International Cooperation in the ICT Field: Bridging the Digital Divide

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Abstract

The great divide between rich and poor countries, long observed with regard to economic wealth and social and economic conditions is equally prevalent and worrisome in the realm of Information and Communications Technologies (ICTs). The world is undergoing an ICT revolution, a revolution that has enormous social and economic implications for the developed and less developed countries of the world. A gigantic gulf already exists between the industrialized and developing countries in terms of access to ICTs (this includes radio, computers, TV and mobile phones). For example, in South Asia only 4 persons per 1,000 own a PC compared to the 585 per 1,000 in the US. It is this disparity between the 'technology-rich' and 'technology-poor', or 'have-not's' that is commonly referred to as the international digital divide. Industrialized countries are home to 88% of all Internet users; yet make up only 15% of the world's population. Unsurprisingly, PC ownership levels differ dramatically between developed and developing nations. While the growth of the Internet and the continuing 'digitalization of society' are much heralded events in more developed countries, many developing nations are searching for ideas on how they can effectively participate in the rapidly evolving globally networked society. For developing countries, the global explosion of knowledge contains both opportunities and challenges. For example, poorer countries can appropriate and adapt the knowledge available for free or at very low cost in the developed countries. There is no need to re-invent the wheel or re-create existing knowledge and waste time, effort and money in the process. With communication costs plummeting, transferring knowledge is cheaper than ever. So there now exists a unique opportunity for developing countries to tap the vast resources of the global information networks to propel them to greater wealth and prosperity and leapfrog over knowledge gaps that have accumulated over centuries and get ready for the global networked economy. International Cooperation in ICT plays a crucial role in this regard.

In a multilingual country like India, with 22 official languages and 10 scripts, it is essential that information processing and translation software should be developed in local languages and available at low cost for wider proliferation of ICT to benefit the people at large and thus paving the way towards 'Digital Unite and Knowledge for all' and arrest the sprawling Digital Divide. A number of initiatives have been taken towards development of software tools and human-machine Interface systems in Indian Languages under the Technology Development for Indian Languages (TDIL) programme. Governments across the globe have recognized the importance and benefits accrued by using ICT in governance. Government of India is also taking many initiatives in this direction. The Government of India has approved

the National E-Governance Action Plan (NEGAP) for implementation during 2003-2007. The Plan seeks to lay the foundation and provide the impetus for long-term growth of e-Governance within the country.

The National Informatics Centre (NIC), Centre for Development of Advanced Computing (C-DAC), Software Technology Parks of India (STPI), Education and Research in Computer Networking (ERNET India) and DOEACC are some of the prominent Government organizations working for development of ICT in the country. The National Informatics Centre of the Department of Information Technology has been playing a pioneering role in propagating IT-led development facilitating rapid economic growth and social transformation in India. NIC is providing network backbone and e-Governance support to Central Government, State Governments, UT Administrations, Districts and other Government bodies.

The International Cooperation Division of Department of Information Technology has been set up to promote international cooperation in the emerging and frontier areas of information technology under bilateral, multilateral or regional framework. Such interaction provides an opportunity for sharing of knowledge and experience with countries, international bodies, academia and institutions for forging partnerships for mutual progress. As far as international cooperation with Korea is concerned, it has been envisaged to promote the investment flow from Korea to the Indian ICT hardware sector, exploitation of complementarities, development of technology, human resource development, next generation ICT industry, Broadband infrastructure, E-Governance, etc. Two major Korean companies - LG and Samsung are established brand names in Indian households and have already acquired a major share of the Indian market in the electronics and white goods segments. The Indian customers are happy with the pricing and service provided by these Korean majors. This paper discusses the above dimensions in details.

Opportunity exists for collaborative ICT Research and joint software development in a variety of applications between India and Republic of Korea. This paper is an effort to throw some light on the initiatives taken by the Government of India to make India a front-runner in the age of Information revolution and the role of International Cooperation in ICT development.

Status of IT in India and IT Policies

Today, India is a dynamic and growing economy with a strong and diversified industrial base. Sweeping reforms continue in policies relating to virtually every sector of the economy - trade, industry, foreign investment, finance, taxation and the public sector. India is the second largest country in Asia, with a population of over one billion. India is organized into 29 States and 6 Union Territories (UTs). There is active and healthy competition amongst states in attracting investment in infrastructure as well as framing IT applications in areas

such as e-governance, e-learning and telemedicine. The Information

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Technology Act, which deals with Cyber Security, Cyber Crime and other information security related legal aspects, is in place. Information Technology has given India formidable brand equity in the global markets. India's natural resource in today's knowledge economy is its abundant technically skilled manpower. India's reputation as a Center for world classes IT and software development destination has growth steadily over the past decade. The Indian Software Industry has been moving up the value chain as well. Indian software companies have a unique distinction of providing efficient software solutions with cost and quality as an advantage by using state-of-the-art technology. Over 250 of the Fortune 500 Companies are clients of Indian firms. India is the R&D base of over 100 Fortune 500 Companies. Through joint efforts of Government and the Industry, Software Development and IT Enabled Services (ITES) have emerged as niche opportunities for India in the global context.

Information Technology (IT) industry is one of the fastest-growing sectors of the Indian industry. It has been growing at a steady pace since last several years and providing employment to a large workforce. The Indian IT-ITES industry is broadly categorized into IT services and software, ITES-BPO and Hardware segments. The software and services segment continue to show robust growth. India is sustaining its leadership in this sector because of our strong fundamentals comprising of a large and growing pool of qualified, English speaking manpower; keen focus on defining and adhering to global quality standards, the demonstrated emphasis on information security, the improving levels and strong government support-focused on improving basic infrastructure and developing policies and an effective regulatory regime that favor the growth of the industry. The software and ITES exports from India have grown from USD 12.9 billion in the year 2003-04 to USD 23.4 billion during the year 2005-06. Software and services exports have grown 32 per cent in dollar terms during the year 2005-06. Strong demand over the past few years has placed India amongst the fastest-growing IT markets in the Asia-Pacific region. The Indian software and ITES industry has grown at a Compound Annual Growth Rate (CAGR) of 28% during the last 5 years. The BPO industry has more than doubled headcount since 2003-04 from 220,000 to 410,000 in 2005-06. Revenue, meanwhile, have grown from USD 3.1 Billion in 2003-04 to USD 6.3 Billion in 2005-06. Taking into cognizance that the human resource is the vital capital of IT software and service industry, the industry had launched skill assessment and certification programmes for entry-level talent and executives to enhance the availability of and access to talent for IT-ITES in the country. The total IT software and services employment is set to reach about 1.3 Million this fiscal. The industry's contribution to the national GDP has risen from 1.2% during the year 1999-2000 to 4.8% during 2005-06.

Recognising the advantages of multi-country service delivery capabilities to better manage evolving customer requirements and execute end-to-end delivery of some new services,

Indian companies are enhancing their global service delivery capabilities through a combination of green-field initiatives, cross-border Mergers and Acquisitions, partnerships and alliances with local players. Global software product giants have established their captive development centres in India. India's record on information security ranks better than most locations. Today, a majority of the companies in India have already aligned their internal processes and practices to international standards such as ISO, CMM, Six Sigma, etc., which has helped establish India as a credible sourcing destination. As of December 2005, over 400 Indian companies had acquired quality certifications with 82 companies certified at SEI CMM Level 5 - higher than any other country in the world.

India has the potential to develop and manufacture Electronics/IT Hardware for the global markets and gain higher global share besides meeting the country's future requirement in the converging areas of information, communication and entertainment. The Government has identified growth of Electronics and IT Hardware manufacturing sector as a thrust area. In order to address the concerns of manufacturing sector, the Government has set up a National Manufacturing Competitiveness Council (NMCC) to provide a continuing forum for policy dialogue to energize and sustain the growth of manufacturing industry including IT hardware. A number of policy measures have already been taken and are proposed to promote the growth of Hardware manufacturing in India. Because of these initiatives, India is very high on the agenda of several leading global Electronics and IT manufacturers. The Policy initiatives taken by the Government of India for the growth of IT industry in the country are given in **Annexure**.

The Department of Information Technology, Ministry of Communications & Information Technology, Government of India is the nodal institutional mechanism for facilitating all the initiative in the Central Government, the State Governments, Academia and the Private Sector for all round growth of Information and Communication Technology in the country. India's approach running parallel to its economic liberalization policy since early 1990s has tended to focus initially on software exports to global markets but became more inclusive since the late 1990s to focus on issues like e-governance and information for all paradigm. There has been a shift from monopoly of Government as service provider to private entry in telecom to promote competition and establishing a neutral regulatory agency. Telecom infrastructure upgradation, increasing teledensity, opening up of basic and value added services to private sector and competition and attracting investment for infrastructure have all received high priority. The essence of the convergence spirit and the vitality of changes have led to lowering of tariffs, plentiful availability of bandwidth at increasingly lower cost, competition and growth in technology. There are extreme variations in classes based on economic status of the people in India. However, the use and penetration of ICT in the society is fast expanding. There are 150 million telephone subscribers in India today. The number of subscribers has doubled in the last 2 years. Since December 2005, about 5 million subscribers are being added every month, which is the highest growth rate in the world. This growth has facilitated the expansion of BPO industry. There are 1200 engineering colleges, 750 business schools and over 1800 polytechnics in India, which produce 6,75,000 technical graduates every year. The present status and the targets set are as under:

Penetration per Thousand of Population

	Present	Target 2008
Penetration of TV (April'06)	130	225
Penetration of Computers (April'06)	18	31
Fixed Telephones (May'06)	47.42 }	500 (2010)
Mobile Telephones (May'06)	105.95 }	
Internet Connections (Dec'05)	6.8	30

International Cooperation in the Field of ICT

The International Cooperation Division of Department of Information Technology has been set up to promote international cooperation in the emerging and frontier areas of information technology under bilateral, multilateral or regional framework. Such interaction provides an opportunity for sharing of knowledge and experience with countries, international bodies, academia and institutions for forging partnerships for mutual progress. The Department of Information Technology has signed Memorandum of Understanding/ Agreement/ Protocol/ Program of Cooperation with 33 countries. The scope of cooperation envisaged in these MOUs mainly includes IT software including telecom software, IT enabled services, E-commerce services & Information Security, Electronic Governance, IT and Electronics Hardware, HRD for IT education and IT enabled education, Research and Development and Exploring third country markets. Under these MOUs, Joint Working Groups (JWG) have been set up as an institutional arrangement. JWGs meet from time to time and discuss agreed agendas and programmes for mutual cooperation.

India: A beneficiary of ICT initiatives with International Bodies

Development Gateway Foundation (DGF)

Development Gateway Foundation (DGF) is an independent public foundation originally started by World Bank. India and Republic of Korea are also members of the foundation. Initially, Government of India (GOI) contributed USD 5 Million to the foundation. Out of this USD 4 Million was given to GOI to setup an ICT Research and Training (R&T) Center in India. This R&T Center was established as a project at Centre for Development of Advanced computing (C-DAC), Bangalore. Indian Institute of Technology (IIT) Mumbai was identified as a principal collaborator to C-DAC for this project. The R&T Center started its operations on 1st April 2003. As a part of activity, 12 projects were identified out of which 8 projects are being done at C-DAC Bangalore and remaining 4 at IIT, Mumbai. Projects cover the area of Internet technology,

language and speech technology etc. The applications being developed are applicable to agriculture, education and health predominantly.

DGF Mission in Brief

Mission of DGF is to make available the power of the Internet to work in promoting economic development in developing countries around the world. It is currently focused on the following:

1 Improving knowledge sharing and collaboration
2 Promoting aid effectiveness
3 Increasing public sector procurement effectiveness and
4 Building local capacity by promoting Country Gateways, particularly helping small and mid-sized businesses (for example farmers) become more profitable.

Presently, over one million people from across the world access Development Gateway services each month, including accessing dgMarket, which has become the largest non governmental source of public sector procurement, has posting on any given day 40,000 current tenders, equivalent to USD 300 Billion in yearly procurement. dgMarket covers 50% of its operating expenses with its own revenues. The Development Gateway is currently working in 70 countries, in collaboration with 600 organizations including all of the major international financial institutions, C-DAC and IIT Mumbai.

On-going projects

1. Localized Knowledge Management (KM) solution for the Healthcare sector

E-Kamps

- **E- Forms -** It is an electronic form, which is useful to collect and analyze the data. This can be used to collect data through handheld devices like Simputer. It has large potential in healthcare and agriculture domain. This is being currently used for collecting information for Panchayat functionaries and health data of villages. The e-Forms project is an initial component of a broader health care project focused on mobile health camps, which periodically visit villages. e-Forms is a web based form creation and data entry system. The functionality of these tools has been generalized so that it can work in areas other than health care.

- Prototypes of e-Forms for both desktop and Simputer versions have been field-tested. Debugging and designing of new features based on mobile devices for Simputer are being attempted. Study of Java enabled technologies is underway in order to launch remote launching of applications in desktop version. A module screen PHCDB is added to include features relating to staff activity.

2. Small and Medium Applications for Rural Technicalization (SMART)

• **Vyapar -** It is an application for e-market place, which provides very easy and user-friendly means for rural mass both in product transaction and services. An application for information interchange among buyers and sellers is bundled along with ECKO (Empowering Communities through KnOwledge: A content management system) thereby making Vyapar accessible from ECKO.

• This also has been deployed at many locations on pilot basis in more than 20 kiosks and has potential to develop 500 kiosks and it is estimated that over half a million people will be benefited from the above.

• **Pradarshini -** A new application in the lines of Vyapar called Pradarshini is being developed for IFFAD (International Federation for Fairtrade and Development) that include Item Management, News Management and Add news modules.

3. Office Applications Suite in Indian Languages across platforms (BharateeyaOO)

• It is devoted to creating versions of common open source tools in Indian languages. It has been developed for eight languages out of which Tamil and Hindi have been released. More than 100,000 users are being benefited out of this so far.

4. Text-to-Speech (and Automatic Speech Recognition) in Indian Languages (Matrubhasha)

• It is a text to speech tool set. It has been developed and available on web for download for catering end users, developers and linguists.

• An application on Indian languages Gnopernicus has been exclusively developed for visually challenged persons.

• Command and Control Acoustic Model for Hindi has been completed.

5. Community Based Content Delivery Networks (CCDN)

• **ECKO -** Empowering Communities through KnOwledge is a “content delivery network” or basically a content management system tailored to the needs of villages in developing countries, especially India. This also has a companion project, V-CAN, for syndicating data between peer ECKO systems.

• ECKO has been completely localized in Tamil. Feature additions and customizations are being continuously carried out based on the new sets of requirements brought in due to various pilot deployments. A new feature that provides brief snippets of news and infobase apart from the listings in the front page of ECKO has been incorporated. Configuration of ECKO has been broken up into smaller units based on the functionalities for easier manipulation of the system.

6. Multilingual Virtual Classroom Facility and Multilingual Communication

System

- **Vartalaap -** It is a system for distance learning including chat, whiteboard, slides, and quizzes.

- Ver2.0 with white-board, presentation window is under progress. Code revision to support localization and testing of Virtual Classroom administration and Vartalaap member administration are in progress. The localization in Hindi is at advanced stage of completion.

- Testing is completed for Client-to-Client file transfer via server and Virtual classroom whiteboard and presentation window.

7. Aid Management Platform (AMP)

- AMP is a web-based application on monitoring and managing aid effectiveness both by donors and users. Currently, this is being deployed by Government of Ethiopia. It is proposed to deploy it with DG Foundation in about ten countries in next two years

8. Cross Lingual Information Retrieval (CLIR)

- It is renamed as Document Access Across Languages (DAAL). This addresses the problem of allowing non-English speaking users to search and read documents in other languages.

- Debugging of rules, lexicon correction and corpus creation are in progress.

9. Intelligent crawling, searching, browsing, and indexing of multilingual data on the Internet

- The project is based on natural language processing and it will enable a language-independent representation of the text. It converts the language to neutral UNL. This project does a direct English - Hindi translation and uses the Google APIs to search Google directly.

- **English to UNL conversion - aAQUA** is an application of English to UNL conversion. It is a web-based application where farmers can put their questions on the portal and replied back by agriculture specialists.

- **Part of Speech (POS) tagger** for Marathi has been tested without the disambiguation module on 3,000+ words. A module for disambiguation is being designed to improve accuracy.

- The accuracy of the POS tagger for Hindi after incorporating the disambiguation module was raised to 93.45% by improving upon the performance of parts of speech with lower accuracy.

- **Marathi and Hindi Wordnets -** Verb Knowledge Bases with hierarchical arrangement

involving Hindi verbs in a hierarchical order according to UNL are in progress. This hierarchy gives sentence frame and the case information of the verbs.

10. Improving the Performance of Information Dissemination Algorithms for Resource Constrained Environments

- The project OSCAR (Open Source Courseware Animations Repository) that is available on website is http://oscar.iitb.ac.in/ have been developed.
- Improvement upon the features to make it user-friendlier is in progress.
- The study on content development tools has been concluded and the process for creating content has been started. About 10 applets are already available and more are being developed for high-school science and math.
- **Deployment of mobile data services (Voice over Wireless LANs):** The feasibility of using Wi Fi for intra-village communication in rural area networks had been completed. Deployment of it at Timbaktu (www.timbaktu.org) is being taken up.

12. Support for building Databases on Simputer

- Work on compression for storage and query optimization in flash based databases is in progress.

Benefits and Achievements so far

Out of the above projects, Vyapar, e-Forms, and Vartalaap may be immediately considered for deployment to country gateways and other partners outside of India. The ECKO project is also transferable, but needs customization before deployment outside India.

- **ECKO & Vyapar:** This has been deployed on pilot basis at six different locations (Rajasthan, Maharashtra, Orissa, Andhra Pradesh, Tamil Nadu, Pondicherry). Currently this addresses around 25,000 villagers in about 100 villages.
- **aAqua:** This is in the form of portal and currently hosted at IITB and being used by more than 4000 farmers
- **BharateyaOO:** A well-received software tool in Indian Language. Currently Telugu, Hindi and Tamil have been launched nationwide. So far more than 0.2 million copies have been in circulation.
- **Text to Speech:** A tool out of this has been put on trial for Visually Challenged to use the normal computer. This is being used at NAB. 5 schools in Tamil Nadu are also using this product.
- **AMP (Aid Management Platform)** is a monitoring tool for aid activity both by donors and users. The Ethiopian Government is currently using this.

Future prospects

- Vartalaap a product on Virtual Classroom facility is on the verge of completion and has lot of potential in India itself. This can be used along with EDUSat programmes and Sarva Shiksha Abhiyan projects.
- The tools developed are very generic and have relevance to many other countries.
- AMP has lot of potential for use by a number of developing and under developed countries.

UNESCAP - Asia Pacific ICT Development Center (APCICT)

India has been elected as the member of the Governing Council of APCICT for a period of 2006-2008. The Center has been set up in Republic of Korea under the aegis of UNESCAP. The Center is expected to sponsor six to eight courses to about 200 persons annually and the duration of training may vary from one week to four to five weeks. The training courses predominantly will attempt to cover courses for policy makers, IT managers, trainer development etc.

UN ICT Task Force

India became the hub for Asia region at UN ICT Task Force, when it was decided to set up four hubs to work on bridging the digital divide in four major regions of the world viz:

1. South Africa for all of Africa

2. Jordan for all of Middle East

3. Brazil for all of Latin America

4. India for rest of Asia

Media Lab Asia is Secretariat of India hub of Task Force.

India has actively participated with UNESCO as a member of its expert group on promotion and use of multilingualism and universal access to “cyber space” on issues such as:

• Linguistic Divide

• Technological Changes

• Digitization policy of languages and international challenges

India is providing key inputs for Expert Group's recommendations on content, access, and

capacity building.

Commonwealth Action Plan on Digital Divide (CAPDD)

The Commonwealth Action Plan on Digital Divide has current focus on improving knowledge sharing and collaboration in technology development. It is in line with India's focus of spreading ICT benefits to the masses. It has always been our endeavor to create a platform for spreading ICT usage among Indian populace and also helping other nations who are striving hard in the similar endeavor. This has been one of the primary reasons for India 's active participation in CAPDD.

World Summit on Information Society (WSIS)

International and regional organizations such as UN, UNESCO, UNDP, ASEAN, ITU and APT etc. can play a leading role in promoting regional cooperation in ICT and in the follow up of the outcomes of the WSIS from the strategic and operational standpoints, including in the measurement of the Information Society, including ICT adoption and use in the region.

India: A supporter of International Cooperation in ICT field

The Government of India is always willing to share its experience and expertise with other countries of the world, specially, the countries of the developing world. In pursuit, we are regularly interacting with the foreign governments and international bodies and our Missions abroad for establishing synergies between the countries for cooperation in ICT sector and also providing technical assistance to other countries for development of ICT projects. In pursuit India has initiated a number of cooperative and collaborative programs internationally. Some of them are described below:

Africa and CIS Countries

Proposal

• **IT Centre at Dushanbe, Tajikistan –** An IT Centre at Dushanbe, Tajikistan is being set up where India is providing support for technical infrastructure, course curricula and training etc.

Achievements

• **Cyber City Project at Ebene, Mauritius –** India had supported the project technically and provided communication networking. Software Technology Parks of India (STPI) and Business Parks of Mauritius Limited (BPML) were involved in implementing the Project.

• **Atal Bihari Vajpayee Centre of Excellence at Ulaan Baatar, Mongolia –** India extended its support for technical infrastructure, course material, curricula and other human resource. National Informatics Centre (NIC) has completed the project in July 2003.

• **Indo-Ghana Kofi Annan Centre of Excellence for Communications and Information Technology at Accra, Ghana –** India extended its support for technical infrastructure, course material, curricula and other human resource. Centre for Development of Advanced Computing (C-DAC), an autonomous society of Department of Information Technology is the project-implementing agency from the Indian side.

• **Jawaharlal Nehru India Uzbekistan Centre for Information Technology (JNIUCIT)** at Tashkent, Uzbekistan has been set up.

SOUTH ASIA

Sri Lanka

Under the scope of between India and Sri Lanka in IT Sector, discussions are underway for bilateral cooperation in the areas of capacity building, training and technical assistance, ICT infrastructure, rural development and E-Governance etc.

Bhutan (Royal Government of Bhutan)

A multi sectoral team from Bhutan Government visited India and has undergone the necessary training at NIC for five days as a part of the E-Governance projects in January, 2006. After the training at NIC (New Delhi and Guwahati) the RGOB in consultation with NIC have identified the various activities that can be undertaken in E-Governance project.

SOUTH EAST ASIA

Thailand

Proposal

• **i-Community Research Project -** The National Informatics Centre (NIC) of Government of India had entered in an MOU with Operations Management Department of Kasetsart University, Bangkok, Thailand in April 2006 at Bangkok, Thailand for the "i-Community Research Project" of Thailand.

Vietnam

Proposal

• **Supporting the Human Resource Development for Software Industry in Vietnam –**

Specialized program on software training for Vietnamese candidates were proposed.

• M. Tech. Course is under progress for the Vietnamese candidates

• **Setting up of Advance Resource Centre in ICT in Hanoi, Vietnam –** A new revised project proposal has been made by NIC, as proposed by Vietnam side and based on updated technologies. The new revised proposal has several new features with cutting edge technologies.

Achievement

The Specialized program on Software training for Vietnamese candidates were commenced batch wise in the following subjects:

- Design and Development & Database
- Portal Programming & Open Source Application development
- Object Oriented Analysis & Design and Database management

Lao PDR

Proposal

• **Setting up of IT Training Center at Vientiane (Lao PDR) -** ICT cooperation project between India and Lao PDR such as establishment of National Data Center at Vientiane, Lao PDR, Release of National e-Governance plan for the Government of Lao PDR and National Portal of the Government of Lao PDR.

Achievement

The state-of-art National Data Centre of Lao PDR inaugurated on 28th May 2006 at Vientiane.

National Informatics Centre (NIC) has successfully implemented the second phase of the project with the following components:

• **Establishment of National Data Centre at Vientiane, Lao PDR**

A state-of art National Data Centre at Vientiane has establish under the India –Lao PDR bilateral cooperation on ICT. The Data Centre is the first of its kind in Laos and would act as the hub of all e-government activities that the Lao government seeks to develop. It will host all the e-governance applications of Government of Lao PDR.

• **Release of National e-Governance plan for the Government of Lao PDR**

On the request of Government of Lao PDR, as a part of the Capacity Building through HRD programme, a team of IT experts was deputed to carry out assessment survey and study at Ministries/ departments/Provinces and executives and Judiciary system of Lao-PDR for the preparation of e-Governance action plan for Government of Lao PDR.

• **National Portal of the Government of Lao PDR**

The National Portal for Lao PDR (http://www.laopdr.gov.la) has been designed and developed on Open eNRICH framework by NIC. The Portal consists of National Portal, Dynamic websites of Ministries/Departments, portals of all provinces and districts of Lao PDR.

ASEAN

India has had close cultural and economic ties with Southeast Asian countries throughout history. ASEAN's political and strategic importance in the larger Asia-Pacific region and its potential to become a major partner of India in the area of trade and investment have encouraged India to seek closer linkages with these countries. In the area of ICT, India has initiated the following proposals for ASEAN countries:

Proposals

• **Information Security for System Administrators of ASEAN nations**

A proposal for holding a three-day workshop by the Indian Computer Emergency Response Team (CERT-In) on Information Systems Security for System Administrators of ASEAN countries has been submitted. It is now at an advanced stage of finalization.

• **Seminar on e-Learning**

Two days seminar on e-Learning and e-Learning technologies has been proposed for ASEAN nations with the objectives of providing a platform to share the experiences of ASEAN countries in the area of e-Learning, e-Learning technologies and its implementation in their countries and to address various related technical issues in arriving at an action plan for the concerned that may establish a networking forum between the experts of ASEAN and India to exchange and share the ideas and developments in the area.

• **Web browsing through listening**

A proposal to share India 's expertise in assistive technologies has been proposed to ASEAN nations with the objectives of establishing new bonds between India and ASEAN countries in the sector of assistive technology and doing more R&D in this field. This will help in promoting awareness about assistive technology for visually impaired people and making

easy availability of this technique at low cost to them.

• **India-ASEAN IT Ministerial and IT Industry Forum**

A proposal is under submission to ASEAN Secretariat based on the India-ASEAN cooperation model that would comprise of IT Ministerial and IT Industry forum with the aim that Industry forum will provide inputs to IT Ministerial Forum to propel IT industry in forward direction among ASEAN nations and India.

Achievement

• **HRD Program in the area of Computer Networking for CLMV**

Nine officials from Cambodia Lao PDR, Myanmar and Vietnam (CLMV) and one member from ASEAN Secretariat attended this programme, which was conducted from 23rd Jan 2006 to 03rd Feb 2006 at C-DAC, Noida. During the implementation of the programme as proposed the participants were given hands-on practical exposure and the technical know-how to implement the technology in their respective countries. The sessions were widely appreciated by the course participants.

• **IT Training Courses for ASEAN**

Twenty officials from eight ASEAN Countries and two members from ASEAN Secretariat attended this programme from 16th Jan 2006 to 20th Jan 2006. During the implementation of the programme as proposed the participants were given hands-on practical exposure and the technical know-how to implement the technology in their respective countries. The Training methodology based on ISO- implementation is being maintained for the implementation of the programme.

As a part of their Programme these participants were also taken to Industry visit to Software Technology Parks of India (STPI) to give them a first hand feel of working of Indian IT industry. During this visit the participants interacted with the industry members and benefited in terms of understanding the growth of IT industry in India.

International Cooperation and relationship with Republic of Korea

It has been envisaged to promote the investment flow from Korea to the Indian ICT hardware sector, exploitation of complementarities, development of technology, human resource development, next generation ICT industry, Broadband infrastructure, E-Governance etc.

Minister for Communications and Information Technology, Republic of India visited Republic of Korea from 19-21 June, 2006 at the invitation of Minister for Information and Communication, Republic of Korea. During his visit, Minister for Communications and Information Technology, Republic of India had detailed discussions with Minister for

Information and Communication, Republic of Korea wherein bilateral issues relating to the Information Technology and Telecom sectors were discussed. It was decided that both countries should work together to leverage their strengths in these sectors for mutual benefit. As a part of the Minister's visit, a meeting of the Indo-South Korean IT Forum was also held wherein Working Groups were set up for the IT sector.

During his visit, Minister for Communications and Information Technology, Republic of India also called on the Deputy Prime Minister and Minister of Finance and Economy, Republic of Korea. Among other issues, the two Ministers discussed possibilities of South Korean investment coming into the hi-tech manufacturing sector in India. Minister for Communications and Information Technology, Republic of India addressed a meeting with the Indo-Korean Friendship Society which is a prominent think-tank comprising leading businessmen of South Korea. The Minister also had detailed discussions with senior officials of Samsung on the possibilities of setting up hi-tech manufacturing facilities in India.

The Ministry of Information and Communication, Republic of Korea had organized a business meeting with potential investors, which was addressed by the Minister. A detailed presentation was also made by the officials both from the IT and Telecom Ministries. Over 20 corporates belonging to the IT and Telecom industry from South Korea attended this meeting.

Information and Communication Technology (ICT) and the Millennium Development Goals

The challenge of the World Summit on the Information Society (WSIS), as defined in the Draft Declaration of Principles, "is to harness the potential of information and communication technology to promote the development goals of the Millennium Declaration."

Goal 1: Eradicate extreme poverty and hunger

Technological improvements, driving increases in economic productivity, are important motors for long-term economic growth. "Total Factor Productivity" growth is a keystone for those economists studying the effect of technology on economic development. Switching from animal to mechanical power was necessary for the industrial revolution, as the introduction of electrical and internal combustion engines was obviously linked to the increase in productivity in the early 20th century. Similar will be the role of ICT in the modern age.

Goal 2: Achieve universal primary education

ICT will have an important role to play in improving educational systems. Automation of information processing, storage and retrieval and the radical improvement of communications technology will transform the way we think and the way we learn. Point-to-point communication media (e.g. telephone to save travel), broadcast media to reach larger numbers of people storage media (including movies, videos, tapes, and so on) to record information, allowing for future study and distribution are all examples. The educational process can be made more asynchronous, allowing people to learn when they choose; distance can be spanned, allowing people to learn where they choose. Appropriate, affordable technologies, such as interactive radio and TV, can help extend education to all, and to improve the quality of education for even the poorest schools in the next decade.

Goal 3: Promote gender equality and empower women

ICT offers possibilities to women to engage in e-commerce, distance education, and e-government, thereby overcoming barriers to women's economic advancement. India has a huge, trained woman work-force that is completely underutilized. Working from home can enable this force to contribute with the mainstream through Information and Communications tools.

The Health Goals: 4, Reduce child mortality; 5, Improve maternal health; and 6, Combat HIV/AIDS, malaria, and other diseases

Low-cost, hand-held computers for collection of medical information, and the use of telephones by auxiliary health personnel can significantly improve the efficiency and quality of services. Smart cards or electronics-based diagnostic devices, may well lead to significant innovations improving primary care in the future. Providing health education through alternative means is especially important. Important health concepts can be effectively communicated via radio. Electronics applications can also improve administrative efficiency and quality in the health sector. Medical records number in the millions and can be mined for detailed depiction of a community. The training of health professionals and paraprofessionals may also benefit. Telemedicine has already been identified as a tool for India to achieve its health goals, especially in the rural context.

Goal 7: Ensure environmental sustainability

A knowledge based economy generates products that are increasingly in the form of services, information, and "content". In contrast to the resource intensive products of the industrial economy, the knowledge economy produces "weightless" services. Thus, countries moving toward knowledge economies may well find that development more environmentally sustainable. In the U.S. economy, energy consumption stayed relatively constant from 1973 to 2000, while the GDP increased by 74 percent in the same period. Electronic product

manufacturing is the most eco-friendly process by way of less pollution caused.

Goal 8: Develop a global partnership for development

There is little need to establish a connect here as the indicators identified for this goal are very clearly ICT indicators.

Target	Indicators
In cooperation with the private sector, make available the benefits of new technologies, especially information and communications	Telephone lines and cellular subscribers per 100 population Personal computers in use per 100 population Internet users per 100 population

Bridging the Digital Divide

The initiatives being taken to bridge the Digital Divide in India are enumerated below:

E-Governance

The National Common Minimum Programme adopted by the Government accords high priority to improving the quality of basic governance and in that context has proposed to promote e-Governance on a massive scale in areas of concern to the common man. A National e-Governance Plan (NEGP) has accordingly been drawn up covering 26 Mission Mode Projects and 8 support components to be implemented at the Central, State and Local Government Levels. India is aiming at achieving the objective of:

"Making all Government services accessible to the common man in his locality, throughout his life through a One-stop-shop (integrated service delivery) ensuring efficiency, transparency and reliability and at affordable costs to meet the basic needs of the common man"

State Wide Area Networks (SWANs)

Government has already approved a scheme for establishment of State Wide Area Networks (SWANs) over a period of 5 years. These SWANs will extend data connectivity of 2 Mega bits per second up-to the block level in all States and Union Territories in the country. The block level nodes in turn, will have a provision to extend connectivity further to the village level using contemporary wireless technology.

Common Service Centres (CSCs)

India is still a predominantly rural country, with almost two thirds of its population living in

villages. The Department has formulated a proposal to establish 100,000 Common Services Centres (CSCs) in rural areas, which will serve not only as the front end for most government services, but also as a means to connect the citizens of rural India to the World Wide Web. CSCs would extend the reach of electronic services, both government and private to the village level. Various government departments have been advised to design and evolve their Mission Mode Projects laying adequate emphasis on Services and Service levels in respect of their interface with citizens and businesses. These advances in ICT technologies will enable us to take concrete steps towards turning our dream of 'government at your doorstep' into a reality.

Community Information Centres

To reduce the digital divide by providing Internet access and IT enabled services to the community at large and to facilitate citizen interface with the Government, Community Information Centres (CICs) have been set-up at 487 blocks in the seven North-Eastern States and Sikkim. In addition, 135 CICs are providing citizen-centric services in Jammu and Kashmir. CICs are also being established in the Government schools in Andaman and Nicobar Islands (41 CICs) and Lakshadweep Islands (30 CICs) for imparting ICT based education.

Technology Development for Indian Languages Programme (TDIL)

The world is in the midst of a technological revolution nucleated around Information and Communication Technology (ICT). Advances in Human Language Technology will offer nearly universal access to information and services for more and more people in their own language. Today 80% of the content on the Web is in English, which is spoken by only 8% of the World population and only 5% of Indian population. The benefits of Information Technology can reach the common man in India only when the digitalized information is available in all Indian languages. At present, the success of IT and its rewards are mostly limited to the largest urban areas, the educated and English speakers. In a multilingual country like India, with 22 official languages and 10 scripts, it is essential that tools for information processing in local languages are developed and be available at low cost for wider proliferation of ICT to benefit the people at large and thus paving the way towards 'Digital Unite and Knowledge for all' and arrest the sprawling Digital Divide. In this context, a number of initiatives have been taken towards development of software, tools and human machine interface system in Indian languages.

To enable wide proliferation of ICT in Indian languages, the Department of Information Technology has taken a major initiative to make available tools and fonts in various Indian Languages freely to the general public. The developed tools and software such as Fonts, Key-Board Drivers, Text Editors, Spell Checkers, Morph Analyzers, Dictionaries and Messaging Systems for Hindi, Tamil and Telugu have been launched in public domain for

free use by the masses. These tools are available on the Website www.ildc.gov.in and http://tdil.mit.gov.in. Similar release of fonts and software tools for other languages is also planned.

Media Lab Asia

Media Lab Asia has been set up as a not-for-profit organization with a vision of leveraging the information and communication technologies and other advanced technologies for the benefit of the common man. The goal of this organisation is to bring the benefits of innovation and emerging technology to the masses. Media Lab Asia's charter is to pursue high-impact technology research that has the potential to improve the lives of common people in developing economies. The organization believes that new technologies, especially Information and Communication Technology (ICT) offer immense possibilities for socio-economic development. It works to harness the advances in technology for the benefit of the masses, especially rural masses that have been untouched by ICT. Media Lab Asia has been largely funded by the Government of India. Industry has also provided seed funding for its activities. Media Lab Asia welcomes sponsorships / partnerships for furtherance of its objectives.

Media Lab Asia works on the paradigm of collaborative research in the task of developing relevant and sustainable technologies and bringing them to the daily lives of people. Media Lab Asia works with academic and R&D institutions, industry, NGOs and Governments in the endeavor. It has already established research hubs at five Indian Institutes of Technology (IITs) at Delhi, Mumbai, Chennai, Kanpur and Kharagpur, IIIT Hyderabad and with more planned in the future. In addition, research, development and deployment projects have been taken up at other institutions. Media Lab Asia is also establishing field test sites near the research organizations and other locations and working with State and local governments, NGOs, and other organizations in this endeavor.

Media Lab Asia’s application development is focused on use of ICT for healthcare, education, livelihood generation, empowerment of the disabled and providing rural connectivity. The Media Lab Asia projects are generally centred around these themes. The research themes of Media Lab Asia include technologies for broadband rural connectivity, affordable computing and access devices, and advanced interfaces. Over 30 research projects are underway.

Experience of Korean Policies and Products & Comments

Over the past 50 years Korea has transformed its economy. The Korean electronics industry began producing global state-of-the-art technologies from the 1990s, bearing plentiful fruit - development of HDTV test products (1993), world’s first 256M DRAM (1994), world’s first commercialization of CDMA system, development of 1-Giga DRAM (1998), world’s first

test performance of high-definition, interactive digital broadcast (2000), development of the world's first 29" digital LCD TV (2001), development of 61" PDP TV (2002), development of world's largest 80" PDP TV (2003), 3 million pixel-class multimedia mobile phone (July, 2004) and world's largest 55" LCD TV (September, 2004).

Korea also became the world's fourth largest electronics producer after the US, Japan and China. ICT exports represent an important driver of economic growth in Korea. Korea has the world's highest number of broadband services per capita. Korea's electronics/information industry technologies today are world class. In the high-tech industry fields, digital TV, CDMA, Notebook PC, TFT-LCD, semiconductors, etc., Korea has developed new technologies leading advanced countries like the US and Japan and is continuing to increase global market shares.

Advancements in ICT have driven substantial economic and social change in recent years, and future society is expected to be in part built on the sound foundation of the ICT industry. In the past, Korea focused its investment on IT infrastructure and new technology development and, as a result, achieved rapid growth in just a decade. Based on this experience and technology, Korea is now promoting ICT development strategies with the aim of building a future ubiquitous society.

The services sector is growing in importance throughout the world. Korea's economy is growing strongly, fuelled by strong exports of ICT manufactured goods that have a major share in exports. However, to sustain growth, Korea must now focus on exports of ICT services as well as ICT goods. The obvious ICT-based service for Korea to export is telecommunications services, especially mobile communications.

ICT and knowledge is a powerful force in shaping the social and economic development of the Asia and Pacific region. The Government of the Republic of Korea has set up a US$20 million e-Asia and Knowledge Partnership Fund at ADB. The fund aims to bridge the digital divide and promote improved access to information and creating and sharing of knowledge through Information and Communications Technologies (ICT) in the Asia and Pacific region. The fund, managed and administered by ADB, will support ADB's developing member countries in achieving the Millennium Development Goals and the World Summit on Information Societies declaration, through its two programs – the e-Asia and the Knowledge Partnership Fund.

The e-Asia program, to receive half of the fund, will support projects that aim to reduce and bridge the digital divide, such as studies and research, education and training, information dissemination and networking through workshops and publications, and innovative approaches to promoting ICT.

The Knowledge Partnership program, with the other half of the fund, will support projects that aim to strengthen the capacity of developing member countries, such as by providing knowledge and sharing information and experiences for poverty reduction and social development through workshops, trainings, research work, and publications.

Two major Korean companies - LG and Samsung are established brand names in Indian households and have already acquired a major share of the Indian market in the electronics and white goods segments. The Indian customers are happy with the pricing and service provided by these Korean majors.

Conclusion

Strength of Korea lies in technology development and ICT hardware manufacturing, whereas India's strength lies in software development/design. Therefore, Opportunity exists for collaborative ICT Research and joint software development in a variety of applications between India and Republic of Korea. India has lessons to learn from Korea in technology/product development and ICT hardware manufacturing.

Numerous studies and the World Summit on the Information Society have shown that corporate and national economic performance is dependent on ICT, which provides developing countries with an unprecedented opportunity to meet vital development goals.

International Cooperation in the ICT field has a very important role to play in bridging the digital divide. It has always been India's endeavor to create a platform for spreading ICT usage among Indian populace and also helping other nations who are striving hard in the similar endeavor. The Government of India is always willing to share its experience and expertise with other countries of the world, specially, the countries of the developing world. In pursuit, we are regularly interacting with the foreign governments and international bodies and our Missions abroad for establishing synergies between the countries for cooperation in ICT sector and also providing technical assistance to other countries for development of ICT projects.

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Annexure

Policy initiatives taken by the Government of India to promote the Information Technology Industry

1. Approvals for all foreign direct investment proposals relating to the Information Technology Sector, with the exception of Business-to-consumer (B2C) e-commerce are under the automatic route.

2. Peak rate of customs duty has been reduced to 12.5%. Customs duty on ITA-1 items (217 items) has been abolished from 1.3.2005. All goods required in the manufacture of ITA-1 items have been exempted from customs duty subject to Actual user condition. Information Technology (IT) Software is exempted from Customs duty. Customs Duty on specified raw materials / inputs used for manufacture of electronic components or optical fibres / cables is 0%. Customs duty on specified capital goods used for manufacture of electronic goods is 0%. Customs duty on MP3 players and MPEG4 players has been reduced to 5%.

3. Excise duty on computers is 12%. Microprocessors, Hard Disc Drives, Floppy Disc Drives, CD ROM Drives, DVD Drives, USB Flash Memory and Combo-Drives have been exempted from excise duty. Parts, components and accessories of mobile handsets including cellular phones are exempted from excise duty. Excise duty on MP3 players and MPEG4 players has been reduced to 8%.

4. Supplies of Information Technology Agreement (ITA-1) items and notified zero duty telecom/electronic items in the Domestic Tariff Area (DTA) by Electronics Hardware Technology Park (EHTP)/Export Oriented Unit (EOU)/ Special Economic Zone (SEZ) units are counted for the purpose of fulfillment of positive Net Foreign Exchange Earnings (NFE).

5. Special Economic Zones (SEZs) are being set up to enable hassle free manufacturing and trading for export purposes. Sales from Domestic Tariff Area (DTA) to SEZs are being treated as physical export. 100% Income Tax exemption on export profits is available to Special Economic Zone (SEZ) Units for 5 years, 50% for next 5 years and 50% of ploughed back profits for 5 years thereafter.

6. Export Promotion Capital Goods scheme (EPCG) allows import of capital goods on payment of 5% customs duty. The Export Obligation under the scheme is linked to the duty saved and is 8 times the duty saved on capital goods imported, to be fulfilled over a period of 8 years. The export obligation under EPCG Scheme can also be fulfilled by the supply of Information Technology Agreement (ITA-1) items to the DTA provided the realization is in free foreign exchange.

7. EOU/STP/EHTP units are eligible for Income Tax exemption on export profits, upto 2009-10, in terms of Sections 10A and 10B of the Income Tax Act.

8. 100% depreciation is available to computers and computer peripherals over a period of 5 years for units under EOU/Software Technology Park (STP)/EHTP/SEZ schemes.

9. Second hand capital goods are freely importable.

10. To induce more investment for Research and Development activities, a weighted deduction of 150% on the sums paid to any university, college or an institution or a scientific research association for the purposes of scientific, social or statistical research is available.

11. Income by way of dividends or long-term capital gains of a Venture Capital Fund (VCF) or Venture Capital company from investment made by way of equity shares in a Venture Capital Undertaking, which has been expanded to include the Software and IT sectors, will henceforth not be included in computing the total income. To give thrust to Venture Capital finance, Securities and Exchange Board of India (SEBI) has been made the single point nodal agency for registration and regulation of both domestic and overseas venture capital funds.

12. Information Technology Act 2000 dealing with Cyber Security, Cyber Crime and other information security related legal aspects is in place to encourage expansion of e-commerce through Internet.

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