	2008	Ongoing
E4.4	Establish ICT business clusters with access to shared infrastructure and services	MoEA, MoIC	2008	Ongoing

Strategy E5.   By 2008, promote the appropriate use and application of ICT in non-ICT businesses

E5.1	Establish a sustainable national e-commerce portal	MoEA, DIT	2008	Ongoing
E5.2	Strengthen postal services to facilitate e-services and e-commerce	Bhutan Post	2008	Ongoing
E5.3	Support the film and music industries to improve their quality of services	BCCI, DoIM	2008	film award sponsored by government Support extended for trainings
E5.4	Demonstrate and promote the use of ICT to improve efficiency in non-ICT businesses	BCCI	2008	Ongoing

2.   INTRODUCTION

a.   BHUTAN'S DEVELOPMENT APPROACH

Since the start of planned development in 1961, Bhutan has followed its own unique development path. Inspired by His Majesty the King's vision of enhancing 'Gross National Happiness', Bhutan has always placed people at the centre of its development efforts.

A series of Five Year Plans has provided the framework for continuous development over the last forty eight years, and has yielded significant results.

"Bhutan 2020" established the goal "to ensure future independence, sovereignty and security of our nation-state," guided by six main principles: "identity, unity and harmony, stability, self-reliance, sustainability and flexibility".

Bhutan has also adopted the Millennium Development Goals as national development targets to aim for by 2015.

b. WHY ICT?

The phenomenon of globalisation is underpinned by innovation, information and enterprise. It is largely supported and driven by the development and use of ICT. Without ICT, it is increasingly difficult to take advantage of the opportunities and as well as minimize the threats of globalisation. There is a real and growing fear of being caught on the wrong side of a global digital divide, disconnected from global markets, knowledge and ideas, or alternatively of being swamped by waves of global culture undermining one's own identity.

ICT has the potential to assist Bhutan overcome its geographic challenges. The traditional geographic barriers that confront Bhutan - a dispersed population divided internally by high mountain passes, being landlocked - can be lessened by the smart application of ICT. Additionally ICT can be used to create business, jobs, tap international markets, preserve and promote cultural heritage and support good governance. In its entirety, ICT can help create a knowledge-based society.

c. BIPS PROCESS

The Ministry of Information and Communications was created in July 2003. The Minister immediately initiated a national ICT policy process, calling for an 'ICT White Paper' to be drafted.

This White Paper was approved by Cabinet in October 2003, and became "the basis for an inclusive and consultative process for formulating a new strategic framework for ICT in Bhutan".

Subsequently five committees were formed, one for each of the five strategic components identified by the White Paper. The Committees worked intensively over a period of three months during which they held individual meetings and as well as interacted with other committees through a number of inter committee meetings.

The Committees drew on a wealth of materials, from the Ninth Five Year Plan, previous ICT plans prepared by international consultants, local e-Readiness studies, and WSIS documents and materials (see Appendix e).

The process was open and participative. All documents and minutes of meetings were posted online at a BIPS website. Open Consultative Workshops were held whereby the inputs from citizens, members of the donor community and other interested parties were gathered. These have contributed significantly to the final shape of BIPS.

The Council of Cabinet Ministers approved this BIPS Report on 22 June 2004.

3. SITUATION ANALYSIS

Bhutan is a small, isolated and landlocked Kingdom in the eastern Himalayas. It rises from the plains in the south to the main range of the Himalayas in the north at an altitude of over 7000m. The population of around 700,000 lives mainly in the valleys, with sparse population in the mountainous north. The terrain makes travel between the population centres difficult and time-consuming.

Bhutan embarked on a rapid process of modernisation with the first Five Year Plan in 1961. Currently most Bhutanese are engaged in agriculture, or employed in the civil service. The Government has recognised the need to boost the private sector as a key source of employment for its youth.

Bhutan is a Buddhist Kingdom, with a rich and unique cultural heritage. Under the leadership of His Majesty King Jigme Singye Wangchuk, Bhutan has pursued a unique development philosophy of 'Gross National Happiness'.

It has a small, compact and competent government. Bhutan is politically stable. Of late it has embarked on a process of decentralisation and democratisation. Educated Bhutanese possess near-native standard of English.

POLICY

Bhutan is putting in place a regulatory environment to encourage the use and development of ICT. A Telecommunications Act was passed in 1999, a Copyright Act in 2000, and the Bhutan Information, Communications and Media Act was passed in 2006. Bhutan is building its institutional capacity to regulate and support ICT activity through the Department of Information & Media (DoIM), Department of Information Technology (DIT) and Bhutan InfoComm & Media Authority (BICMA), and the establishment of ICT Units in Ministries to assist them harness the potential of ICT.

Bhutan has the opportunity to harness the potential of ICT through a greater and more co-ordinated national effort. ICT can improve the internal efficiency of Government as well as the provision of information and services to citizens. ICT can enhance efforts in a number of established national priorities, such as de-centralization, private sector development and good governance. ICT can also make governance and policy-making more inclusive and transparent, by providing citizens with access to key public information and the mechanisms to participate in public debate and policy formulation.

There are vast collections of relevant public documentation within Ministries which could be digitized and provided online. There is a consensus across Government that legislation, rules and regulations and *chathrims* should be made available online. Recognising email as official correspondence will boost the internal efficiency of communications in the government system. The newly established ICT Units provide a strategic framework to enhance intra-ministerial as well as inter-ministerial (and thereby national) coordination and application of ICT.

ICT equipment is already exempted from import duty and ICT companies have been accorded a tax holiday.

INFRASTRUCTURE

Bhutan faces geo-demographic constraints for the roll-out of ICT infrastructure, including harsh terrain and small scattered populations. ICT vies with other development priorities for funds; Bhutan's limited resources have meant that the roll-out of ICT equipment in schools and businesses is not far advanced. The small size of the country means that there is limited ability to build a critical mass of telecommunications engineers and other ICT professionals to adopt and implement infrastructure; Bhutan continues to rely substantially on outside technical assistance. However, Bhutan has made progress in centrally planned roll-outs of key backbone infrastructure. As a relatively late entrant, Bhutan has been able to capitalise on mature technologies. The BTL transmission network is mainly comprised of 34Mbps and 155Mbps 7/8GHz microwave radio and digital switching systems at the more populous Dzongkhag headquarters and urban centers. Spur routes to smaller towns use 8Mbps radio connected to a Remote Line Switching Unit. The services to the smallest Dzongkhag HQ's are provided using 2.3GHz DRMASS (Digital Radio Multiple Access Subscriber Systems) and 1.8GHz CorDECT equipment. In 2004, Bhutan Telecom has installed an Optical Ground Wire (OPGW) transmission system with Synchronous Transport Module (STM)-1 capacity connecting Thimphu, Paro and Phuentsholing over the Bhutan Power Corporation's (BPC) 66kV transmission lines. International connectivity is also provided via satellite earth station in Thimphu, which connects voice traffic to London, Tokyo and Singapore. All Dzongkhag headquarters are connected, either via the microwave backbone or 8Mbps radio links.

All 20 Dzongkhags and 199 of 205 geowgs are connected to the national fixed line telecom network. Mobile coverage has reached to 107 gewogs and there is plan to cover all 205 geowgs in few years' time. Fixed-line teledensity has increased from 2.8% in 2002 to 4.6% in July 2008 and mobile teledensity as of July 2008 has reached 36% since its launching in November 2003.

Cable TV networks operate in 19 of 20 Dzongkhags. BBS, as the national public service broadcaster, provides both radio and television services across the Kingdom. Its FM radio service covers all 20 Dzongkhags. Currently, 44 towns in Bhutan can watch BBS TV directly. There is an efficient and trusted national postal network.

Bhutan is committed to establishing a liberalised and competitive ICT infrastructure market to improve services and lower costs. The roll out of the broadband master plan and use of national power grid as an ICT carrier, greater co-ordination between infrastructure providers and including integrated utility ducts offer further opportunities to improve infrastructure scenario.

HUMAN CAPACITY

Bhutan does not have adequate ICT and knowledge-workers. This is partly due to the small size of the population, but also can be ascribed to the ability of the training institutions. The civil service, which is the largest and most sought-after employer, has no job profiles or career paths for ICT professionals, resulting in their skills not being fully utilised. There is also a mismatch between the skills demanded by the job market and the ICT training available. Many school leavers are taking basic ICT training courses but then find no willing employer.

There are two main tertiary institutions providing ICT training: RIM and Sherubtse College. RIM provides diploma courses in ICT, and Sherubtse College provides Bachelor courses in Computer Applications, Information Technology, and Science (Computers) through its affiliation with Delhi University, as well as a Post Graduate Certificate in Teaching Information Systems. Some vocational training institutes such as Vocational Training Institute in Rangjung, Department of Human Resources, and Bhutan Vocational Qualification Authority are developing curriculum for basic computer hardware maintenance, TV/VCR repair, and regulatory and monitoring ICT training programmes. There are also 18 private institutes providing basic ICT courses in fields including network administration, web developing, graphics and desktop publishing. There are no training institutes providing courses in more advanced vocational ICT skills such as telecommunications, mass communications and media studies, communication management and information management systems.

Future opportunities include building awareness of the potential of ICT, expanding access to ICT training, and boosting the overall quality and relevance of training courses. There is currently limited infrastructure or ICT curriculum development for ICT in schools. However, the MoE has formulated an Education ICT Master Plan to roll-out ICT infrastructure to schools and implement ICT curricula.

Combined with a young population eager to learn, and renewed RGoB focus on ICT and private sector development, there is great potential to boost the nation's ICT human capacity.

CONTENT AND APPLICATIONS

Bhutan is just beginning to tap the potential of ICTs by developing and using relevant content and applications. Some Ministries have web pages, but content tends to be static and not updated regularly. While there has been some progress in the development of some systems, limited co-ordination means that similar systems are being re-created. Data compatibility for future systems integration is another issue. Some of the better websites are run by private tour operators. E-services and a-business are hindered by the lack of online payment systems, appropriate legal frameworks, infrastructure and private sector initiative.

All Ministries use email for informal correspondence, and basic data management and monitoring tools are in use. Some central agencies are using ICT to communicate with and gather data from regional offices.

Future opportunities abound. E-commerce whereby Bhutanese products can be sold globally is a significant one. Preservation of cultural heritage and enhancing national identity are other opportunities. The provision of health and education services can also be substantially improved.

ENTERPRISE

The ICT private sector is young and small. The size of the domestic ICT market is very limited. There are about 45 firms dealing in IT business,. ICT business is heavily centered around hardware with very limited development and provision of software products and services. Limited access to capital has also limited the expansion of ICT businesses, and poor enforcement of intellectual property rights has not helped the development of high-value software enterprises.

There is, therefore, substantial opportunity for the private sector to upgrade its skills and business management, improve its reputation amongst RGoB customers, and take advantage of RGoB outsourcing policy and increasing ICT investments. It may be able to harness the skills of foreign workers within the national labour policy to deliver better service and transfer skills to national staff. There is also great potential to grow the market for ICT goods and services into the private sector, by demonstrating the efficiency gains that can be made. Further, Bhutan is keen to explore the viability of establishing business process outsourcing pilots for call centres and data warehousing, which offer great future potential as export industries.

4. VISION

> *With people at the centre of development, Bhutan will harness the benefits of ICT, both as an enabler and as an industry, to realise the Millennium Development Goals and towards enhancing Gross National Happiness.*
>
> From the ICT White Paper, October 2003

ICT can create a knowledge-based society. Empowered by knowledge, Government, the private sector, communities and individuals can make better informed choices about how best to pursue their individual and collective happiness.

5. POLICY OBJECTIVES AND GUIDING PRINCIPLES

National policies in Bhutan are informed by **Bhutan's Vision 2020** and the principles of **Gross National Happiness (GNH)**. Bhutan has also adopted the Millennium Development Goals as an important aspiration.

POLICY OBJECTIVES
Three broad policy objectives underpin the BIPS strategies.

1. **To Use ICT for Good Governance;**
2. **To Create a Bhutanese Info-culture; and**
3. **To Create a "High-Tech Habitat"**

ICT Vision

ICT for Good Governance

Creating a Bhutanese Info-Culture

Establishing a High-Tech Habitat

POLICY OBJECTIVES

POLICY

INFRASTRUCTURE

HUMAN CAPACITY

CONTENT AND APPLICATIONS

ENTERPRISE
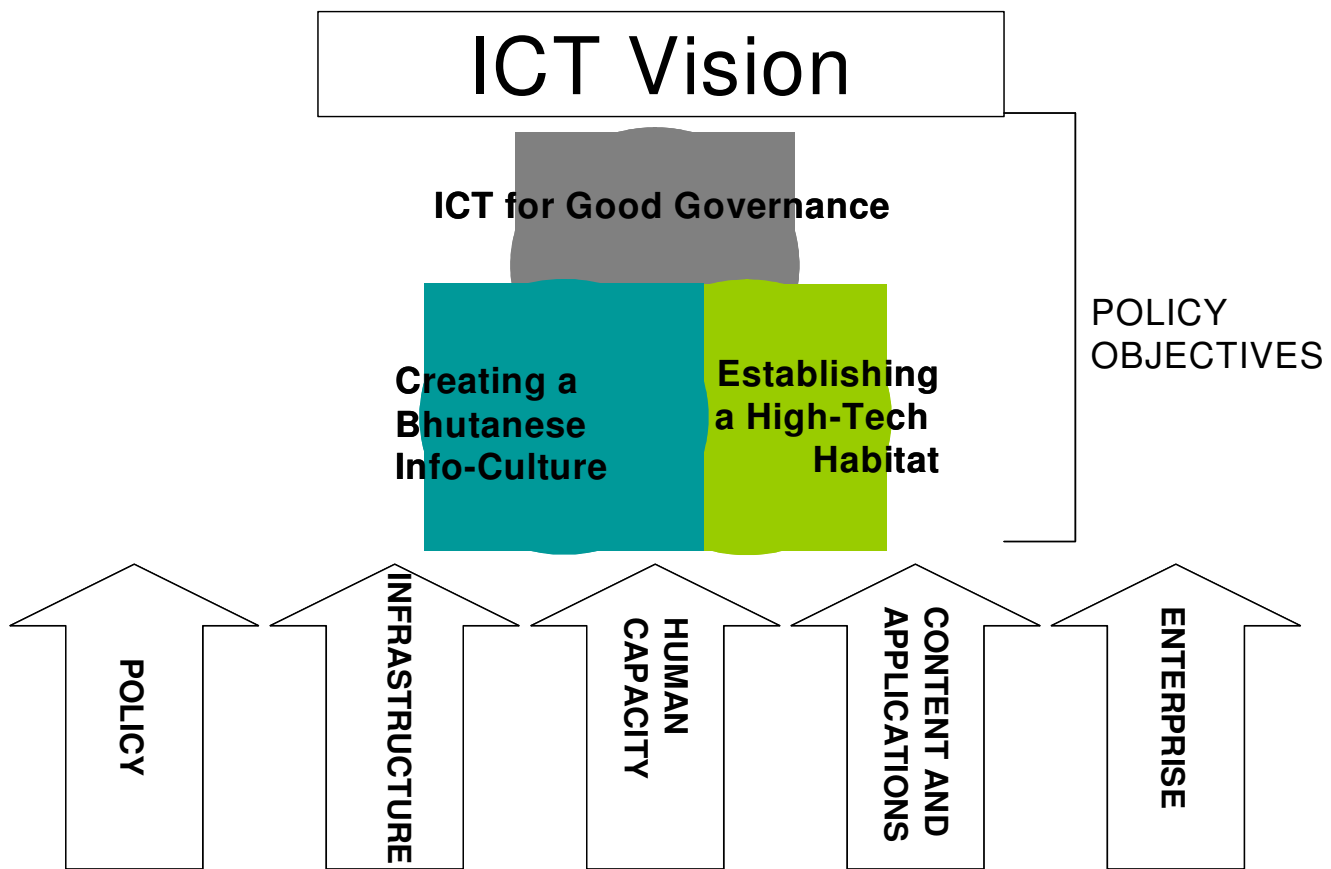
1. To Use ICT for Good Governance

Good governance is characterised by efficiency, transparency and accountability. As Bhutan seeks to create de-centralised and democratic governance, ICTs can help in boosting the internal efficiency of Government and improving the ability of citizens to access key information and services. Good governance is responsive to the needs of its citizens; ICTs can help to create interactions between citizens and Government where citizens can identify their needs.

2. To Create a Bhutanese Info-culture

As Bhutan continues its rapid modernisation, Government decision-makers, citizens and businesses will increasingly demand access to information to assist them in making better decisions. Creating a culture of open and free sharing of information will not only boost efficiency in all sectors of the economy, but will also increase the accountability of Government and allow an enterprising culture to develop in the private sector. It will also be necessary to promote the skills which allow people to disseminate and access information.

3. To Create a "High-Tech Habitat"

Government can aim to create the enabling environment for ICTs to be applied and developed. From global experience, the important factors include skilled workers, a culture of enterprise, access to capital, access to local and global markets, and research and development. This environment will allow Government and businesses in all sectors to apply ICT to improve their efficiency and operations, and for the ICT sector itself to grow, resulting in productivity gains and the creation of high-value jobs. Government can assist in creating this environment; the private sector will capitalise on it.

GUIDING PRINCIPLES

The pursuit of the above objectives will be guided by three guiding principles which reflect the reality of ICT globally:

i)   **Strong Government Leadership** is perceived as one of the key principles required to ensure success in implementing the ICT policy of Bhutan. The Government must be the key driver of ICT policy and provide the leadership and necessary resources to back up programmes whose developments will impact every sector and sphere of life.

ii) **Convergence** of ICT technologies and markets requires an integrated approach for regulation and coordinated development within the ICT sector. The Bhutan ICT Policy will promote convergence as one of its core principles. This shall be reflected in the institutional set up of the Acts and bodies set up to regulate, plan and monitor ICT development as well as in ICT-related plans and programmes.

iii) **Public-Private partnership** will be a key instrument by which ICT sector will be promoted. This is a tested model in other countries and Bhutan will use this to promote sustainability of ICT programmes as well as promote private sector growth. The government will ensure an enabling environment for the private sector to leverage their businesses to realize the common goal of productivity and high-value employment.

6.   STRATEGIES AND ACTIVITIES

These strategies and activities form the crux of BIPS. They are categorised under the five strategic components identified by the Digital Opportunity Initiative : Policy, Infrastructure, Contents and Application, Human Capacity and Enterprise.

a.   POLICY

Creating a legislative and regulatory framework, which is adaptable, comprehensive, transparent, inclusive and forward-looking, and building effective institutional capacity to implement it.
From ICT White Paper

Bhutan recognises that to become a truly 'knowledge-based society' requires policy approaches that encourage transparency, access to information and accountability. ICT tools are uniquely suited to these ends.

While creating a 'Bhutanese Info-Culture' might be some way off, it is important to start taking steps in that direction if the full benefits of ICT are to be reaped. Again, Government is well-placed to set the example. The following sets of strategies and activities will help Bhutan progress towards its overall ICT policy objectives.

Strategy P1. By 2010, use ICT to make governance more efficient, accountable and transparent.

In Bhutan, Government has a special role in the economy and society. While in the medium term RGoB recognises the private sector as the driver of economic and employment growth, it is natural in the short-term that RGoB should take a strong lead in the application of ICT. In this way, RGoB will not only create private sector market opportunities through outsourcing, it will also act as a lead user and demonstrator of the benefits of ICT to all other sectors. The efficiency gains from better application of ICT to government processes will have benefits for citizens in terms of improved Government services and access to information.

In Bhutan's mountainous terrain, citizens frequently travel days to access public services. ICT can be used to take these services closer to where they live. Good governance is founded on active citizen participation. ICTs can allow citizens more opportunities to participate in governance, through access to government procedures, by communicating directly with public servants and elected representatives, as well as communicating with each other to discuss issues relevant to them.

Table P1. By 2007, RGoB will use ICT to make governance more efficient, transparent and inclusive.

	Activity	Agency	US$ (000)	04	05	06	07	08	09	10
P1.1	Establish policies on information-sharing between agencies	MoIC (**DIT**), all agencies	Agency		▓					
P1.1a	Implement the policy guideline on information sharing	MoIC **(DoIM)**	Agency					▓		
P1.2	Establish policies on ICT security	MoIC (**DIT**), all agencies	Agency				▓			
P1.3	Encourage use of free and open source software	MoIC (**DIT**), all agencies	Agency					▓		
P1.4	Email recognised as official Government correspondence	**RCSC**, MoIC (DIT)	Agency					▓		
P1.5	Introduce 'e-Gazette' as official RGoB publication of record	MoIC (**DIT**), all agencies	Agency					▓		
P1.6	Establish InfoComm & Media division in each Ministry and major autonomous agency	MoIC (**DIT**), **DoIM, RCSC,** all agencies	Agency					▓		
P1.7	Establish InfoComm & Media Section in all 20 Dzongkhags	MoIC (**DIT**), Dzngkhgs	Agency						▓	
P1.8	Each Ministry, autonomous body and agency to provide 75% of all possible public services deliverable through ICT	**All agencies**, Cabinet, MoIC (DIT & DoIM)	Agency							▓
P1.9	Streamline and automate business and ICT licensing processes	**MTI, BICMA**	Agency					▓		
P1.10	Establish system for online citizen polling on Government policies and other public intrest issues	All	Agency		▓					
P1.11	Publish senior RGoB officials' email addresses	**RCSC**	Agency			▓				
P1.12	Publish all public Government reports online	**Cabinet, Ministries, autonomous**	Agency		▓					

				04	05	06	07	08	09	10
P1.13	Establish DIT as the focal agency for management of all ICT personnel in the country	**RCSC**						■		

Related strategies and activities :

    IN1.3   *Promote FDI in ICT infrastructure development*
    IN2.2   *Develop a plan for a countrywide connectivity to ICT infrastructure*
    IN2.6   *Establish multipurpose telecentres in every Geog*
    HC1.1   *Draft National ICT HRD plan*
    HC1.3   *Ensure recruitment of qualified personnel for RGoB ICT positions*
    HC4   *By 2008, all students who have completed basic level education have acquired basic IT and computer skills*
    CA1.1   *Establish an affordable local digital signature Certifying Authority*
    CA1.3   *Ensure payment methods exist to support online transactions, including facilities to transfer funds within Bhutan;*
    CA3   *By 2010, Bhutan will harness ICTs to enhance the quality and accessibility of education*
    CA4   *By 2010, Bhutan will harness ICTs to enhance the quality and accessibility of health services*
    CA5   *By 2008, all Bhutanese citizens will have real-time access to Bhutanese media*
    E2.2   *Ensure awareness and capacity to conduct outsourcing by conducting business fairs and workshops on ICT outsourcing for industry and RGoB*

Strategy P2. By 2008, implement a flexible, 'light-touch' and modern regulatory environment.

The world of technology changes rapidly. New technology trends can make it difficult for policy-makers and legislators to keep pace. It is important to establish regulatory frameworks that are adaptable and technology-neutral. Global experience in developing countries has demonstrated the benefits of deregulation and competition on improving infrastructure. The Information, Communications and Media Act 2006 has been prepared with these key principles in mind. However, there are other short-term activities that can assist in creating a regulatory environment in which ICT can thrive. Pushing forward with access to public information as a right will also help shift Bhutan towards being a knowledge-based society. Protection and enforcement of intellectual property right will constitute a key part of this regulatory environment.

Table P2. By 2007, introduce a 'light-touch' and modern regulatory environment.

	Activity	Agency	US$ (000)	04	05	06	07	08	09	10
P2.1	Finalise ICM Act and introduce to National Assembly	**MoIC**	-		■					
P2.2	Legislate for access to and dissemination of information	**MoIC**, Judiciary and OAG	>50			■				
P2.3	Enforcement of intellectual property legislation	**MTI, Judiciary, revenue & Customs, RBP**	Agency				■			
P2.4	Establish a liberalized and competitive ICT market	**MoIC**					■			
P2.5	Promote FDI in ICT industry development	**MoIC**					■			

Related strategies and activities :

    IN1.1   *License new operators and service providers*
    IN2.2   *Develop a plan for a countrywide connectivity to ICT infrastructure*
    IN1.3   *Promote FDI in ICT infrastructure development*
    HC3.1   *Review current policies in relation to businesses generally and ICT training specifically*
    CA1.1   *Establish an affordable local digital signature Certifying Authority*

CA1.2   Create a mechanism for the resolution of e-business disputes
E3.2   Investigate need for ICT business fund to support start-up enterprises
E3.3   Review existing tax environment for ICT businesses

Strategy P3. By 2008, strengthen ICT regulatory and enforcement capacity.

In order to deal with the increasing complexities of ICT policy and regulatory challenges, it will be important to strengthen the capacity of existing regulatory bodies. The introduction of the new ICT and media legislation in 2005 will introduce a range of new regulatory responsibilities, such as setting interconnection fees and administering a Universal Service Fund.

Table P3. By 2006, strengthen the existing policy and regulatory bodies to cope with ICT policy and regulatory environment.

	Activity	Agency	US$ (000)	04	05	06	07	08	09	10
P3.1	Recruit appropriate regulatory personnel and, train and re-train them regularly	**RCSC**, BICMA	100				▓			
P3.2	Provide competitive remuneration package for ICT regulatory professionals/specialists	**RCSC, BICMA**					▓			

Related strategies and activities :
IN1.1   License new operators and service providers
IN1.3   Promote FDI in ICT infrastructure development
IN2.2   Develop a plan for a countrywide connectivity to ICT infrastructure
HC3.1   Review current policies in relation to businesses generally and ICT training specifically
E3.2   Investigate need for ICT business fund to support start-up enterprises
E3.3   Review existing tax environment for ICT businesses

Strategy P4. By 2005, investigate ways to fund and reduce the cost of ICT services

Bhutan will ensure that the benefits of ICT reach right across the country. Universal access will be a major aim and government measures will promote the universality of networks and services. In places where infrastructure investment will be uneconomical, RGoB will undertake a variety of activities to ensure that these areas are not left on the wrong side of the information divide.

Table P4. By 2005, investigate ways to fund and reduce the cost of ICT infrastructure throughout Bhutan

	Activity	Agency	US$ (000)	04	05	06	07	08	09	10
P4.1	Develop a plan for a National ICT Infrastructure Fund (NICTIF), taking into account the Universal Service Fund	**MoIC**			▓					
P4.2	Explore ways of reducing cost of ICT hardware, software and services: - 'walled garden' of Bhutanese web content; - demand aggregation initiatives.	**DIT**			▓					

Related strategies and activities :
IN 2.9   Explore ways of reducing cost of ICT hardware and software
HC3.   By 2006, expand ICT institutes to other regions
HC4.1   Ensure infrastructure is in place in all MHS and HS schools
HC4.4   Explore use and adoption of open source software for use in schools

Strategy P5. By 2015, make ICT services accessible and affordable throughout Bhutan

	Activity	Agency	US$ (000)	04	05	06	07	08	09	10
P5.1	Enable access to public information deploying shared infrastructure	**MoIC, BICMA, DoIM, DIT, Bhutan Post**	Agency							▓
P5.2	Promote universal service and individual citizen access to public information and services	**MoIC, BICMA, DoIM, DIT**								▓

b. INFRASTRUCTURE

Deploying a reliable, sustainable, appropriate and affordable ICT infrastructure to achieve universal access and global connectivity through liberalisation and co-ordination between infrastructure providers.

From ICT White Paper

ICT infrastructure is a critical enabling element for all ICT related activities. Without appropriate infrastructure, it will be difficult for enterprises to tap into global markets, for Government to operate more effectively and for schools to get access to new learning tools. Infrastructure should be appropriate and wide-spread, to ensure that no segment of the community, especially those in isolated areas, is left on the wrong side of the information divide.

Strategy IN1. By 2008, establish a competitive, level-playing and reliable ICT infrastructure market

A liberalized and competitive ICT infrastructure market can deliver many benefits to citizens, including improved services and lower prices. This strategy aims to support the policy of liberalization by creating an open ICT market that is internationally competitive and conducive for investment, employment and expansion.

Table IN1. By 2007, RGoB will have established the framework for a liberalised and competitive ICT infrastructure market

	Activity	Agency	US$ (000)	04	05	06	07	08	09	10
IN1.1	License new operators and service providers	**BICMA**	100			▓				
IN1.2	Provide incentives for new ICT players to establish ICT businesses	**MoIC**, MoF, MoEA	250					▓		
IN1.3	Promote FDI in ICT infrastructure development	**MoIC**, MoF	100				▓			
IN1.4	Establish a proper co-ordination mechanism to improve co-ordination amongs infrastructure providers	**BICMA, MoIC**	Agency				▓			

Related strategies and activities :

P1. By 2007, RGoB will use ICT to make governance more efficient, transparent and inclusive.
P2.1 Finalise ICM Act and introduce to National Assembly
CA1.1 Establish an affordable local digital signature Certifying Authority
E3.1 Promote foreign direct investment with high skills transfer components
E3.2 Investigate need for ICT business fund to support start-up enterprises
E3.3 Review existing tax environment for ICT businesses
E3.4 Encourage the creation of private capital markets for investment in ICT businesses

Strategy IN2. By 2015, ensure affordable, fast, secure and sustainable ICT infrastructure throughout Bhutan

This strategy aims to build a countrywide ICT infrastructure providing access to network facilities and services. The infrastructure to be created should be appropriate, affordable, fast and secure. It should be 'future-proof' to the extent possible: that is, using the most up to date open standards that are compatible with foreseeable future technologies. It should be able to carry voice, data and other multi-media services. The infrastructure roll-out should support and keep pace with the implementation of all other activities.

The government, supported by external funding partners, will be the promoter and catalyst of ICT infrastructure building, and be responsible for ensuring that the policy and regulatory environment encourages private sector investment in infrastructure. Extra emphasis has to be made to put in place advanced and appropriate technologies.

Table IN2. By 2010, ensure an affordable, fast, secure, sustainable and appropriate ICT infrastructure throughout Bhutan

	Activity	Agency	US$ (000)	04	05	06	07	08	09	10
IN2.1	Support establishment of a nationwide ICT backbome infrastructure	MoIC, BICMA	15,000							▓
IN2.2	Develop a plan for a countrywide connectivity to ICT infrastructure, including schools, Geog centres and villages	**MoIC**	Agency		▓					
1N2.2a	Establish a nationwide broadband network	**MoIC, BICMA**								▓
IN2.3	Establish Government-wide intranet connecting all agencies in Thimphu	**MoIC**	2,000				▓			
IN2.4	Extend Government-wide intranet to all Dzongkhags headquarters	**MoIC**	1,000							▓
IN2.5	Extend Government-wide intranet to all Geogs	**MoIC**, MoHCA	1,000							▓
IN2.6	Establish Community Informatio Centers (CICs) in every Geog	MoIC (**DIT**), BT	250							▓
IN2.7	Establish at least 10 telephone connections in each Geog	**BICMA,** BTL	20,000					▓		
IN2.8	Explore ways of reducing cost of ICT hardware and software: - Open source software; - Re-cycling computers; - Substitute processors	MoIC (**DIT**)	100		▓					
IN2.9	Establish a national Internet Exchange Point	MoIC, BICMA							▓	
IN2.10	Last mile access down to village level	MoIC,BICMA								▓

Related strategies and activities :

P1.   *By 2007, RGoB will use ICT to make governance more efficient, transparent and inclusive.*
P4.2   *Explore ways of reducing cost of ICT hardware, software and services*
HC3.   *By 2006, expand ICT institutes to other regions*
HC4.1   *Ensure infrastructure is in place in all MHS and HS schools*

c.   HUMAN CAPACITY

Ensuring institutions and curricula to provide ICT skills at all levels, from technical, professional and entrepreneurial skills for industry and government to basic ICT literacy for all.
From ICT White Paper

Without activities designed to boost the ICT human capacity of Bhutan, very few of the strategies and activities listed in this report can be achieved. Further, ICT skills training should also target ICT beginners, to ensure that they are capable of using ICT to improve their lives.

It is also crucial to generate a critical mass of knowledge workers to allow ICT industry to take-off and for the benefits to be fully realized. This will have an overall impact on the use and application of ICT in the country. Heavy emphasis must be placed on strengthening the existing human resource capacity for the private sector and to ensure a steady supply of ICT professionals, managers and entrepreneurs.

Strategy HC1. By 2013, all ICT positions will be filled by well-qualified national staff

RGoB has recently introduced ICT Units in each Ministry to assist in the implementation of ICT systems, equipment and training. However, there remains no clear career path for ICT professionals within the civil service. HRD in the ICT sector poses a big dilemma. In-country training is inadequate while sending people outside is expensive. There is also a need to better match the training and the job market requirements.

This strategy aims to overcome some of these barriers. It will result in the production of critical mass of national ICT professionals. This will facilitate future growth of ICT businesses and attract more young people into ICT professional.

Table HC1. By 2013, all ICT positions will be filled be well-qualified national staff

	Activity	Agency	US$ (000)	04	05	06	07	08	09	10
HC1.1	Draft National ICT HRD plan, incorporating: - RGoB and private sector training needs assessment; - developing ICT occupational profiles for RGoB positions; - ICT career paths for RGoB ICT professionals.	**MoIC (DIT)**	75				▓			
HC1.2	Initiate implementation of the National ICT HRD Master Plan	**DIT, RCSC**,	100					▓		
HC1.3	Enforce labour market regulation, including Labour Act and MoUs with private sector companies	**MoLHR**	Agency			▓				
HC1.4	Establish DIT as the focal agency for management of all ICT personnel in the country	**RCSC**	Agency					▓		

Related strategies and activities :

Strategy HC2. By 2010, establish one ICT "Center of Excellence"

The Centre of Excellence will be the national leader and co-ordinator for ICT education and research and development. It will be charged with boosting the quality and consistency of ICT education in all institutes across the country. This will be achieved by linking the Centre of Excellence to global ICT educational institutions, as well as by entrusting it with the role of certifying and standardizing ICT curricula within Bhutan.

Table HC2. By 2008, establish one ICT "Center of Excellence"

	Activity	Agency	US$ (000)	04	05	06	07	08	09	10
HC2.1	Identify educational partners in Centre of Excellence	**MoE**, RUB)	NA				▓			
HC2.2	Identify and establish linkages with international institutions	**MoE**, MoIC (DIT), RUB	50				▓			
HC2.3	Carry out research and development in ICT	**RUB, MoE**, MoIC (DIT)	50						▓	
HC2.4	Create standardised curriculum for skills required in the job market	**MoE**, MoIC (DIT), MoLHR	50					▓		

Related strategies and activities :
CA2.5   Encourage the creation of Bhutanese web content
CA3.1   Establish policy for the recognition of online degrees
CA3.2   Establish e-learning nodes in all tele-kiosks and telecentres
CA3.3   Share educational resources throughout Bhutan

Strategy HC3. By 2009, expand ICT institutes to other regions

Not surprisingly, ICT training institutions in Bhutan tend to cluster in the larger towns, where markets are better developed. However, to achieve the national priority of broad and equitable access to ICTs, there must also be broad access to ICT skills.

This strategy aims to ensure that access to ICT training extends to all regions of Bhutan. This will be achieved through private sector involvement, government interventions and as well as public private partnership.

Table HC3. By 2009, expand ICT institutes to other regions

	Activity	Agency	US$ (000)	04	05	06	07	08	09	10
HC3.1	Formulate strategies for Government intervention to encourage establishment of ICT institutes in other regions	**MTI**, MoIC (DIT), MoLHR	Agency					▓		

Related strategies and activities :
P4.1   Develop a plan for a National ICT Infrastructure Fund (NICTIF)
IN2.2   Develop a plan for a countrywide connectivity to ICT infrastructure
IN2.6   Establish multipurpose telecentres in every geog

HC1.1   Draft National ICT HRD plan
CA2.5   Encourage the creation of Bhutanese web content
CA3.1   Establish policy for the recognition of online degrees
CA3.2   Establish e-learning nodes in all tele- kiosks and telecentres
CA3.3   Share educational resources throughout Bhutan
E3.2   Investigate need for ICT business fund to support start-up enterprises
E3.3   Review existing tax environment for ICT businesses
E3.4   Encourage the creation of private capital markets for investment in ICT businesses

Strategy HC4. By 2013, all students who have completed basic level education have acquired basic IT and computer skills

ICT education in schools will ensure that our youth are ready for the workplaces of the future. Providing access to computer equipment and training in schools will also increase the future pool of ICT professionals. In order to achieve this target, infrastructure must be in place, and teachers must have the knowledge, tools and curriculum to deliver ICT skills to their students.

Open source software offers a potential cost-effective tool to assist in achieving this strategy.

Table HC4. By 2013, all students who have completed basic level education have acquired basic IT and computer skills

	Activity	Agency	US$ (000)	04	05	06	07	08	09	10
HC4.1	Ensure infrastructure is in place in all MHS and HS schools	**MoE**	2,000							▓
HC4.2	Ensure teachers are ICT literate through recruitment and training	**MoE**	Agency						▓	
HC4.3	Develop standardised 'basic ICT literacy' curriculum for use in schools and other training centres	**MoE**	100				▓			
HC4.4	Implement use and adoption of open source software for use in schools	MoIC (**DIT**), MoE	Agency							▓

Related strategies and activities :
P1.   By 2007, RGoB will use ICT to make governance more efficient, transparent and inclusive.
P4.2   Explore ways of reducing cost of ICT hardware, software and services
IN2.2   Develop a plan for a countrywide connectivity to ICT infrastructure
CA2.1   Develop and incorporate Dzongkha computing into at least one operating platform
CA2.5   Encourage the creation of Bhutanese web content
CA3.3   Share educational resources throughout Bhutan

Strategy HC5. By 2010, majority of Bhutanese will be aware of the benefits of ICT

General awareness of the benefits of ICT is low. This will negatively impact the development of ICT. If Bhutan is to become a knowledge-based society, at the very least, people from all walks of life will need to be aware of the benefits of ICT.

Table HC5. By 2010, majority of Bhutanese will be aware of the benefits of ICT

	Activity	Agency	US$ (000)	04	05	06	07	08	09	10
HC5.1	Disseminate ICT-related programming through all available media	MoIC (DIT)	25			▓				
HC5.2	Incorporate ICT skills into community	**MoE**, MoIC (DIT)	50							▓

	learning centres and NFE program									
HC5.3	Conduct a national ICT awareness-raising campaign	MoIC (**DIT**)	50							

Related strategies and activities :

P1.   *By 2007, RGoB will use ICT to make governance more efficient, transparent and inclusive.*
IN2.2   *Develop a plan for a countrywide connectivity to ICT infrastructure*
IN2.6   *Establish multipurpose telecentres in every geog*
CA2.1   *Develop and incorporate Dzongkha computing into at least one operating platform*
CA4.3   *Develop applications to enhance the delivery of health services*
E2.2   *Ensure awareness and capacity to conduct outsourcing by conducting business fairs and workshops on ICT outsourcing for industry and RGoB*

d.   CONTENT AND APPLICATIONS

> *Promoting widespread creation of content and applications that are accessible, relevant, appropriate and useful, in particular, the development of applications for public services.*
>
> From ICT White Paper

Content and applications are what will truly unleash the power of ICT. It is vital to both develop relevant content and applications and to put in place the underlying framework to support them. Bhutan's rich and diverse indigenous cultural content can be appropriately captured and used.

Strategy CA1. By 2009, Bhutan will have the enabling framework to promote e-business

E-business has great potential to help Bhutan enter global markets despite its geographic isolation, but there are a number of fundamental requirements for e-business to take-off. E-business cannot proceed without payment methods, mechanisms to enhance trust, and the postal systems to deliver goods.

This strategy will facilitate online transactions.

Table CA1. By 2009, Bhutan will have the enabling framework to promote e-business

	Activity	Agency	US$ (000)	04	05	06	07	08	09	10
CA1.1	Establish an affordable local digital signature platform and an appropriate Certifying Authority	**MoIC (DIT)**	75							
CA1.2	Create a mechanism for the resolution of e-business disputes	**M**oEA, BICMA	50							
CA1.3	Ensure payment methods exist to support online transactions, including:	**RMA**	Agency							
	- Facilities to transfer funds within Bhutan;	**RMA**	Agency							
	- Facilities to allow Bhutanese customers to purchase online (eg Visa cards);	**RMA**	Agency							
	- Facilities to allow Bhutanese merchants to sell online (eg PayPal)	**RMA**,	Agency							

Related strategies and activities :

P1.   *By 2007, RGoB will use ICT to make governance more efficient, transparent and inclusive.*
P2.   *By 2007, Introduce a 'light-touch' and modern regulatory environment.*
IN1.2   *Establish incentives for new ICT players to establish ICT businesses*
E1.1   *ICT association strengthened to represent industry and increase competence*
E5.1   *Establish a sustainable national e-commerce portal*

Strategy CA2. By 2010, use ICTs to preserve and promote culture and heritage, and create appropriate local content

Bhutan has long recognised the importance of its cultural heritage, both in its own right and as a mark of its sovereignty and nation status. ICTs provide a number of tools to enhance the preservation and conservation of this heritage, as well as new ways of sharing this rich culture with the rest of the world.

In this context, it is important to build Dzongkha language support in major computing platforms.

Table CA2. By 2010, use ICTs to preserve and promote culture and heritage, and create appropriate local content

	Activity	Agency	US$ (000)	04	05	06	07	08	09	10
CA2.1	Develop and incorporate UNICODE-based Dzongkha computing into at least one operating platform	MoIC (**DIT**)	150			▓				
CA2.2	Develop digital archive of significant Bhutanese and religious texts	**MoHCA**, MoIC (DIT)	150					▓		
CA2.3	Develop digital archive of significant Bhutanese cultural content in sound and picture formats	**MoHCA**, BBS	200					▓		
CA2.4	Avail online content to promote Bhutanese cultural heritage in support of tourism industry	**MoHCA**, MoEA (DoT)	50						▓	
CA2.5	Encourage the creation of Bhutanese web content	MoIC (**DIT**), BBS	25							▓

Related strategies and activities :
P1. By 2007, RGoB will use ICT to make governance more efficient, transparent and inclusive.
IN2.2 Develop a plan for a countrywide connectivity to ICT infrastructure
HC4.3 Develop standardised 'basic ICT literacy' curriculum
HC5.1 Broadcast ICT-related programming through existing media
E5.3 Strengthen the film and music industries by improving the quality of its products through the use of ICT

Strategy CA3. By 2010, Bhutan will harness ICTs to enhance the quality and accessibility of education

ICT brings great potential for enhancing the quality and accessibility of education. Multi-media materials can enrich the learning experience; ICT infrastructure can be used to share and disseminate learning resources.

The following activities are aimed at facilitating online education. Recognising online degrees will increase access to education as well as prove cost effective, particularly in post-tertiary studies, given the current high cost of sending students outside to pursue further studies.

Table CA3. By 2010, Bhutan will harness ICTs to enhance the quality and accessibility of education

	Activity	Agency	US$ (000)	04	05	06	07	08	09	10
CA3.1	Establish policy for the recognition of online degrees	**RCSC**, National Qualification Authority	Agency					▓		
CA3.2	Establish e-learning nodes in all Community Information Centers	**MoE**, MoIC (DIT)	75							▓
CA3.3	Share educational resources throughout Bhutan - Establish digital library of educational resources - Establish system for distance education	**MoE, RUB**	200							▓

Related strategies and activities :

    P1.   By 2007, RGoB will use ICT to make governance more efficient, transparent and inclusive.
    P4.2   Explore ways of reducing cost of ICT hardware, software and services
    IN2.2   Develop a plan for a countrywide connectivity to ICT infrastructure
    HC1.1   Draft National ICT HRD plan
    HC3.   By 2006, expand ICT institutes to other regions
    HC4.   By 2008, all students who have completed basic level education have acquired basic IT and computer skills
    HC5.   By 2006, majority of Bhutanese will be aware of the benefits of ICT

Strategy CA4. By 2010, Bhutan will harness ICTs to enhance the quality and accessibility of health services

ICT is a proven tool for delivery of health services. It is particularly relevant in a situation where there is a lack of adequate specialists and beneficiaries are far removed. ICT has clear potential to assist in the delivery and accessibility to health services. ICT can assist in bringing relevant information to health professionals, and linking Bhutan's health providers with each other and with international experts.

The Ministry of Health is already well advanced in developing health-related ICT applications, and this work is set to continue. When combined with the plans to link hospitals with appropriate infrastructure, the quality and accessibility of health services to all Bhutanese can be expected to be boosted by the application of ICT.

Table CA4. By 2010, Bhutan will harness ICTs to enhance the quality and accessibility of health services

	Activity	Agency	US$ (000)	04	05	06	07	08	09	10
CA4.1	Strengthen telemedicine Unit and linkages in BHUs, District Hospitals and Referral Hospitals	**MoH**	50							▓
CA4.2	Initiate telemedicine linkages with neighbouring countries and international agencies to promote e-health	**MoH**	6,500						▓	
CA4.3	Establish Health Information Management System	**MoH**, MoIC (DIT)	1,000						▓	
CA4.4	Promote continued Medical Education (CME) through Internet to doctors and other health workers	**MoH, RIHS/RUB**						▓		

Related strategies and activities :

Strategy CA5. By 2010, citizens will have real-time access to Bhutanese media

In light of the pervasive accessibility of global media, it is important to strengthen as well as to improve local media in terms of coverage, real-time access and quality.

The 9FYP emphasises the importance of expanding BBS TV programming hours and geographic coverage of the FM radio network. The recent Media Impact Study outlined the benefits Bhutanese are gaining from access to local media, and their enthusiasm for expanding the coverage.

This strategy and activities are aimed at expanding the current coverage of Bhutanese radio, TV and print media to all parts of the country, to allow all Bhutanese to balance their exposure to foreign media with local media content that is relevant and timely.

Table CA5. By 2008, all Bhutanese citizens will have real-time access to Bhutanese media

	Activity	Agency	US$ (000)	04	05	06	07	08	09	10
CA5.1	Extend FM radio coverage to all Dzongkhags	**BBS**	50		▓					
CA5.2	Kuensel distributed on the same day in all Dzongkhags	**Kuensel**,	Agency			▓				
CA5.3	Extend real-time BBS TV coverage to all Dzongkhags	**BB**S	50					▓		
CA5.4	Expand private FM radio services in all Dzongkhags	**Kuzoo FM, Radio valley & Centennial Radio**							▓	
CA5.5	Private newspapers distributed on the same day in all Dzongkhags	**Bhutan Times, Bhutan Observer**						▓		
CA5.6	Extend real-time BBS TV coverage to all Gewogs	**BBS**							▓	

Related strategies and activities :
IN2.2   *Develop a plan for a countrywide connectivity to ICT infrastructure*
HC5.1   *Broadcast ICT-related programming through existing media*
HC5.3   *Conduct a national ICT awareness-raising campaign*

Strategy CA6. By 2008, Bhutan will develop content and applications to support good governance

There can be no better tool than ICT to realise the objectives of good governance. Appropriate content and applications take the centre stage. Different sectors need to work together both to share information and as well as to develop shared applications. It will be crucial to follow common data standards

Table CA6. By 2009, develop local content and applications to support good governance

	Activity	Agency	US$ (000)	04	05	06	07	08	09	10
CA6.1	Establish data interoperability standards	MoIC (**DIT**)	Agency				■			
CA6.2	Support the implementation of a national GIS system	National Land Commission	Agency				■			
CA6.3	Identify common usage applications	MoIC (**DIT**)	Agency		■					
CA6.4	Establish computerised ID system for citizens	**MoHCA**	>1,000	■						
CA6.5	Establish computerised ID system for companies	**MoEA**	>1,000					■		
CA6.6	Re-develop and re-launch integrated RGoB web portal	MoIC (**DIT, DoIM**))	>10		■					
CA6.7	Ensure updated online presence for all Ministries, autonomous bodies and agencies, including making all public documents available online	**All agencies**,	Agency				■			
CA6.8	Publish online information relevant to the public including :	**All agencies**,	Agency							
	- Acts, rules and regulations				■					
	- Plans, goals, targets and progress						■			
	- Contracts, procurements and tenders							■		
CA6.9	Launch Citizen-Citizen portal	MoIC (**DIT**)	>100						■	
CA6.10	Establish automated system for dealing with citizen complaints and inquiries	MoIC (**DIT**), All agencies	150						■	
CA6.11	Enhance HR Information System	RCSC, DIT					■			
CA6.12	Develop a National Architecture for e-Governance/Government	DIT					■			
CA6.13	Develop e-Governemnt applications to improve service delivery	DIT/All						■		

Related strategies and activities :

P1.   By 2007, RGoB will use ICT to make governance more efficient, transparent and inclusive.
IN2.2   Develop a plan for a countrywide connectivity to ICT infrastructure
IN2.3   Establish Government-wide intranet connecting all agencies in Thimphu
IN2.4   Extend Government-wide intranet to all Dzongkhags headquarters
IN2.5   Extend Government-wide intranet to all Geogs

e. ENTERPRISE

Creating an enabling business environment that helps to generate employment, attracts local and foreign investments, enhances access to local and global markets, improves business processes, stimulates domestic demand and fosters research and development.

From ICT White Paper

Globally, the private sector has been at the forefront of the ICT revolution, both in producing ICT goods and services, and harnessing ICTs to improve their business operations.

In Bhutan, the private sector is in a relatively infant stage. Factors such as a small local market far removed from external markets, limited infrastructure and ICT skills have combined to limit growth potential.

For Bhutan to capture the potential of ICT, it is vital that local enterprises, both in the ICT sector and more broadly, are well placed. To achieve this, a number of strategies will be important, including some strategies discussed in the Human Capacity and Infrastructure sections above.

Detailed below are a series of strategies focussing on the local private sector to prepare it to fully harness the potential of ICT.

Strategy E1. By 2008, increase competency of the local ICT industry

Bhutan plans to join the WTO in 2007, which may open local markets to competition from foreign enterprises. In order to be able to meet this competition, local private sector companies, especially ICT businesses, will need to bring their operations and products up to world-standard.

Detailed below are activities to help strengthen the capacity of the local ICT industry in light of these future challenges.

In many countries, a strong industry association has proved a catalyst for improving competency and networking amongst ICT firms. Some activities that industry associations can undertake include 'demand aggregation' activities. By adding together the demand of many members for services such as leased line access or an installment payment system for ICT goods, an association can negotiate for lower prices for these services for their members.

Table E1. By 2006, increase the competency of the local ICT industry

	Activity	Agency	US$ (000)	04	05	06	07	08	09	10
E1.1	ICT association strengthened to represent industry and increase competence	**BCCI**	50		▓					
E1.2	Establish vendor certification guidelines to certify and improve the skills of local ICT companies	**MoIC (DIT)**	<50		▓					
E1.a	Implement vendor certification guidelines	**BICMA**	-				▓			
E1.3	Establish professional forums to exchange knowledge between ICT professionals	**DIT, BCCI**	-					▓		
E1.4	Explore demand aggregation to reduce the price of common goods and services (e.g. business leased line Internet access, installment financing for ICT equipment etc.)	**DIT, BCCI**			▓					

Related strategies and activities :
IN1.2   Establish incentives for new ICT players to establish ICT businesses
IN1.3   Promote FDI in ICT infrastructure development
IN2.1   Deploy backbone infrastructure across Bhutan
HC1.1   Draft National ICT HRD plan
HC3.1   Review current policies in relation to businesses generally and ICT training specifically
CA3.   By 2010, Bhutan will harness ICTs to enhance the quality and accessibility of education

Strategy E2. By 2008, ensure outsourcing of all appropriate RGOB ICT work

The 9FYP states that 'ICT support, maintenance and software development will be increasingly outsourced to the private sector.'

In Bhutan, RGoB represents by far the largest market for suppliers of ICT goods and services. Therefore, in order to create opportunities for the private sector, it is vital that RGoB follows the prescription of the 9FYP in relation to outsourcing.

The activities below will gather information on the outsourcing market, and address some of the main constraints identified by the private sector.

Table E2. By 2007, ensure outsourcing of all appropriate RGOB ICT work

	Activity	Agency	US$ (000)	04	05	06	07	08	09	10
E2.1	Conduct a baseline survey of current ICT outsourcing practice	MoIC (**DIT**)	<10		▓					
E2.1a	Analyze the baseline survey of current outsourcing practices, make appropriate recommendations and undertake subsequent implementation	DIT, BCCI						▓		
E2.2	Conduct awareness on outsourcing by organizing business fairs and workshops for industry and RGoB	MoIC (**DIT**), BCCI	<50					▓		
E2.3	Review current tendering and procurement procedures and establish e-procurement system	**MoF,** (DIT)	<10					▓		
E2.4	Encourage outside professionals with greater focus on skill transfer	**DIT, MoLHR**						▓		

Related strategies and activities :
P1.   By 2007, RGoB will use ICT to make governance more efficient, transparent and inclusive
IN2.1   Develop a plan for a countrywide ICT infrastructure
CA2.2   Develop digital archive of significant Bhutanese and religious texts
CA2.3   Develop digital archive of significant Bhutanese cultural content in sound and picture formats
CA2.4   Avail online content to promote Bhutanese cultural heritage in support of tourism industry
CA2.5   Encourage the creation of Bhutanese web content

Strategy E3. By 2008, improve the access to financial mechanisms for ICT businesses

Globally, the key to successful growth of ICT businesses is access to capital. In developing countries poorly functioning capital markets make access to funds difficult.

ICT businesses need access to different financial mechanisms at different stages of their growth. Early stage, highly innovative companies often need public support for their R&D activities, which are often too high-risk for private sector investors. At later stages of growth, 'angel' and mezzanine investors mostly support growth in well-developed capital markets. Further up the development curve, private capital markets function by way of take-overs and public offerings.

The benefits of some of these activities are not limited to ICT firms. FDI policies, availability of expansion capital and a review of the business tax environment will have benefits for businesses within and outside the ICT sector.

FDI can bring not only capital investments to local ICT companies, but through appropriate partnering also bring in expertise resulting in the transfer of high-end technical skills to local companies.

In order to make investment in ICT businesses financially attractive, the market for ICT goods and services must develop through outsourcing and otherwise.

Bhutan has been progressive in removing sales tax on some types of ICT equipment. A re-examination of the tax environment as it effects ICT businesses, including depreciation, sales tax exemptions, and possible incentives for investment in ICT businesses, is now timely.

Table E3. By 2008, improve the access to financial mechanisms for ICT businesses

	Activity	Agency	US$ (000)	04	05	06	07	08	09	10
E3.1	Promote foreign direct investment with high skills transfer components	**MoEA,** MoF, MoIC	NA				▉			
E3.2	Investigate need for ICT business fund to support start-up enterprises	**MoEA,** MoF, MoIC	<10				▉			
E3.3	Review existing tax environment for ICT businesses	**MoEA,** MoF, MoIC	NA					▉		
E3.4	Encourage the creation of private capital markets for investment in ICT businesses	**MoEA,** MoF, MoIC	NA					▉		

Related strategies and activities :
> *P1.9   Streamline and automate business and ICT licensing processes*
> *P4.1   Develop a plan for a National ICT Infrastructure Fund*
> *IN1.2   Establish incentives for new ICT players to establish ICT businesses*
> *IN1.3   Promote FDI in ICT infrastructure development*
> *IN2.1   Deploy backbone infrastructure across Bhutan*
> *HC3.1   Review current policies in relation to businesses generally and ICT training specifically*

Strategy E4. By 2009, export ICT services

The global information infrastructure provides opportunities for Bhutan to overcome the barriers of its geography which have historically hampered its ability to trade. ICT enables business process outsourcing, such as call centres and software development, which can provide great economic benefit.

A number of the strategies in BIPS are aim to capture these opportunities. However, it is still necessary to assess the viability of these industries in Bhutan through pilot projects, and identify the 'competitive advantage' that Bhutan possesses to succeed in highly competitive global markets.

Table E4. By 2009, export ICT services

	Activity	Agency	US$ (000)	04	05	06	07	08	09	10
E4.1	Establish pilot small-scale call centre to investigate viability	**MoEA**	75				▓			
E4.2	Establish pilot small-scale data warehouse for RGoB data to investigate viability	MoIC (DIT)	100					▓		
E4.3	Investigate demand for ICT incubation services	MoIC (DIT)	Agency					▓		
E4.4	Establish ICT business cluster with access to shared infrastructure and services	**MoEA**, MoIC (DIT)	250					▓		

Related strategies and activities :
> P2.3   *Enforce intellectual property legislation*
> P1.9   *Streamline and automate business and ICT licensing processes*
> IN2.8   *Introduce and deploy advanced and appropriate technologies*
> HC1.1   *Draft National ICT HRD plan*
> HC2.   *By 2008, establish one ICT "Center of Excellence"*
> HC2.2   *Identify and establish linkages with international institutions*
> CA1   *By 2007, Bhutan will have the enabling framework to promote e-business*
> CA2.2   *Develop digital archive of significant Bhutanese and religious texts*
> CA2.3   *Develop digital archive of significant Bhutanese cultural content in sound and picture formats*

Strategy E5. BY 2008, promote the appropriate use and application of ICT in non-ICT businesses

It has become increasingly clear that the sustained growth of the global economy through the '90s was due as much, if not more, to the implementation of ICT in non-ICT sectors as to the growth of the ICT sector itself. To fully harness the benefits of ICT in Bhutan, it is important to plan for the appropriate application of ICT in non-ICT businesses as well.

A number of activities towards this end are listed below.

The 9FYP emphasises the opportunity to harness ICTs for e-commerce including by establishing a national e-commerce portal.

The vibrant Bhutanese film and music industry reinforces Bhutanese culture as well as providing many jobs. ICT can be applied for the more efficient production and distribution of these important cultural industries.

Table E5. By 2008, promote the appropriate use and application of ICT in non-ICT businesses

	Activity	Agency	US$ (000)	04	05	06	07	08	09	10
E5.1	Establish a sustainable national e-commerce portal	MoIC (**DIT**), MoEA	100					▓		
E5.2	Strengthen postal services to facilitate e-services and e-commerce	**Bhutan Post**	Agency					▓		
E5.3	Strengthen the film and music industries by improving the quality of its products through the use of ICT	**DoIM, BCCI**	100					▓		
E5.4	Demonstrate and promote the use of ICT to improve efficiency in non-ICT businesses	**BCCI**	50					▓		

Related strategies and activities :
> *P4.2   Explore ways of reducing cost of ICT hardware, software and services:*
> *CA1.   By 2007, Bhutan will have the enabling framework to promote e-business*
> *CA3.   By 2010, Bhutan will harness ICTs to enhance the quality and accessibility of education*
> *CA4.   By 2010, Bhutan will harness ICTs to enhance the quality and accessibility of health services*
> *CA6.1   Establish data interoperability standards*
> *CA6.2   Support the implementation of a national GIS system*

7.   RISK ANALYSIS

There are a number of risks which will have an impact on the overall implementation of the BIPS.

NATIONAL COMMITMENT

ICT is a cross-cutting issue that presents challenges and opportunities to all sectors of Government and the private sector. The BIPS process recognised this by involving committee members from all ministries and the private sector to ensure that all views were taken into account and that the resulting strategy is truly a 'National' effort.

Reflecting the reality of ICT as cross-cutting, most of the activities outlined will be implemented outside MoIC.

This raises the risk that implementation of the BIPS strategies and activities is heavily dependent on the commitment, and in some cases the financial resources, of all sectors. While most of the BIPS activities are relatively low-cost, some of the activities will require an allocation of internal resources.

This risk has been lessened by ensuring broad representation on the BIPS Committees. Further, the approval of BIPS by the Committee of Secretaries and then the CCM was intended to ensure whole-of-government commitment.

Future steps such as involving all sectors in the monitoring and oversight of implementation, as well as continuing to boost awareness of the potential of ICT throughout Bhutan, will also mitigate this risk factor.

DONOR SUPPORT

Bhutan is in the socio-economic category of least developed countries, with limited ability to mobilise internal resources for development activity. Therefore there is a need for strong donor support to ensure that the strategies and activities in BIPS can be carried out.

In line with Bhutan's development approach, the BIPS represents Bhutan's national priorities in the ICT sector. While members of the donor community attended the consultative workshops, they were not involved directly in the committee processes. This was to ensure that the final BIPS report is driven by national needs, not donor priorities.

It is hoped that all partners will support activities which fit their funding priorities and development policies.

HUMAN CAPACITY

In order to implement the BIPS activities successfully, the implementing agencies will need both specific technical and project managerial skills. Currently Bhutan has a fairly small pool of highly skilled ICT technicians apart from a few managers with skills and knowledge in development and project management. The private sector in general lacks sufficient technical and as well as managerial skills to initiate innovative growth in ICT businesses.

An additional human capacity risk is that decision-makers and key actors who are risk-averse may refrain from promoting ICT activities for fear of negative impacts that may result.

In order to mitigate these risks, sufficient technical and project managerial skills training must be undertaken, focussing particularly on private sector identified needs. Project management training could focus initially on the ICT Unit Heads who will be participating in the monitoring and oversight. Technical training needs should be assessed and incorporated into the ICT HRD Plan (see activity HC1.1). Further, an ongoing awareness-raising campaign (see activity HC 5.3) should be careful to target key decision-makers and actors within organisations to try to overcome risk-aversion.

OTHER RESOURCE AND ENVIRONMENTAL ISSUES

There is a variety of other resource and environmental issues that may constitute risk factors to the successful implementation of the BIPS activities.

Currently, urban centres in Bhutan enjoy a reliable and abundant supply of electricity. Future availability can be ensured through good infrastructure security.

Bhutan has historically enjoyed social, labour and political stability. Ongoing efforts to ensure geo-political stability, led by His Majesty the King, will maximize the chances of this continuing into the future.

8. MONITORING AND OVERSIGHT

While implementation of the BIPS strategies and activities will be decentralised across RGoB and the private sector, progress will be monitored by an Inter-Ministerial Working Group. The membership will consist of all ICT Unit Heads from across Government, MoIC PPD Officers, and the Director of DIT. ICT Units will be responsible for monitoring activities for which their agency has lead responsibility.

The Working Group will meet quarterly to review progress for each activity. Every six months, the Working Group will prepare a progress report on BIPS to the Cabinet.

Appropriate software will be used for monitoring purposes, and the Web will be utilised wherever possible to increase transparency and accountability. It may be necessary to conduct training for members of the Working Group to ensure they have the skills and capacity to perform their functions.

9.   APPENDICES

a.   ACHIEVEMENTS/COMPLETED ACTIVITIES

POLICY

Strategy P1. By 2010, use ICTs to make governance more inclusive, efficient, accountable and transparent

	Strategic Activities	Lead Agency	Timeframe	Status
P1.1	Establish policies on information-sharing between agencies	MoIC	2005	Policy endorsed by Government in 2006
P1.2	Establish policies on ICT security	MoIC/DIT	2007	Information Management Security Policy submitted and approved by Cabinet. Other details are being worked out
P1.10	Establish system for online citizen polling on government policies and other public interest issues	All	2005	Completed It is incorporated in the government portal
P1.11	Publish senior government officials' e-mail addresses	RCSC	2006	Completed
P1.13	Establish DIT as the focal agency for management of all ICT personnel in the country	RCSC	2008	DIT established as the focal agency vide RCSC circular no. RCSC/HRMD/26/2009/7 9 dated 11th February 2009

Strategy P2. By 2008, implement a flexible, 'light-touch'[2] and modern regulatory environment

P2.1	Finalise the Bhutan Information, Communications and Media Bill and introduce to the National Assembly	MoIC	2005	Completed (Enacted by the 85th Session of National Assembly 2006)
P2.2	Legislate for access to and dissemination of information	Judiciary, MoIC, OAG	2006	Completed- ICM Act takes care of it
P2.3	Enforcement of intellectual property legislation	MTI, Judiciary, Revenue & Customs, RBP	2007	Ongoing
P2.4	Establish a liberalised and competitive ICT market	MoIC	2007	Regime introduced and second mobile operator started operation in 2008

Strategy P4. By 2005, investigate ways to fund and reduce the cost of ICT services

P4.1	Develop a plan for a National ICT Infrastructure Fund (NICTIF), taking into account the Universal Service Fund	MoIC	2005	Completed- Rules detailing the modus operandi of the fund is

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[2] A loosening of regulatory controls associated with free market policies.

			being formulated by BICMA as per the provisions of the ICM Act

INFRASTRUCTURE

Strategy IN1. By 2008, establish a competitive, level-playing and reliable ICT infrastructure market

IN1.1	License new operators and service providers	BICMA	2006	Implemented

Strategy IN2. By 2015, ensure affordable, fast, secure, and sustainable ICT infrastructure throughout Bhutan

IN2.2	Develop a plan for a countrywide connectivity to ICT infrastructure, including schools, Gewog centers and villages	MoIC	2005	Completed
IN2.3	Establish Government-wide intranet connecting all agencies in Thimphu	DIT	2007	Completed
IN2.7	Establish at least 10 telephone connections in each Gewog	BTL	2007	97% completed
IN2.8	Explore ways of reducing cost of ICT hardware and software: - Open source software; - Re-cycling computers; - Substitute processors	DIT	2005	Ongoing

HUMAN CAPACITY

Strategy HC1. By 2013, all ICT positions will be filled by well-qualified national staff

HC1.1	Draft National ICT HRD plan, incorporating : - RGoB and private sector training needs assessment; - developing ICT occupational profiles for RGoB positions; - ICT career paths for RGoB ICT professionals	DIT	2007	Completed
HC1.3	Initiate enforcement of the Labour and Employment Act of Bhutan	MLHR	2006	Implemented

CONTENT AND APPLICATIONS

Strategy CA2. By 2010, use ICTs to preserve and promote culture and heritage, and create appropriate local content

CA2.1	Develop and incorporate UNICODE-based Dzongkha computing into at least one operating platform	DIT	2006	Completed
CA2.2	Develop digital archive of significant Bhutanese and religious texts	MHCA, DIT	2008	70% completed

Strategy CA5. By 2010, citizens will have real-time access to Bhutanese media

CA5.1	Extend FM radio coverage to all Dzongkhags	BBS	2005	Completed
CA5.2	Kuensel distributed on the same day in all Dzongkhags	Kuensel	2006	Achieved
CA5.3	Extend real-time BBS TV coverage to all Dzongkhags	BBS	2008	Completed

Strategy CA6. By 2009, develop local content and applications to support good governance

CA6.1	Establish data interoperability standards	DIT	2007	Completed
CA6.3	Identify common usage applications	DIT	2005	Completed
CA6.4	Establish computerised ID system for citizens	MHCA	2004	Completed
CA6.7	Ensure updated online presence for all Ministries, autonomous bodies and agencies, including making all public documents available online	All	2007	Completed

ENTERPRISE

Strategy E1. By 2008, increase competency of the local ICT industry

E1.2	Establish vendor certification guidelines to improve supply of ICT goods and services	DIT	2005	Completed

Strategy E2. By 2008, ensure outsourcing of all appropriate government works

E2.1	Conduct a baseline survey of current outsourcing practices	DIT	2005	Completed

b.   COMMITTEE MEMBERS

Secretariat

Honourable Lyonpo Leki Dorji, Minister for Information and Communications
Honourable Dasho Tashi Phuntsog, Secretary, Ministry of Information and Communications
Bhimlal (Sharma) Suberi, Deputy Chief Planning Officer, PPD, MoIC
Tshering Tenzin, Planning Officer, PPD, MoIC
Dorji Wangmo, Planning Officer, PPD, MoIC
Yeshey, Assistant Planning Officer, PPD, MoIC

Policy Committee

Chair :	Tenzin Chhoeda, Director, DIT, MoIC
Members :	Karma Tshiteem, Deputy Secretary, PPD, Ministry of Finance
	Ugyen Wangdi, Legal Officer, Office of Legal Affairs
	Dorji Norbu, Joint Director, Department of Planning, MoF
	Karma Yonten, Head, Bhutan Electricity Authority
	Chris Faris, UNV ICT for Development Specialist, UNDP
	Penjore, Head of Research, RMA
	Chenchen Dorji, Managing Director, RIIT
	Cheda, Legal Officer, PPD, MoIC
Rapporteurs :	Karma Wangdi, Systems Engineer, DIT, MoIC
	Tandin Wangchuk, Economist, BCA/MoIC

Infrastructure Committee

Chair :	Thinley Dorji, Director, BCA, MoIC
Members :	Dechen Yangdon, Assistant Engineer, Department of Works and Housing
	Sonam Tobgay, System Engineer, Bhutan Broadcasting Service
	Gangaram Sharma, Planning Engineer, Bhutan Telecom
	Kinley Dorji, Association of Private Cable Operators
	Karma Tshering, Assistant Engineer, Department of Energy, MTI
	Karma Singay, Managing Director, Peljorkhang Pvt. Ltd.
Rapporteurs :	Kezang, Deputy Executive Engineer, BCA, MoIC
	Pema Choejey, System Analyst, DIT, MoIC

Human Capacity Committee

Chair :	Pema Wangda, Director, Department of Labour, MoLHR
Members :	Karma Jurmi, IT Co-ordinator, Department of School Education
	Singye Namgay, Joint Director, NFE
	Bharat Subba, Programmer, Druk Information Technology
	Kuenga Jurmi, Head ICT, RIM
	Graeme Foster, UNV Lecturer, Sherubtse College
	Thinlay Wangdi, Director of Planning, Royal University of Bhutan
	Sangay Wangchuk, Deputy Director, DIT, MoIC
	Nim Dem, Director, Dept. of Higher Education, MoE
	Umesh Pradhan, Managing Director, InfoTech Solutions
Rapporteurs :	Tashi Wangmo, Head, PPD, MoLHR
	Tshering Chophel, Communications Officer, DIM, MoIC

Content and Applications Committee

Chair :	Karma, Deputy Managing Director, BNB
Members :	Tshering Jamyang, Monitoring and Evaluation Officer, PPD, MOA
	Tobgye, Information and Communications Officer, MOA
	Singay Namgyal, Planning Officer, PPD, MOE
	Sonam Dhargay, GIS Officer, CSO
	Yangka, Director of Academy, Royal University of Bhutan
	Rinzin Dorji, Deputy Director, Department of Planning, MoF
Rapporteurs :	Jigme Tenzing, System Analyst, DIT, MoIC
	Tenzin Dorji, Assistant Engineer, BCA, MoIC

Enterprise Committee

Chair :	Sonam Tshering, Director, Department of Energy, MTI
Members :	Yeshi Selden, Planning Officer, PPD, MTI
	Karma Tshering, Program Officer, Department of Industry, MTI
	Damber S. Kharka, Senior Lecturer, RIM
	Sourav Howlader, IT Manager, BPC
	Lekey Dorji, Manager, Bhutan Telecom
	Rinzy Dorji, Managing Director, Sigma Cable
	Nirpa Raj Rai, Executive Director, Peljorkhang Pvt. Ltd.
	Jiwan Siwakoti, General Manager, Singye Group of Enterprise
Rapporteurs :	Mayumi Miyata, UNV Systems Analyst, PPD, MoIC
	Passang Dorji, Assistant Manager, BPC

c. WORKSHOP PARTICIPANTS

Participants in the Consultative Workshop held on 16 April 2004
(not including above-listed Committee members):

Aditya Sharma, MG Techno World, Thimphu
Akira Kawada, AMC, JOCV, Paro
Bishnu Bakta Mishra, Technical Officer, JICA
Chandra Ghallay, Kelwang Enterprise, Thimphu
Chris Whitehouse, UNDP
Dawa Gyeltsen, MoLHR
Dawa Penjor, DIM, MoIC
Deirdre Boyd, Deputy Resident Representative, UNDP
Dechen Chimme, Save the Children Foundation
Dorji Thsering, Department of Survey and Land Records, Thimphu
Dhendup Wangdi, Helvetas
Gaki Tshering, MoH, Thimphu
Gopilal Acharya, Kuensel Corporation, Thimphu
Hem Raj, Sherikhang, Thimphu
Hemlal Subedi, DIT, MoIC
Ichharam, Department of Urban Development and Housing, MoWHS
Jigme Thinley, Youth Development Fund, Thimphu
Karma Tshering, Dept. of Employment, MoLHR
Dasho Megraj Gurung, MD, Bhutan Post
Nidup Dorji, Sherubtse College, Kanglung
Dasho Nima Wangdi, Director, Road Safety and Transport Authority, MoIC
Pema Chewang, Department of Aid and Debt Management, MoF
Phub Dorji, National Provident and Pension Fund, Thimphu
Prakash, Digital Shangrila, Thimphu
Dasho Dr. Sonam Tenzin, MoHCA
Sakaida Hideaki, JOCV, Centre for Bhutan Studies
Sangay Zam, Department of Revenue and Customs, MoF, Thimphu
Sangay Norbu, CEO, Kuenphen Technology, Thimphu
Sangay Tenzing MD, Bhutan Telecom
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Sherub Dorji, DIT, MoIC
Sonam Tobgyal, Planning, MoF
Sonam Phuntsho, Deputy Secretary, RCSC
Sonam, RCSC
Sonam Tashi, City Corporation, Thimphu
Sonam Tobgay, Bhutan International
Suemitsu Hiroshi, Coordinator, JOCV
Tandin Wangmo, MoLHR, Thimphu
Takaya Osada, Department of National Property, JICA, Thimphu

Thinley Jyamtsho, Department of Survey and Land Records, Thimphu
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Tshering Wangchuk, DIT, MoIC
Teruhito Sakuma, JOCV, Department of Budget and Accounts
Ugen Norbu, Department of Aid and Debt Management, MoF
Wangchuk Gyeltshen, Dhendup Informatics, Thimphu
Yosuki Sehata, JICA, RIM, Thimphu
Zecko, DIT, MoIC

d.   SECRETARIES' PRESENTATION PARTICIPANTS

Participants in the Secretaries' Presentation held on 6 May 2004 to seek cross sector endorsement:

Dasho Sangay Thinley,Secretary, MoA
Pema Thinley, Secretary, MoE
Aum Yanki T Wangchuk, Secretary, MoF
Aum Neten Zangmo, Secretary, MoFA
Sangay Thinley, Secretary, MoH
Dasho Penden Wangchuk, Secretary, MoHCA
Dasho Tashi Phuntsog, Secretary, MoIC
Dasho Karma Dorji, Secretary, MTI
Dasho Sherab Tenzin, Secretary, Cabinet Secretariat

e.   BIPS SCHEDULE

Task Items	December	January	Feburary	March	April	May	June	July
100 Orientation								
110 Chairmen Meeting	▭ (wk 8)							
120 Create guidance	(wk 15–29)							
140 Kick-off Meeting		▭ (wk 5)						
200 Drafting								
210 Individual Committee Meetings		(wk 12 – Mar 8)						
220 Inter-committee meeting				▲ 10/03				
230 Consultative Workshop					▲ 16/4			
240 Draft Paper					(Apr)			
250 Consolidate and Finalize						(May)		
300 Release								
310 Put up to Committee of Secretaries						▲		
320 Put up to CCM						06/05	▲	19/07
330 Press Release							22/06	△ (tentative)
Rapporteur meeting	✓ ✓	✓			✓	✓		
Chairmen Meeting	✓				✓			

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f. REFERENCES

Many of the resources listed below are available through the BIPS website : www.dit.gov.bt/bips

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UNDP Evaluation Office, *Essentials – Information and Communications Technology for Development*, September 2001

WSIS Declaration and Plan of Action (2003)

Online References:

Asia-Pacific Development Information Program (www.apdip.net)

Digital Opportunity Initiative (www.opt-init.org)

Millennium Development Goal (www.un.org/millenniumgoals/)

United Nations Development Programme : ICT for Development (www.sdnp.undp.org/it4dev)

World Summit for the Information Society (www.itu.int/wsis)

g. ABBREVIATIONS

BBS	Bhutan Broadcasting Service
BCA	Bhutan Communications Authority
BCCI	Bhutan Chamber of Commerce and Industry
BNB	Bhutan National Bank
BPC	Bhutan Power Corporation
CSO	Central Statistical Organisation
DDA	Dzongkha Development Authority
DIM	Department of Information and Media
DIT	Department of Information Technology
DoP	Department of Planning
FDI	Foreign Direct Investment
GNH	Gross National Happiness
HRD	Human Resource Development
ICT	Information and Communications Technology
ITU	International Telecommunications Union
MDGs	Millennium Development Goals
MoA	Ministry of Agriculture
MoE	Ministry of Education
MoF	Ministry of Finance
MoH	Ministry of Health
MoHCA	Ministry of Home and Cultural Affairs
MoIC	Ministry of Information and Communications
MoLHR	Ministry of Labour and Human Resources
MTI	Ministry of Trade and Industry
PPD	Policy and Planning Division
R&D	Research and Development
RCSC	Royal Civil Service Commission
RGoB	Royal Government of Bhutan
RIM	Royal Institute of Management
RMA	Royal Monetary Authority
RUB	Royal University of Bhutan
UNDP	United Nations Development Programme
WiFi	Wireless Fidelity
WSIS	World Summit on the Information Society
WTO	World Trade Organisation

h. EXPLANATORY NOTES

[1] The Digital Opportunity Initiative (DOI), a public private partnership of <u>Accenture</u>, the <u>Markle Foundation</u> and the <u>United Nations Development Programme (UNDP)</u>, was launched at the G-8 Okinawa Summit in 2000, with the aim of identifying the roles that information and communication technologies (ICT) can play in fostering sustainable economic development and enhancing social equity. See <u>www.opt-init.org</u>.

[2] Bhutan is divided into 20 administrative regions, known as "Dzongkhags", and 205 sub-regional areas known as "Geogs".