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CROSS-BORDER PRIVATE SECTOR COOPERATION IN ICT AMONG SASEC COUNTRIES

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From the Author:

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ABBREVIATIONS AND ACRONYMS

3E	E-Government Executive Education
AAHAM	American Association of Healthcare Administrative Management
AAI	Airports Authority of India
ADB	Asian Development Bank
ADR	Alternative Dispute Resolution
ADR/GDR	American Depository Receipts/Global Depository Receipts
AEPC	Apparel Export Promotion Council
AFACT	Asia Pacific Council for Facilitation of Procedures and Practices for Administration, Commerce and Transport
AHSL	Apollo Health Street Limited
AICTE	All India Council for Technical Education
AIDS	Acquired Immune Deficiency Syndrome
APEC	Asian Pacific Economic Cooperation
APFIRST	Agency set-up by the Government of Andhra Pradesh for attracting foreign investments
ARCI	Advanced Radio Cells Inc.
ASAP	ASEAN Services Access Platform
ASEAN	Association of South East Asian Nations
ASOCIO	Asian Oceanic Computing Industry Organisation
ASYCUDA	Automatic System for Customs Data
AT&T	American Telephone and Telegraph Company
ATI	Austin Technology Incubator
AVU	African Virtual University
B2B	Business to Business
BASIS	Bangladesh Association of Software and Information Services
BCC	Bangladesh Computer Council
BCCI	Bhutan Chamber of Commerce and Industry
BCG	Boston Consulting Group
BCS	Bangladesh Computer Samity
BIPS	Bhutan ICT Policy & Strategy
BLCF	Business Linkages Challenge Fund
BPO	Business Process Outsourcing
BRM	Business Reference Model
BT	British Telecom
BTRC	Bangladesh Telecommunication Regulatory Commission
BTTB	Bangladesh Telegraph and Telephone Board
CA	Certifying Authority
CAN	Computer Association of Nepal
CCA	Controller of Certifying Authorities
CCAM	Certified Clinic Account Manager
CCNA	Cisco Certified Network Associate
CCNP	Cisco Certified Network Professional
CID	Centre for International Development
CIECC	China International Electronic Commerce Centre
CII	Confederation of Indian Industry

CMM	Capability Maturity Model
CMU	Carnegie Mellon University
CONCOR	Container Corporation of India
CPAM	Certified Patients Account Manager
CSPP	Computer Systems Policy Project
CT	Computer Tomography
DGCI & S	Directorate General of Commercial Intelligence and Statistics
DGFT	Directorate General of Foreign Trade
DIT	Division of Information Technology
DRM	Data and Information Reference Model
ebXML	Electronic Business using eXtensible Markup Language
EC	Electronic Commerce
ECG	Electro Cardiogram
ECHO	Echocardiogram
EDI	Electronic Data Interchange
EDIFACT	Electronic Data Interchange For Administration, Commerce and Transport
EDPC	Electronic Data Processing Centre
EDS	Electronic Data Systems Corporation
eGIF	e-Government Interoperability Framework
EGM	Export General Manifest
EIF	European Interoperability Framework
ERNET	Education and Research Network
ESCAP	Economic and Social Commission for Asia and the Pacific
EU	European Union
FBCCI	Federation of Bangladesh Chambers of Commerce and Industry
FDI	Foreign Direct Investment
FGDC	Federal Geographic Data Committee
FICCI	Federation of Indian Chambers of Commerce and Industry
FLAG	Fibre-optic Link Around the Globe
FNCCI	Federation of Nepal Chambers of Commerce and Industry
G2B	Government to Business
G2C	Government to Citizens
GBT	Group on Basic Telecommunications
GECIS	GE Capital International Services
GSM	Global System for Mobile Communications
GSP	Generalized System of Preferences
GTZ	Gesellschaft fur Technishe Zusammenarbiet
HDI	Help Desk Institute
HIPAA	Health Insurance Portability and Accountability Act
HR	Human Resources
HS	Harmonized Commodity Coding System
HSBC	Hong Kong and Shanghai Banking Corporation
IBIS	International Business Incubation Systems
IBM	International Business Machines
ICT	Information and Communications Technology
IDA	Interchange of Data between Administrations
IDRBT	Institute for Development and Research in Banking Technology
IIM	Indian Institute of Management
IIT	Indian Institute of Technology
iLIUP	Infocomm Local Industry Upgrading Programme

INSEAD	Institut Européen d'Administration des Affaires
INTELSAT	International Telecommunications Satellite
IPAM	Institute of Public Administration and Management
IPO	Initial Public Offering
ISB	Indian School of Business
ISDN	Integrated Services Digital Network
ISP	Internet Service Provider
ISRO	Indian Space Research Organisation
IT	Information Technology
ITES	Information Technology Enabled Services
ITIH	Information Technology Infrastructure for Health
KDDI	Kokusai Denshin Denwa International
KTNET	Korea Trade Networks
LAN	Local Area Network
LOMA	Life Office Management Association
MAIT	Manufacturers' Association for Information Technology
MCCI	Metropolitan Chamber of Commerce and Industry
MNC	Multi-National Company
MSIT	Master of Science in Information Technology
NASD	National Association of Securities Dealers
NASSCOM	National Association of Software and Service Companies
NCC	National Computer Centre
NEC	Nippon Electronic Corporation
NECTEC	National Electronics and Computer Technology Centre
NIC	National Informatics Centre
NISG	National Institute of Smart Government
NITC	Nepal Information Technology Centre
NR	Nepalese Rupee
NSDI	National Spatial Data Infrastructure
NTT	Nippon Telegraph and Telephone Corporation
NTU	National Technological University
PAA	Pan Asian Alliance
PC	Personal Computer
PKI	Public Key Infrastructure
PRM	Performance Reference Model
QAI	Quality Assurance International
R&D	Research & Development
RBI	Reserve Bank of India
RIIT	Rigsam Institute of Information Technology
SAARC	South Asian Association for Regional Co-operation
SABF	South Asia Business Forum
SAFE	South Africa Far East
SAFTA	South Asian Free Trade Area
SAGQ	South Asian Growth Quadrangle
SASEC	South Asia Sub-regional Economic Cooperation
SEA-ME-WE	South East Asia - Middle East - West Europe
SEDF	South Asian Enterprise Development Facility
SIDBI	Small Industries Development Bank of India
SITA	'Société Internationale de Télécommunications Aéronautiques'
SMART	Simple, Moral, Accountable, Responsive and Transparent
SME	Small and Medium Enterprise

SRM	Service Component Reference Model
SSPA	Service and Support Professionals Association
STM	Synchronous Transport Module
SWTA	Service – Wide Technical Architecture
TCIL	Telecommunications Consultants India Limited
TCS	Tata Consultancy Services
TEDI	Trade Electronic Data Interchange
TIPWG	Trade, Investment and Private Sector Cooperation Working Group
TRAI	Telecom Regulatory Authority of India
TRIPs	Trade Related Aspects of Intellectual Property Rights
TRM	Technical Reference Model
UK	United Kingdom
UNCTAD	United Nations Conference on Trade and Development
UNDP	United Nations Development Programme
UNIDO	United Nations Industrial Development Organization
US	United States
VoIP	Voice over Internet Protocol
VSAT	Very Small Aperture Terminal
VSNL	Videsh Sanchar Nigam Limited
WHO	World Health Organisation
WIPO	World Intellectual Property Organisation
WITSA	World Information Technology and Services Alliance
WTO	World Trade Organisation
XML	eXtensible Markup Language
XSL	eXtensible Stylesheet Language

Cross Border Private Sector Cooperation in ICT in the SASEC Subregion

TABLE OF CONTENTS

EXECUTIVE SUMMARY

Background

Information and Communications Technologies (ICTs) have a vital role to play in development. Regional co-operation can amplify domestic development of ICTs and help in bridging the digital divide. The Asian Development Bank (ADB) is keen to promote cross-border private sector co-operation in ICT between Bangladesh, Bhutan, India and Nepal. The present study focuses on exploring ways to achieve this goal.

The concept of sub-regional co-operation between Bangladesh, Bhutan, India and Nepal first emerged in 1996 with the South Asian Growth Quadrangle (SAGQ). A report prepared by the Federation of Indian Chambers of Commerce and Industry (FICCI) on the opportunities for economic partnership in the SAGQ focused largely on the telecom sector with regard to ICT. Though the South Asian Association for Regional Cooperation (SAARC) has a technical committee on Science and Technology, much focus has not been given to co-operation in the ICT sector. Industry initiatives under the South Asia Business Forum and by individual industry associations have been more active in identifying areas of mutual co-operation in the sub-region.

Regional initiatives on ICT

ICT has become an important area of focus for regional groupings. e-ASEAN has set up a Task Force with representation from governments and the private sector. The private sector has taken up a number of pilot projects in the region in areas like trade facilitation, education, incubation, payment gateways, e-service delivery, etc.

e-Europe aims at an 'Information Society for All' with a focus on online public services, e-Government, e-learning, e-health and a dynamic e-business environment. e-Europe is playing an important role in setting interoperability standards and sharing best practices.

e-APEC aims at using ICT for boosting productivity, stimulating growth and extending services to the whole community. The initiative is oriented to strengthening markets and institutions, facilitating an environment for infrastructure investments and technology development, enhancing human capacity building and promoting entrepreneurship.

Important lessons can be learnt from these initiatives in terms of organizational arrangements and priorities for co-operation in ICT.

ICT Development in SASEC Countries

e-Readiness frameworks can be useful tools for ranking countries and prioritising areas for policy interventions in the context of ICT. While some of the frameworks merely provide a methodology for evaluating e-Readiness, a few others actually apply the methodology for ranking of countries. With regard to the countries of the SASEC sub-region, it is found that India is the most e-ready. For example, according to the 'Networked Readiness of Nations' index while India ranked 37, Bangladesh ranked 77 out of 82 countries surveyed. According to e-Readiness data, there was already a digital divide emerging in the sub-region. The teledensity in January 2004 in the sub-region ranged from 16 for Nepal to 68 for India per 1,000 population. PC penetration ranged from 1.9 for Bangladesh to 5.8 for India per 1,000 population. Private sector co-operation can help in bridging this divide.

Each of the SASEC countries has a policy framework in place for ICT. A number of initiatives have been launched to promote the growth of ICT. Though teledensities are low in the sub-region, infrastructure for ICT is clearly improving. Mobile phones have overtaken fixed line phones in Bangladesh. The Country will also have its own under-sea OFC link with SEA-ME-WE 4 by June 2005. Bangladesh can however gain by connecting with the Indian terrestrial networks. Bhutan will soon have OFC links connecting with India and extending upto Thimpu. India itself has seen a dramatic improvement in telecom infrastructure with deregulation and with the induction of private sector players. Nepal is establishing an East–West Superhighway that will link up with Kathmandu and connect with Indian terrestrial networks in the south. India has seen a dramatic growth in software exports and has matured as a global player especially as a supplier of offshored IT and BPO services. The other SASEC countries have yet to see similar growth. The hardware sector in the sub-region however, continues to be a case of much opportunity but little achievement.

Issues and Recommendations

1) e-Government

There are immense opportunities for the private sector to participate in the development of e-Government applications in the SASEC countries. A common sub-regional Interoperability Framework for e-Government would make it easier for private sector companies in the sub-region to collaborate with each other. A common framework would make the experience in development of e-Government applications more portable and replicable in the sub-region. Collaboration between private sector companies with regard to e-Government projects would also become easier with information sharing through the medium of an e-Government observatory. Further, training and sensitisation of government decision makers about public-private partnerships in e-Government would open up new opportunities for the private sector.

2) Paperless Trading

Paperless trading offers immense benefits in terms of lower costs, better efficiencies and the capacity to participate in 'just in time' supply chains. It also opens up new opportunities for small players to cater to a global market. While countries like India have been progressively expanding the use of EDI systems, a lot more has to be done for migrating to a paperless trading regime. It will be necessary to harmonize cyber laws in the sub-region to facilitate paperless trading. The approach adopted by the Pan Asian e-Commerce Alliance has much to recommend itself for both the government and private sector companies in the sub-region. A similar approach is suggested for the SASEC countries including setting up of public-private partnerships for moving towards a paperless trading environment.

3) IT Enabled Services

IT enabled services offer great potential for generating incomes and employment in the SASEC countries. India has already emerged as a significant global player with regard to BPO. The BPO opportunity is expected to increase to US$178.5 billion by 2005 according to the Gartner Group. A large number of MNCs have established their back-office operations, in India and have witnessed not only substantial cost savings but also enhanced quality. In order to ensure business continuity and mitigate risk, a number of western companies are looking at co-locating their back office operations in India and a third country. This presents a unique opportunity for Bangladesh, Bhutan and Nepal to piggyback on India's success. In order to benefit from this opportunity however, attention will have to be paid to improving telecom infrastructure and developing a pool of skilled manpower. A common ITES training

and certification programme could greatly help in co-location. Further, a sub-regional track at international events on BPO/ITES would go a long way in improving awareness and forging linkages between companies in the sub-region.

Knowledge workers are the most important resource for ICT companies. The HR function is therefore critical to the success of such enterprises. While the big players have access to expert advice and can outsource their HR functions, such options are not available to smaller companies. It is therefore proposed to set up an HR BPO using the service of a leading international HR firm with part funding by a suitable agency. Such a facility could help attract and retain good quality talent by smaller ICT companies. Better talent and better HR management processes would be helpful in improving the prospects of collaboration between companies in the sub-region.

4) ICT education

There are immense opportunities for collaboration between SASEC countries in the field of ICT education. At present, the quality of ICT education provided by most institutions in the sub-region is not up to the mark. Except in certain institutions of excellence in the public and private spheres, many ICT training initiatives do not meet international quality benchmarks. The Government of India has been establishing centres of IT excellence in different countries. There are plans to establish such centres in Nepal and Bhutan. It is recommended that the Government of India should assist in setting up a Virtual Tech University for improving the quality of ICT education in the sub-region. The Virtual Tech University could establish linkages with top institutions and companies to create a pool of trained manpower that is internationally benchmarked. The availability of trained manpower will facilitate investments by ICT companies in the sub-region, thereby achieving the objective of cross-border collaboration.

5) Telemedicine

Tele-health and telemedicine are increasingly becoming important with the expansion of global networks. It is estimated that tele-health contributes US $ 1.25 trillion in terms of global revenues. The health infrastructure available in the SASEC sub-region is extremely weak. This is compounded by the non-availability of doctors and hospitals in remote and far flung areas. It would be extremely beneficial for the SASEC countries to collaborate on telemedicine initiatives involving the private sector. However, for such initiatives to succeed, it is important that the health information infrastructure should be harmonized across countries and legal provisions for telemedicine should be introduced. In order to give a fillip to collaboration on telemedicine in the sub-region, it is suggested that corporate hospitals, medical practitioners and policy makers be brought on a common platform.

6) Incubation

Business incubation has been found to be a practical means of encouraging entrepreneurship. A sub-regional incubation initiative can help ICT start-ups with critical support in terms of funding, management assistance, business/technical services, office space, equipment and marketing. By having a sub-regional approach to incubation, international linkages in terms of venture capital funding and consultancy support can be more easily provided. Further, involvement of ‘Eco-nets’, ‘meta-companies’ and ‘vendor capital’ in incubation can also help forge linkages between start-ups in the sub-region thus resulting in increased private sector co-operation in ICT.

7) Fostering Business Linkages

A number of Challenge funds have been set up in different countries for encouraging business linkages between firms. For example, UK's Department for International Development has set up a Business Linkage Challenge Fund, which encourages and supports small enterprises in developing countries to link up with each other or with international partners. It is recommended that a Business Linkage Fund be set up for the sub-region. The Fund should support linkages between ICT companies in the sub-region and facilitate linkages of local SMEs with MNCs. Such linkages could also be established by using the model of the Singapore Infocomm Local Industry Upgrading Programme in the sub-region. The Business Linkage Fund should focus on developing solutions in high impact areas relevant to the sub-region.

8) Enlarging ICT supply

In dealing with ICT related issues, enlarging ICT supply is an important area deserving attention. By virtue of geographical proximity, Bangladesh, Bhutan and Nepal can benefit from access to international bandwidth through Indian networks in the public/ private sector. This has become all the more attractive on account of Indian companies like Reliance acquiring international carriers like FLAG. It would therefore be worthwhile for telecom service providers in Bangladesh, Bhutan and Nepal to explore possibilities for reducing cost of international bandwidth by connecting with Indian telcos. This would also improve reliability of international circuits in view of a greater choice of alternative bandwidth providers.

Thailand has launched an ambitious programme to provide one million low cost PCs to low - income families. The cost of PCs has been brought down considerably by virtue of a better bargaining position, stemming from the large volumes involved. It would make sense for countries of the sub-region to collectively explore the possibility of aggressively lowering prices for PCs to be supplied to academic institutions and to the not so affluent sections of the public.

There is tremendous potential for cross-border win-win partnerships in the field of ICT. The present study has identified some of the more promising areas. It is hoped that the initiatives identified will improve ICT penetration in the sub-region and contribute to greater growth and competitiveness.

I. BACKDROP

1. Introduction and Background

1. Information & Communications Technologies (ICTs) are profoundly reshaping our societies and economies. ICTs are key enablers for improving efficiencies and productivity and enhancing the competitiveness of nations. According to Michael Porter, true competitiveness is measured by productivity.[1] The central challenge therefore for economic development is to create the conditions for rapid and sustained productivity growth. ICTs can play a vital role in enhancing productivity and hence competitiveness. They can therefore be a useful ally in increasing the pace of development. Those countries that focus on Information Technology and use it to their strategic advantage will have better prospects of success, while those who neglect the sector will be in danger of lagging behind.

Regional approach to ICT

2. National productivity and competitiveness can also be enhanced through coordinating policies among neighboring countries. Consequently, adopting a sub-regional approach to ICT can prove to be useful for enhancing productivity. Regional cooperation can expand access to key resources and markets and provide wider development opportunities for participating countries. Regional cooperation can enhance and amplify domestic development efforts and widen the range of options available to poor countries. More specifically regional cooperation can help reduce the growing gap between the 'information rich' and 'information poor' economies and groups. The private sector and collective industry bodies such as trade associations and chambers of commerce can play an important role in this regard.

South Asian Growth Quadrangle

3. The idea of sub-regional cooperation in the context of a South Asia Growth Quadrangle (SAGQ) first emerged in December 1996. The proposal was originally to consider Bangladesh, Bhutan and Nepal with the Northeastern region of India (comprising of Arunachal Pradesh, Assam, Manipur, Meghalaya, Mizoram, Nagaland, Tripura, Sikkim) and West Bengal as a growth quadrangle.

4. The Federation of Indian Chambers of Commerce and Industry (FICCI) prepared a report entitled 'South Asia Growth Quadrangle: Emerging Opportunities for Economic Partnership' that looked at various opportunities for partnership between Bangladesh, Bhutan, India and Nepal.[2] It was felt that the SAGQ had the advantages of geographical proximity, socio-cultural cohesiveness, economic complementarity and a potential for opening up further east to the ASEAN region.

Regional Co-operation in ICT

5. The FICCI report looked into the possibilities of regional cooperation in the field of ICT in the SAGQ countries. The focus of the report was however largely on the telecommunications

[1] Michael E. Porter, "Building the Microeconomic Foundations of Productivity: Findings from the Microeconomic Competitiveness Index" in *The Global Competitiveness Report 2002-2003*, Oxford University Press, New York, p. 25.

[2] FICCI, *South Asian Growth Quadrangle: Emerging opportunities for Economic Partnership* 2001.

sector. The report pointed out the need to facilitate greater private sector initiative in Telecom, and to ensure a healthy regulatory framework. In terms of the possibilities of regional cooperation, the report recommended that a regional Internet exchange should be created to facilitate more efficient traffic flows in the region. It also suggested "Regional cooperation should be increased between ISPs and other infrastructure players through forums, conferences and joint projects."[3] It was felt that e-Commerce within the region would "help develop the skills, expertise, essential institutions (banking, arbitrage, logistics) and unique solutions which would allow merchants of South Asia to access the world market for goods and services."[4] Another recommendation was for an agreement on roaming facilities for GSM mobiles in the countries of the sub-region. It was also suggested that international gateways within the South Asian region could be utilised to remove the anomaly of Internet traffic of the region being routed through Singapore and other countries.

South Asian Association for Regional Cooperation (SAARC)

6. The four SASEC countries are all members of the South Asian Association for Regional Cooperation (SAARC). The SAARC additionally has the Maldives, Pakistan and Sri Lanka as members. One of the objectives mentioned in the SAARC Charter (1985) is to "promote active collaboration and mutual assistance in the economic, social, cultural, technical and scientific fields".[5] SAARC has established about a dozen technical committees to focus on different areas of cooperation. Two of these committees are immediately relevant to ICT, namely the Technical Committee on Communications and the Technical Committee on Science and Technology. However, there is no exclusive initiative on ICT under SAARC.

7. More recently ICT has begun to attract increasing attention as part of SAARC's agenda. This is evident for example from the Islamabad Declaration made at the twelfth SAARC Summit in January 2004. According to the Declaration, "SAARC should endeavor to bring the benefits of information and communications technology to all peoples of the region, bridging the digital divide and assist in the development of knowledge based societies."[6]

South Asia Subregional Economic Cooperation (SASEC) Programme

8. Supporting regional cooperation and promoting the role of the private sector in development are two important planks of the Poverty Reduction Agenda for the Asian Development Bank.[7] The ADB has been promoting sub-regional cooperation between Bangladesh, Bhutan, India and Nepal through its South Asia Sub-regional Economic Cooperation (SASEC) programme. Five priority sectors have been identified for sub-regional cooperation namely, transportation; energy and power; tourism; environment; and trade, investment and private sector cooperation.

South Asia Business Forum (SABF)

9. The Trade, Investment and Private Sector Cooperation Working Group (TIPWG) has set up a South Asia Business Forum (SABF) as a platform for private sector cooperation in the sub-region. SABF is an initiative to enhance business cooperation in the SAGQ sub-region and act

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[3] FICCI, 93.
[4] FICCI, 94.
[5] SAARC Secretariat, *South Asian Association for Regional Co-operation: A Profile,* Kathmandu, 1998, p. 4.
[6] SAARC Secretariat, Twelfth *SAARC Summit, Islamabad, 4-6 January 2004, Islamabad Declaration,* para 35. <http://www.saarc-sec.org/summit12/summit12declaration.htm>.
[7] Asian Development Bank, *Moving the Poverty Reduction Agenda Forward in Asia and Pacific: The Long Term Strategic Framework of the Asian Development Bank (2001- 2015)*, March 2001, pp. 22-27.

as the primary catalyst in cementing the bonds within the sub-region. SABF is constituted by the private sector and is primarily a business-to-business network. It consists of the apex chambers of the South Asia sub-region. These are the Bhutan Chamber of Commerce and Industry (BCCI), the Federation of Bangladesh Chambers of Commerce and Industry (FBCCI) and the Federation of Nepal Chambers of Commerce and Industry (FNCCI) apart from FICCI from India.

10. Under the SABF, every partner Chamber will establish a Business Facilitation Cell which would help the private sector in pursuing business opportunities and networking. Such cells have already been inaugurated in Nepal, Bangladesh and Bhutan.

Other Industry Interactions

11. Apart from the initiatives taken by FICCI, the Confederation of Indian Industry (CII) has also been interacting with its counterpart organisations in the sub-region. The CII for example drew up an action plan for 1999 - 2000 for promoting cooperation between India and Bangladesh. Information Technology was identified as one of the eight areas of cooperation. Four areas were identified for cooperation in the field of Information technology. These were the development of telecommunications and international networking, establishment of software development parks, e-Governance and e-Commerce.[8]

12. Subsequently, in a joint meeting of the Metropolitan Chamber of Commerce and Industry (MCCI) from Bangladesh and the CII in New Delhi on the 11th March 2003, telecommunications was identified as one of the promising opportunities for investment.[9] It was observed that there were already a number of foreign companies present in Bangladesh both as operators and as suppliers of equipment and telecommunications services. Teleport from Norway for example, had made investments in cellular services and was gradually expanding its operations through joint ventures with other international operators and investors. It was felt that there would be further prospects for expanding operations and networks through joint ventures with established operators for equipment supply, technical know-how and even management, all of which could be exchanged for equity.

Focus and scope of the present study

13. The TIPWG for the SASEC sub-region has identified ICT as one of the sectors for immediate ADB support. The present study is aimed at identifying areas for cross-border private sector cooperation in ICT.

14. The specific responsibilities assigned with respect to the study include the following:

- Survey recent discussions on ICT initiatives and draw implications to the SASEC countries;
- Analyze ICT development of the SASEC countries focusing on benefits to the private sector;
- Prepare a framework whereby countries could share their experiences in ICT development, particularly e-governance;
- Explore opportunities for ICT enabled services in the sub-region; and
- Develop an operational plan that institutionalizes regional cooperation programs in ICT.

[8] CII, *India – Bangladesh: Plan for Business Co-operation*, June 1999, p.11.
[9] CII, *Third Meeting of MCCI – CII JEC, New Delhi 11 March 2003.*

15. This study has accordingly attempted to identify opportunities for cross border private sector collaboration in the field of ICT for the SASEC subregion.

Role of the private sector

16. Private sector participation can be extremely beneficial at a time when governments are faced with increasing complexities and when resources are becoming a serious constraint. Effective Public Private Partnerships can help in sharing the risks and costs in the development of infrastructure. There has been a welcome change in government policies in the sub-region with regard to infrastructure. For example, most countries have liberalized or are in the process of further liberalizing the telecommunications sector, thereby enlarging the field for private sector participation in this vital area. We have found that there are distinct opportunities for private sector collaboration in the subregion over a range of areas including e-Government, IT enabled services, e-health, education and e-entrepreneurship.

Study outline

17. The present study has identified eight areas for greater cross border private sector collaboration in the SASEC subregion. These areas have been identified based on the competencies available in the subregion, and on the basis of interviews with a number of individuals and organizations in the public and private sector, related to ICT. The areas identified fall into four buckets. One bucket consists of matters directly pertaining to government e.g.: e-Government and paperless trading. Another bucket relates to the emerging opportunities in IT enabled services, which hold considerable promise for countries of the sub-region. A third bucket pertains to use of ICT for development of human resources especially in areas like education and health. The last bucket is for encouraging growth of the ICT sector through incubation initiatives, business linkages, access to high quality HR services and sharing of information infrastructure. The study has come up with 18 recommendations, which have been detailed in the relevant sections below. The recommendations are finally summarized in Chapter 12 together with details of anchor institutions that could be entrusted with the implementation of each recommendation.

2. Important Regional Initiatives on ICT

18. Regional initiatives have been considered to be useful for countries to fast track their transition to the information age. It is now realized that cooperation at the regional and sub-regional level can prove a force multiplier in benefiting from ICT. There are three regional initiatives that are worth looking at, in the context of ICT cooperation at the international level. These are e-ASEAN, e-Europe and e-APEC.

e-ASEAN

19. The e-ASEAN initiative was one of the first initiatives to be taken at a regional level. It was rooted in the 1997 ASEAN Vision 2020 according to which member countries resolved to "accelerate the development of science and technology including information technology by establishing a regional information technology network and centres of excellence for dissemination of and easy access to data and information".[10] Article 3 of the e-ASEAN Framework Agreement signed on November 24, 2000 covers measures to:

(i) facilitate the establishment of the ASEAN Information Infrastructure;
(ii) facilitate the growth of electronic commerce in ASEAN;
(iii) promote and facilitate the liberalisation of trade in ICT products, ICT services and of investments in support of the e-ASEAN initiative;
(iv) promote and facilitate investments in the production of ICT products and the provision of ICT services;
(v) develop an e-Society in ASEAN and capacity building to reduce the digital divide within individual ASEAN member states and amongst ASEAN member states; and
(vi) promote the use of ICT applications in the delivery of government services (e-Government).[11]

20. A high-level e-ASEAN Task Force was created as a public-private sector advisory body with two representatives from each of the 10 ASEAN member countries, appointed directly by the heads of the member states. The Task Force was mandated to develop a comprehensive action plan for "an ASEAN e-space" to assist member countries to compete successfully in the global information economy. The Task Force was to provide policy advice, approve pilot projects and focus on capacity building and advocacy.

21. A significant private sector role has been contemplated as part of the e-ASEAN initiative. The approach is that the private sector will lead and the governments will enable. A number of pilot projects from the private sector have been taken up as part of e-ASEAN. Some of the pilot projects taken up are listed below:[12]

[10] ASEAN, *ASEAN Vision 2020*, <http://www.aseansec.org/1814.htm>.
[11] ASEAN, *e-ASEAN Framework Agreement,* 22-25 November 2000, <http://www.aseansec.org/5308.htm>.
[12] ASEAN Secretariat, overview of the meeting of the ASEAN Telecommunications Ministers, 27-28 August 2002, <http://www.aseansec.org/7808.htm>.

(i) ASEAN Trade Electronic Data Interchange (TEDI), which aims to create an ASEAN ecosystem for e-trade utilizing Internet technology and standards such as UNEDIFACT and ebXML;
(ii) Cybermatrix, which aims to establish zoned Internet in ASEAN enabled by intelligence overlaid on regional and national telecommunication networks;
(iii) ASEAN SchoolNet aimed at enabling ASEAN students and teachers to tap into the wealth of information and learning resources on the internet;
(iv) ASEAN Incubator Network, which aims to help ASEAN SMEs and entrepreneurs to network with venture capitalists and techno-preneurs;
(v) ASEAN Services Access Platform (ASAP), which promotes the creation of a pan-ASEAN infrastructure for member countries to very rapidly launch services that other countries can leverage on, to build even more complex services; and
(vi) ASEAN Regional Electronic Payment Gateway Solution, which aims to develop and implement solutions to facilitate cross border e-clearing of retail payments in ASEAN using agreed currencies by clearing through existing efficient national clearing houses and/or payment processing centres in ASEAN.

22. During the ninth ASEAN Summit held in Bali in October 2003, e-ASEAN was identified as one of the priority sectors for integration to be accelerated and Singapore was entrusted with its coordination. This formed part of the recommendations of the High Level Task Force on ASEAN Economic Integration.[13]

23. e-ASEAN provides a useful template for regional collaboration in ICT. The e-ASEAN Task Force has been an effective instrument for involving the private sector in ICT initiatives. The ASEAN region has wide disparities in terms of the e-readiness of member countries. For instance countries like Singapore are very advanced, while countries like Laos and Myanmar are only now beginning to develop their capabilities in ICT. Programmes for entrepreneurs from countries like Laos have been taken up by embedding them in companies in the Philippines for example, so as to expose them to processes and practices adopted by successful ICT companies.[14] Much can be learnt from the e-ASEAN experience for replication in the SASEC sub-region.

e-Europe

24. The European Commission launched its e-Europe initiative on December 8, 1999 upon the adoption of a concept of an e-Europe 'Information Society For All.' e-Europe was launched with the aim of accelerating the uptake of digital technologies across Europe and ensuring that all Europeans have the necessary skills to use them.[15] e-Europe builds on the strengths of previous initiatives. Regional efforts on ICT collaboration can be traced back to May 1994 when the Bangemann Report entitled "Recommendations to the European Council: Europe and the Global Information Society" was brought out.

25. A draft action plan on e-Europe was presented to the Commission on May 24, 2000. A month later the draft action plan became an agreement that was formalized at the Feira European Council.[16]

[13] <http://www.aseansec.org/hltf.htm>
[14] Telephonic interview with Dr.Emmanuel Lallana, previously Executive Director of e-ASEAN Task Force Secretariat.
[15] *E-Europe : An Information Society For All* , 23-24 March 2000, <http://europa.eu.int/comm/information_society/eeurope/news_library/pdf_files/initiative_en.pdf>.
[16] Held on June 19th and 20th 2000.

26. The Action Plan initially identified eleven target areas that were clustered under the following three main objectives:

(i) A cheaper, faster, secure Internet
  (a) Cheaper and faster Internet access
  (b) Faster Internet for researchers and students
  (c) Secure networks and smart cards

(ii) Investing in people and skills
  (a) European youth into the digital age
  (b) Working in the knowledge-based economy
  (c) Participation for all in the knowledge-based economy

(iii) Stimulate the use of the Internet
  (a) Accelerating e-commerce
  (b) Government online: electronic access to public services
  (c) Health online
  (d) European digital content for global networks
  (e) Intelligent transport systems

27. The strategy spelt out for achieving the action plan was to first accelerate the establishment of an appropriate legal environment, second, support new infrastructure and services across Europe, and third, apply an open method of coordination and benchmarking.

28. More recently e-Europe has come out with an action plan 'e-Europe 2005: An Information Society For All'.[17] The Action Plan is based on two groups of actions that reinforce each other. One, it aims to stimulate services, applications and content covering both online public services and e-business, second, the underlying broadband infrastructure and security matters are sought to be addressed. e-Europe 2005 aims at a Europe that has modern online public services, e-Government, e-learning services, e-health services and a dynamic e-business environment. It is also proposed that e-Europe should be an enabler for widespread availability of broadband access at competitive prices and for a secure information infrastructure.

29. e-Europe 2005 focuses on the following four sets of action points:

Policy measures

30. To review and adapt legislation at national and European level: to ensure legislation does not unnecessarily hamper new services; to strengthen competition and interoperability; improve access to a variety of networks; and to demonstrate political leadership.

Good Practices

31. e-Europe aims at facilitating the exchange of experience, good practices and demonstration projects as also sharing lessons learnt from failures. It proposes to launch projects to accelerate the roll out of leading edge applications and infrastructure.

[17] e-Europe 2005: An information Society for All, <http://europa.eu.int/information_society/eeurope/2002/news_library/documents/eeurope2005/eeurope2005_en.pdf.

Benchmarking

32. Policy measures will be monitored and better focused by bench marking of progress made in achieving objectives and policies spelt out as part of the e-Europe action plan.

Over all coordination of existing policies

33. A steering group for providing an overview of policy developments and ensuring good information exchange between national and European policy makers and the private sector has been set up.

34. e-Europe offers valuable lessons in sharing and promoting best practices among member countries. One of the significant initiatives taken up as part of e-Europe is to develop a Pan European Interoperability Framework for enabling cross border delivery of electronic services. This is an approach that has immediate relevance to the SASEC sub-region and is discussed in more detail in Chapter 4. Another initiative has been the setting up of an e Observatory[18] for collecting and analyzing information concerning the main initiatives and developments in the field of e-Government, in Europe and beyond and disseminating this information through the IDA[19] website.

e-APEC

35. APEC leaders launched a wide-ranging action Agenda for the new economy in their meeting in Brunei Darusalam in 2000. The agenda outlined programmes that would help APEC economies to use technological advances for boosting productivity, stimulating growth and extending services to the whole community. It included ways to promote the right policy environment and build capacity to help create a framework for strengthening markets, e-Commerce, infrastructure, knowledge and skills development and for providing affordable and a more efficient access to communication and the internet. As a follow up to the New Economy Action Agenda, leaders endorsed an e-APEC strategy at the 13th APEC economic leaders meeting at Shanghai, China in 2001. The e-APEC strategy develops a long term and action oriented plan under three areas:[20]

(i) To create an environment for strengthening of market structures and institutions
   (a) Facilitate structural adjustment by promoting trade, e-commerce and investment liberalization.
   (b) Ensure that any taxation of Internet services or e-commerce is clear, consistent, neutral and non-discriminatory; continue the WTO customs duty moratorium on electronic transmissions.
   (c) Open public utilities to competition and privatisation.
   (d) Adopt international best practices in supervising financial institutions and markets; strengthen banking and financial regulations to world best standards.
   (e) Promote training and technical assistance for fighting financial crime.
   (f) Reduce barriers to competition and maintain an open policy stance for international trade and investment to reduce the costs of IT products and services, improve standards, and promote e-commerce.

[18] <http://europa.eu.int/ISPO/ida/jsps/index.jsp?fuseAction=showChapter&chapterID=140&preChapterID=0>
[19] IDA is a European Commission driven strategic initiative for 'Interchange of Data between Administrations'. See <http://europa.eu.int/ISPO/ida/jsps/index.jsp?fuseAction=home>
[20] US Department of State, *Fact Sheet : e-APEC Strategy,* 19 October 2001, <http://usinfo.state.gov/topical/global/ecom/01101901.htm>.

(g) Foster the development of venture capitalists' entrepreneurial skills and fund managers' investment skills.
(h) Implement the 1996 WIPO treaties, TRIPs, the Berne Convention and the Rome Convention; update domestic intellectual property systems to meet the needs of the digital economy.
(i) Reduce or eliminate interest rate and price controls and subsidies – direct or indirect – impacting on the pricing of risk.

(ii) To facilitate an environment for infrastructure investment and technology development.
(a) Enhance cooperation and coordination on information security.
(b) Adopt international market driven standards for interoperability among systems.
(c) Liberalize telecom markets, modernize regulatory structures to accommodate converging technologies and services and remove impediments to private sector participation in the provision of high-speed communication services.
(d) Endorse the expedited implementation of the WTO agreement on Basic Telecommunications, and encourage the adoption of the GBT Reference Paper.
(e) Encourage the accession of all economies to the WTO information technology agreement.
(f) Continue to develop the policy framework to encourage investment, competition and lower prices for Internal services and develop government policies that increase the availability of education, training, and support for underserved groups.
(g) Work with the private sector to address gaps in the basic infrastructure in remote and underserved areas and share economy experiences and information regarding access for all.
(h) To enhance human capacity building and promote entrepreneurship.
(i) Address inequality of access to information and communications technology, in part by completing and adopting the APEC Digital Divide Blueprint for Action.
(j) Continue efforts not just to achieve basic education for all, but provide wider training opportunities, strengthen life-long learning, and expand cyber-education.
(k) Cooperation and information exchange among APEC members, within society, and between APEC and other organizations.
(l) Encourage setting up of policies to facilitate financing for entrepreneurs.

36. An e-APEC Task Force was set up to monitor and report on implementation of the e-APEC strategy.

37. e-APEC has been focusing on issues like the digital divide, charging arrangements for Internet services, e-security, inter-connect regimes, mutual recognition arrangements, e-commerce and e-Government. A number of valuable projects have been taken up for providing advice and information on key issues. For example, in the case of e-commerce these projects have covered issues like interoperability, cross-border links between e-commerce market places and legal infrastructure requirements. A sub-regional approach to ICT for the SASEC countries would gain from the perspectives that have emerged from these projects.

3. ICT in the SASEC countries

e-Readiness

38. There are a number of e-readiness frameworks available internationally that provide a method for ranking countries and prioritising areas for policy interventions. A large number of frameworks for ICT measurements have been developed variously by the private sector, governmental organisations and academic institutions. Some of the private sector initiatives on ICT measurement include the Global Technology Index and McConnell's Ready? Net, Go! APEC has come out with a framework that can act as a policy guide for governments based on inputs from the business community. Mosaic's Global Diffusion of the Internet comes from the academic world.

39. Different e-readiness frameworks have dealt with e-readiness differently. Appendix 2 spells out the most significant e-readiness frameworks in use internationally. Among the countries of the SASEC sub-region India was most e-ready. For example according to the 'Networked Readiness of Nations' index, India ranked 37th out of 82 countries surveyed, while Bangladesh ranked 77th. India's rank was 39th out of 49 countries surveyed under the Global Technology Index brought out by the Meta Group. In the case of the Economist e-Readiness Rankings, India ranked 46th out of 65 countries covered. Nepal ranked 14th out of 15 countries included in the Mosaic study. Bhutan has not been covered by most international e-Readiness surveys.

40. The most comprehensive data available on the relative status of ICT development in different countries is that provided by the World Bank as part of its knowledge assessment matrix. We have presented in Appendix-3 comparative data on important parameters pertaining to ICT, for the four countries as available with the World Bank.

41. Appendix-3 shows wide variations between countries of the SASEC sub-region with respect to different ICT parameters. For example, the teledensity in 2001 in terms of telephone main lines for 1,000 people was 38 for India, 25 for Bhutan, 13 for Nepal and only 4 for Bangladesh. Bangladesh had one of the lowest telephone densities in the world. In terms of the cost of local calls Bangladesh had the highest cost at 3 cents per 3 minutes, as compared to 2 cents for Bhutan and India and 1 cent for Nepal. Similarly, with regard to the availability of personal computers the penetration rate per 1000 people in 2001 was the lowest for Bangladesh at 1.9. Bhutan and India had the highest penetration rates of 5.8, followed next by Nepal at 3.5. These figures are illustrative but they are also symptomatic of a digital divide emerging in the sub-region.

42. The information available on the World Bank site is a bit dated. The teledensities for the SASEC countries have increased significantly over the last two years. According to official country sources by the end of 2003 the teledensity had increased to 20 for Bangladesh, 29 for Bhutan, 67.6 for India and 16 for Nepal, taking mobile and fixed telephones together.

ICT environment in the SASEC sub-region

43. The critical factors for an enabling environment for ICT include telecommunications infrastructure, availability of fixed and mobile phones, PC penetration and access to the Internet. Further, the availability of knowledge workers and skilled manpower are also key elements for the growth and development of ICT. We focus below on the policy environment, the

telecommunications infrastructure, the existing status of the ICT industry in terms of hardware and software and associations representing the ICT industry in the SASEC sub-region. It is observed that there are wide variations in the sub-region. While India has emerged as a significant player in software in the sub-region, other countries have yet to make their mark. The telecommunications infrastructure in the sub-region has been witnessing steady improvement. The process of liberalization and de-regularization has given a strong impetus to both the reach and quality of telecommunication networks in India. This process is slowly extending to other countries of the sub-region.

Bangladesh

Policy

44. Bangladesh has renamed its Ministry of Science and Technology as the Ministry of Science and Information & Communication Technology, in order to give ICT focused attention. The new Ministry has come out with a National Policy on Information and Communication Technology in October 2002. According to the vision spelt out in the policy, the country aims at building an ICT-driven nation and a knowledge-based society by the year 2006.[21] The vision goes on to say that "a countrywide ICT infrastructure will be developed to ensure access to information by every citizen to facilitate empowerment of people and enhance democratic values and norms for sustainable economic development."[22] In keeping with this vision, the policy focuses on training of human resources, developing ICT infrastructure, encouraging research and development in ICT and also addresses a number of specific sectors. These include the software and hardware industry, services industry, e-commerce, e-Government/e-Governance, legal, healthcare, agriculture and poverty alleviation, social welfare, transportation, tourism, environment and the judiciary. The policy specifically mentions regional and international co-operation. It states that the "Ministry of Science and ICT shall explore regional, sub-regional and international co-operation and execute collaborative agreements on ICT with developed and developing countries as well as with relevant agencies and development partners."[23]

45. Bangladesh has drafted an investor friendly IT policy. Some of the salient features of the policy are:

(i) Waiver of all the duties and taxes for import of computer hardware and software;
(ii) Tax holiday for software in IT services companies;
(iii) 100% foreign owned companies allowed;
(iv) 100% remittance of profit and capital gains for foreign investors;
(v) Intellectual Property Rights law enacted; and
(vi) Electronic transactions and cyber crimes law drafted.

46. ICT has been declared a thrust sector and an IT Task Force under the leadership of the Prime Minister has been formed. It is also proposed to increase government spending in ICT to at least 2 percent of the annual development plan by 2006. Some of the initiatives undertaken by the Government in the recent past for promoting ICT in Bangladesh include the following:

(i) Earmarking 3 billion Taka towards a Joint IT and Agriculture Fund – the money would be utilized to fund term loans and private IT investments;

[21] Ministry of Science and Information & Communication Technology, *National Policy on Information and Communication Technology,* Government of the Peoples' Republic of Bangladesh, October 2002, p.1.
[22] Ministry of Science and Information & Communication Technology, p. 1.
[23] Ministry of Science and Information & Communication Technology, p. 19.

(ii) Development of a Software incubator in Dhaka;
(iii) Development of a Software Park in Dhaka;
(iv) Creating export promotion service cells in Bangladesh's High Commissions abroad to promote the country's software and services;
(v) Bangladesh Bank has been directed to offer term loans to private investors in the IT industry;
(vi) All 64 districts have been targeted to have internet connectivity and
(vii) The Ministry of Education has distributed 10,000 computers to schools.

47. The ICT policy of Bangladesh focuses on creating a pool of IT skilled manpower for ICT. Among the initiatives mentioned in the policy, the following deserve to be highlighted:

(i) Creation of three to four National Institutions of IT with annual intake to go up from 2,000 to 6,000 students per annum by the year 2005;
(ii) Advising local universities to increase intake in IT streams;
(iii) Offer Diploma / IT certificates in state owned Polytechnics; and
(iv) Standardize private IT education through a nationally adopted system of accreditation.

48. According to the Global Competitiveness Report 2003-2004, Bangladesh ranked 43rd out of 102 countries surveyed in terms of government prioritization of ICT.[24]

Telecommunications

49. The Bangladesh Telegraph and Telephone Board (BTTB) under the Ministry of Posts and Telecommunications had a monopoly on Bangladesh's telecommunication sector until 1989. The BTTB still dominates fixed line networks; though there are several operators who provide telecommunication services. The telecom operators in Bangladesh are shown in Table 1 below.

Table 1: Telecommunication Operators in Bangladesh

Sl. No.	Name of the operator	Function
1.	Pacific Bangladesh Telecom Limited	Cellular services
2.	Bangladesh Telecom (Pvt) Limited	Paging, radio trunking & Riverine telecom services
3.	Bangladesh Rural Telecom Authority	Establishment, operation & maintenance of digital telephone exchanges in 200 Upazilla's
4.	Seba Telecom (Pvt) Ltd.	Rural telecom services in 199 Upazilla's and cellular services
5.	Telecom Malaysia International (BD) Ltd.	Cellular services
6.	Grameen Phone Consortium	Cellular services

Source: BTTB Annual Report 2001-02, p.6.

[24] World Economic Forum, *The Global Competitiveness Report 2003-2004,* New York, Oxford University Press, 2004 p.195.

50. As can be seen from Table 2 below, the government run telephone service has approximately 606,000 lines in 2001-2002 to serve 130 million people which represents, one of the lowest penetration rates in the world.

Table 2: Telecom Infrastructure

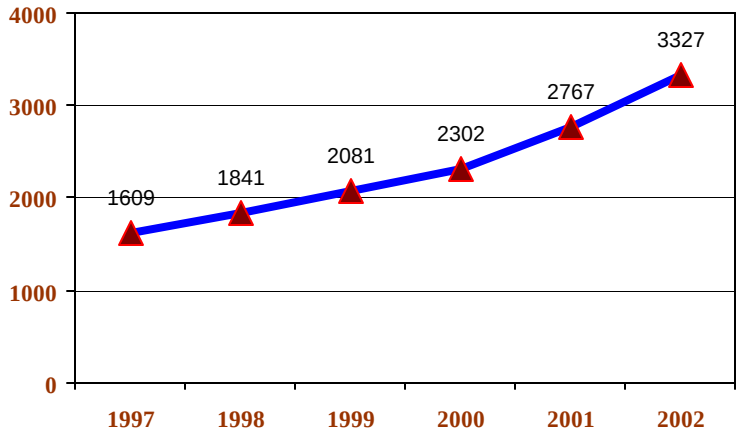
Year	Type of exchange	No. of exchanges	Exchange capacity	Telephone connections	Pending demand
2001-2002	Manual	416	39,293	32,449	21,997
	Auto (Analog)	84	55,598	45,182	10,484
	Auto (Digital)	168	651,187	528,300	178,630
	Total	**668**	**746,078**	**605,931**	**211,111**

Source: BTTB Annual Report 2001-02, p.17.

51. Efforts are under way to upgrade the telephone system including expanding domestic and international capacity and installing digital exchanges. Analog exchanges at the 64 district headquarters have been converted to digital. It is proposed to convert all analog exchanges in the upazillas (sub-districts) to digital by December 2005. The BTTB has installed fibre optic networks covering 50 out of the 64 districts in the country.

52. The growth of international voice circuits can be seen from Figure 1 below.

Figure 1: Growth of International Voice Circuits



Source : BTTB Annual Report 2001-02, p.14.

53. An 1800 kms long fibre optic network has been established by the Bangladesh Railway and is currently being utilised by private cellular phone operators. The Government plans to have access to a sub-sea fibre optic cable connecting Bangladesh with the rest of the world. The submarine fibre optic cable SEA-ME-WE 4 with a landing site at Cox's Bazar is likely to become operational by June 2005.

54. The mobile market is growing rapidly and has already overtaken fixed line phones in the country. This can be seen from Table 3 below.

Table 3: Mobile phone subscribers in Bangladesh (2001-2002)

Sl. No.	Cell phone company	Number of subscribers
1.	Grameen Phone	525,000
2.	AkTEL	110,000
3.	City Cell	75,000
4.	Sheba Telecom	30,000
	Total	**740,000**

Source: E-readiness and Need Assessment, Bangladesh Country Gateway, August 2002, p.11

55. That the telecommunications sector in Bangladesh was witnessing rapid growth is evident from the fact that by the end of December 2002, there were 0.92 million land lines in Bangladesh and the number of cellular phones had reached 2 million.[25] The country had about 0.1 million internet users.[26] All 64 districts and 35 percent of the upazillas were having internet access through dial-up connections. There were 195 Internet service providers in major cities.

56. The telecom sector was opened for private investment by the National Telecom Policy of 1999. The Bangladesh Telecom Act 2001 was enacted and in January 2002, the Bangladesh Telecommunication Regulatory Commission (BTRC) was established, separating the regulatory functions of the BTTB from its commercial operations. VoIP (Voice over Internet Protocol) services have been opened to private sector players, and VSAT licence/connection fees and overseas/long distance call charges have been substantially reduced.

IT Industry

Hardware

57. According to the US Commercial Service, the computer hardware peripherals and software market in Bangladesh was worth approximately US$25 million and was increasing by 20-25 percent per year. It was estimated that in 2000 there were approximately 350,000 desktop PCs in Bangladesh, with sales dominated, by locally assembled clones. A large number of computer assemblers imported motherboards and other components from Taiwan and South Korea, while the software and peripherals market was largely dominated by US brands.

Software

[25] Dr.Md.Omar Faruque Khan, Secretary in charge of the Ministry of Science and Information and Communications Technology, Government of the People's Republic of Bangladesh, Country Paper presented at the First Meeting of the ICT Working Group for SASEC Countries at Delhi, 15-16 March 2004, p.3.

[26] Ibid. p.4.

58. About 100 local companies are presently involved in the development and export of software. In 2003, these companies were projected to post US$30 million export earnings from software exports. Most of the companies engaged in software exports are service providers or sub-contractors.

ICT Associations

59. Bangladesh has two major associations representing the ICT industry. These are the Bangladesh Computer Samity (BCS) and the Bangladesh Association of Software and Information Services (BASIS).

Bangladesh Computer Samity

60. The BCS was established in 1987 and includes distributors, dealers, resellers of computer and allied products, locally assembled computer vendors, software developers and exporters, Internet service providers, ICT based education institutions and training houses, and ICT integrated services providers. It currently has 385 members. The organisation was set up as a forum for the ICT sector to express its views to government and promote and safeguard the interests of the industry. The BCS is also a category 'A' member of the Federation of Bangladesh Chambers Of Commerce and Industry.

Bangladesh Association of Software and Information Services

61. The Bangladesh Association of Software and Information Services was formed in 1997 with a view to mobilizing regulatory and policy support for the industry, and to assist member firms in building capacity for better addressing the needs of domestic and overseas markets. It has a membership of 81.

Bhutan

Policy

62. In 1994, the Royal Government of Bhutan brought out a Computerisation Master Plan for 1997-2000 with assistance from the UNDP. In 1999 the Computer Service Centre (presently the Division of Information Technology) with assistance from the Government of Denmark prepared a Bhutan Information Technology Strategy.

63. In July 2003 Bhutan bifurcated its Ministry of Communication into two ministries, the Ministry of Information and Communication and Ministry of Public Works and Human Settlements. This bifurcation has been done in order to give focused attention to the ICT sector.

64. The Division of Information Technology in the erstwhile Ministry of Communications has come out with an ICT Master Plan in June 2001. According to the Master Plan the development and application of IT in Bhutan will be guided by three broad policy objectives namely: (i) use of IT as an integral tool to enhance good governance; (ii) development of IT and IT enabled industries to generate employment and income for the country; and (iii) application of IT to improve the livelihood of all Bhutanese citizens. The Master Plan identifies seven key areas for focused attention namely infrastructure; institutional arrangements; human resources and training; information management and content development; regulations, guidelines, and legislation; public access and awareness and private sector development. Following the Master Plan, a Bhutan ICT Policy and Strategy (BIPS) is in advanced stages of preparation.

Telecommunications

65. In terms of communication infrastructure, Bhutan has 21,500 telephone users with a total exchange capacity of 26,000. The telecommunication backbone uses 34 Mbps digital stream carried over 8 GHz band microwave radio. The quality of voice and data outputs is good. Most of the digital multiplexes and equipment are of Japanese make (NEC).

66. At present, the international connectivity for Bhutan is through microwave links from Thimpu connecting to the Indian network and also through satellite. Bhutan Telecom has signed a memorandum of understanding with Bhutan Power Corporation to lay optical ground wire on existing power transmission lines from Thimphu to Phuentsholing and Chumdo to Paro with drop facilities at Semtokha, Khasadrapchu, Chapcha, Tsimasham, Chhukha, Gedu and Pasakha. The initial transmission capacity will be STM-1 between the main nodes. The Power Grid Corporation of India Limited has been selected as the consultant for the project and is also responsible for the implementation.

67. Though the overall teledensity for Bhutan is 29 per 1000 persons, most rural areas do not have access to a telephone. Three major towns Thimphu, Pheuntsholing and Paro contribute 65 percent of total users. About 80 percent of Bhutanese live in rural areas spread over 201 geogs comprising of approximately 2,000 villages in 20 districts. However, the rural areas accounted for less than ten percent of total telephone connections and less than one percent of Internet connectivity in the country.

68. The circuit and bandwidth details for Internet traffic are given in Table 4 below.

Table 4: International data bandwidths

From	To	Bandwidth	Remarks
Bhutan	KDDI, Japan	1 Mbps	
Bhutan	BT, London	1 Mbps	
Bhutan	North America	640 kbps	Via Germany Intelsat Station
Bhutan	Singapore	64 kbps	For SITA

Source: Bhutan e-Readiness Assessment Report, p.20.

69. At present the only Internet service provider in Bhutan is Druknet which is owned by Bhutan Telecom. Though the policy permits private ISPs, no private players have entered into this business yet. There are approximately 1,900 Internet dial-up account holders with Druknet and 26 leased lines. These leased lines are used by government, semi government or international agencies. No private sector companies have leased line access. The Internet is expensive in Bhutan. Internet usage for an hour costs around US$3 at an Internet cafe as compared to the hourly earnings of Bhutanese office workers and private sector employees of around US$1.56 per hour.

IT Industry

Hardware

70. Computers were first introduced in Bhutan in 1984. It is estimated that there are about 8,000 to 10,000 computers in the country.

Software

71. There are 16 IT firms in the country including suppliers, service and maintenance centres. There are also 18 computer-training institutes. Most of the IT companies are in the SME category.

72. The high cost of Internet, lack of appropriately skilled employees, high cost of external IT professionals and underdeveloped ICT regulations are major constraints to the growth of ICT in the private sector.

ICT Associations

73. Bhutan does not have an association representing the ICT sector, though plans for establishing one are on the anvil.

India

Policy

74. The Government of India has recognized IT as a thrust area for growth and has taken a number of initiatives to promote it. Some of the major initiatives taken by the government in the IT sector are:[27]

i. Setting up of a new Ministry of Information Technology in October 1999, which was re-christened as Ministry of Communication and Information Technology in September 2001 given the increasing convergence between communication and IT;
ii. Setting up of National Task Force on Human Resources Development in IT in July 2000;
iii. Creation of an IT Venture Capital Fund of Rs. 1 billion in 1999;
iv. Upgrading the Education and Research Network (ERNET) connecting various universities and engineering colleges through a high speed network;
v. Upgrading all regional engineering colleges to the level of National Institutes of Technology;
vi. Enactment of a comprehensive Information Technology (IT) Act, 2000, which provides legal recognition for electronic transactions;
vii. Lowering custom duties on IT products, allowing 100 percent foreign direct investment (FDI) in the sector, raising the limit on the issue of American depository Receipts/Global Depository Receipts (ADR/GDR) by stock swap from US$50 million to US$100 million or up to ten times the company's export earnings in the previous year;
viii. Computerisation of government departments by spending up to 3 per cent of the budget on IT;
ix. Setting up of Community Information Centres;
x. Promotion of computer and Internet access to 60,000 secondary schools in the country taken up under a Vidya Vahini Programme; and

[27] Planning Commission, *Tenth Five-Year Plan (2002-2007),* Government of India, p. 802.

xi. Research and development (R&D) in emerging areas of technology and supercomputing.

75. According to the Global Competitiveness Report for 2003-2004, India ranked 12th out of 102 countries surveyed with regard to Government prioritisation of ICT. In terms of the success in ICT promotion it ranked 16th.[28]

Telecommunications

76. The telecommunication sector in India has witnessed the fastest ever expansion of the telecom network after reforms were introduced in 1999. The private sector has been permitted to provide telecom services without any restriction on number of operators except for the cellular mobile phone segment due to frequency constraints. The National Long-Distance Service has been opened to private operators without any restriction on the number of operators effective from August 13, 2002. The monopoly of the VSNL in International Long-Distance services has been terminated effective from March 31, 2002. Internet Service Providers have been given clearance for commissioning of international gateways for Internet using satellite media.

77. According to the Department of Telecommunications, Government of India, by the end of January 2004, the number of phones in the country increased to 72.28 million consisting of 45.65 million provided by public operators and 26.63 million by private operators. As at the end of January 2004 there were 23.36 million cellular mobile phones in the country.

78. The share of the private sector in the total number of telephones has increased from 4.7 percent in 1998-99 to 36.85 percent as at the end of January 2004. With this growth, the teledensity in India has increased to 67.6 per 1000 persons overall. However, there is a great degree of variation in terms of teledensity among various states and within the states themselves. Generally, the southern states including Maharashtra have a teledensity that is higher than the national average of 67.6, while the Western region (excepting Gujarat), Central and North-Eastern regions have teledensities much lower than the national average.

79. A number of private sector players have entered the telecom sector and have been expanding at an aggressive pace. For example, Reliance Infocomm has built a nationwide optic fibre network of 60,000 kms using digital state of the art technologies; capable of carrying terabits of data per second across the country. Reliance acquired control in January 2004 over FLAG Telecom, a leading provider of international wholesale network transport and communications services. Bharati, another major telecom player has not only set up a national level fibre optic network but has also participated in setting up an under sea cable link i2i between Chennai and Singapore in partnership with Singtel. This undersea cable has a capacity of carrying 8.4 terabits per second. Another private sector player Tata Teleservices has gained control over VSNL, which was previously India's sole monopoly international telecom service provider. VSNL has international gateways in Cochin and Mumbai connecting with FLAG, SEA-ME-WE and SAFE. The entry of private sector players in the telecom arena has brought about a sea change in the telecommunication scenario in the country.

IT Industry

Hardware

80. The IT industry in India is largely dominated by software as compared to hardware. The hardware segment contributed to about $8.2 billion in revenues (2002-03) with exports

[28] World Economic Forum, *The Global Competitiveness Report 2003-2004,* New York, Oxford University Press, 2004 p.263.

contributing a meagre US$1.5 billion. The sale of personal computers was about 2 million during 2002-03, with the total number of PCs in the country estimated at 8 million. The penetration of computers in the commercial and domestic segments in the country was approximately in the ratio of 80:20 respectively.

Software

81. The Indian software and services industry has however been doing extremely well in recent years. It has emerged as one of the fastest-growing sectors in the Indian economy with a turnover of US$12.7 billion and exports of US$10 billion in the year 2002-03. The sector employs over 600,000 people.

ICT Associations

82. India has two major associations representing the ICT industry. These are the National Association of Software and Service Companies (NASSCOM) and the Manufacturers' Association for Information Technology (MAIT).

National Association of Software and Service Companies

83. NASSCOM is the apex organisation representing the software industry in India. It was launched in 1988 and currently has more than 860 members. NASSCOM has been active on a number of fronts within the software sector. Through its Information dissemination, awareness generation and brand building activities, NASSCOM has been helping Indian software companies. It has been active in lobbying for the software and services companies with the Indian and overseas governments. With a view to provide focused attention to some of the key issues relating to the software market, NASSCOM has created special groups and forums which include ITES, SMEs, products, MNCs, and an international policy group. NASSCOM is a member of the Asian Oceanic Computing Industry Organisation (ASOCIO) and has signed MoUs with a number of international associations.

Manufacturers' Association for Information Technology

84. MAIT was set up in 1982 for the purpose of scientific, educational and IT industry promotion. It has emerged as an influential organisation representing the hardware, training and service sectors of the Indian IT industry. Its overall membership is around 160. MAIT has been active in lobbying with the government on issues relating to the hardware sector and has been bringing out publications of interest to the industry.

Nepal

Policy

85. Nepal acquired an IBM 1401 computer system for processing its census data in 1971. An autonomous Electronic Data Processing Centre (EDPC) was set up in 1974, which was renamed as the National Computer Centre (NCC) in 1978. The Ministry of Science and Technology, which was created in 1996, took up the role of IT promoter, facilitator and regulator for the IT sector. Nepal has recently formulated a National Policy on Information Technology (November 2000) with a vision to establish Nepal as a global IT player within five years. The IT Policy of Nepal has been formulated to achieve the following objectives:

(i) To make Information Technology accessible to the general public and increase employment through this means;
(ii) To build a knowledge-based society; and
(iii) To establish knowledge-based industries.

86. The IT Policy has the following elements:

(i) To declare information technology sector a priority sector;
(ii) To adopt single window system for the development of information technology;
(iii) To prioritise research and development in the field of information technology;
(iv) To create an atmosphere conducive to attracting investment in the private sector keeping in view the private sector's role in the development of information technology;
(v) To provide Internet facilities gradually to all Village Development Committees of the country;
(vi) To assist educational institutions and encourage domestic and foreign training to fulfill the requirement of appropriate manpower at various levels pertaining to information technology;
(vii) To computerize the system in all government offices and build their websites for the flow of information;
(viii) To encourage the use of computers in private sectors;
(ix) To develop physical and virtual information technology parks at various places with private sector participation;
(x) To use information technology to promote e-commerce, e-education, e-health, among others, and to transfer technology to rural areas;
(xi) To establish a National Information Technology Centre;
(xii) To establish a fund at the national level by mobilizing resources from His Majesty's Government, donor agencies and the private sector so as to promote research and development in information technology and other related activities;
(xiii) To establish a venture capital fund with joint participation of public and private sectors;
(xiv) To include computer education in the curriculum starting from the school level and broaden its scope;
(xv) To establish Nepal in the global market through the use of information technology;
(xvi) To enact necessary laws for providing legal sanction to the use of information technology; and
(xvii) To use information technology gradually in all government activities.

Telecommunications

87. Telecommunications links are poorly developed in Nepal. While generally good in the capital city of Kathmandu where the quality of international fax and telephone services is high, the quality of facilities outside major population centres is not as good. Nepal has an installed capacity of 417,919 lines. The number of fixed line telephone subscribers in January 2004 in the country was 386,267. The country had 59,882 mobile phones and 30000 internet and email subscribers. There were 22 ISPs operating in Nepal.

88. The teledensity in Nepal is 16 per 1000 persons. However, there are wide variations in the density between rural and urban areas. The teledensity in rural areas was only 4. Nepal uses Intelsat for its international telecommunications traffic. Nepal is connected to India via optical fibre having 450 circuits and with Bangladesh via microwave having 12 circuits. Nepal has a total of 764 satellite circuits connected with a total bandwidth of 23,552 kbps. The Nepal Telecommunications Corporation is currently the sole fixed line service provider in Nepal. A new

Telecommunications Act, 2053 (1997) has been enacted and a regulatory body, the Nepal Telecommunications Authority has been constituted.

89. An East-West Highway Optical Fibre Project has been taken up under grant assistance from the Government of India. The project will establish an optical fibre backbone link for a total length of 898 km extending from Bhadrapur in the Eastern Development Region to Nepalgunj in the Midwestern Development Region. TCIL has been entrusted with the execution of the project. The project is scheduled for completion by August 2004. Kathmandu is being linked to Hetauda through optical fibre ground wire, which is being leased from the Nepal Electricity Authority. The completion of the East-West Highway Project will provide Nepal with high-speed digital links.

IT Industry

Hardware

90. Nepal has had moderate success in terms of development of its IT industry. The country imports computer hardware through Hong Kong and Singapore. The import of computer hardware is around US$20 million. It is unofficially estimated that there are about 250,000 PCs in Nepal (2004)[29].

Software

91. There are no authentic figures for software exports from Nepal. Unofficial data suggests that the exports amount to about NRs 150 million per annum. The IT Policy of Nepal plans to increase exports related to IT to 10 billion Nepalese rupees within the next five years.[30]

ICT Associations

92. Nepal currently has one major association, the Computer Association of Nepal (CAN) representing the ICT industry.

Computer Association of Nepal

93. The Computer Association of Nepal was established in December 1992 as an autonomous, non-political, non-partisan, and non-profitable, service-oriented organisation. The association has been formed with the involvement of professionals, specialists, manufacturers, institutions and organisations related to the ICT industry. It aims at promoting the use of ICT and provides a platform for both professionals and companies engaged in ICT.

[29] S.K.Pudasaini, Chairman, Nepal Telecommunication Authority, presentation made at the First meeting of the ICT Working Group for the SASEC countries at Delhi, March 15-16, 2004.

[30] Ministry of Science and Technology, *Information Technology Policy 2057 (2000)*, His Majesty's Government of Nepal, para 4.15.

II. ISSUES AND RECOMMENDATIONS

4. e-Government

Increasing focus on e-Government

94. Many countries are using Information Technology for enhancing the efficiency and accessibility of their public services. Countries like Singapore have launched pioneering initiatives in the area of e-Government by focusing on providing 'one-stop non-stop' services to citizens, engaging citizens in policy making through a consultation portal and transcending organizational boundaries to achieve a networked government.

95. Most of the Governments in the SASEC region are committed to developing and implementing e-Government applications for the benefit of their citizens. For example, the IT policies of each of the countries in the SASEC region very clearly state the importance attached to e-Government. According to the National Policy on ICT of Bangladesh, "The Government shall use ICT system within the public administration to improve efficiency, reduce wastage of resources, enhance planning and raise the quality of services."[31] The ICT Master Plan for Bhutan mentions the use of IT as an integral tool to enhance good governance.[32] India's Tenth Plan document mentions the application of IT to bring about Simple, Moral, Accountable, Responsive and Transparent (SMART) governance.[33] Similarly e-Governance is one of the key elements of the IT Policy of Nepal.[34]

e-Government Architecture

96. There are certain common lessons that can be gleaned from different approaches to e-Government in different countries. Successful e-Government involves a multifaceted approach. One of the key elements for success in implementing e-Government is e-Government architecture. An e-Government blueprint is an extremely useful tool for effecting integration, saving cost, guiding acquisition/adoption of technology, enabling reuse and helping to develop e-Government applications faster.

Spatial data standards

97. It is now well recognized that it is important to have a unified IT architecture to guide the overall development of e-Government applications. The importance of such an architecture can be seen for example, from the approach adopted by the Federal Geographic Data Committee (FGDC) in the US. In 1994, President Bill Clinton signed an executive order 12904 – 'Coordinating Geographic Data Acquisition and Access: The National Spatial Data Infrastructure' (NSDI). NSDI is defined as the technologies, policies and people necessary to promote the sharing of geo-spatial data at all levels of the government, the private and non-profit sectors and the academic community. The FGDC has also coordinated the development

[31] Ministry of Science and Information and Communication Technology, National *Policy on Information and Communication Technology (ICT),* Government of the Peoples' Republic of Bangladesh, October 2002, p. 13.
[32] Division of Information Technology (DIT), Bhutan *ICT Master Plan*, Ministry of Communications, 2002, p. 7.
[33] *Tenth Five-Year Plan (2002 – 2007),* Planning Commission, Government of India, p. 805.
[34] Ministry of Science and Technology, *Information Technology Policy 2057 (2000)*. His Majesty's Government of Nepal, p. 2.

of the Geospatial Data Clearinghouse."[35] The data referenced in the clearinghouse can be leveraged across agency and government boundaries.[36]

Metadata Standards

98. One of the key objectives of e-Government is to achieve joined up government. Providing linked services to citizens requires for example capturing and managing metadata. Several e-Government initiatives now include either a project or a competency centre to address integration and data modeling. Examples include the Australian Government Locator Service,[37] the UK Government Metadata Framework,[38] the Irish Reach project,[39] and the framework adopted by the French Agency for Information and Communication Technology in Administration.[40]

Interoperability Frameworks

99. Interoperability frameworks are based on e-Government architecture and incorporate data and metadata standards to permit consistent development of e-Government applications.

100. Many governments are now adopting inter-operability frameworks for guiding their e-Government applications. Some good examples of such frameworks are the ones adopted by the US, the UK and Singapore.

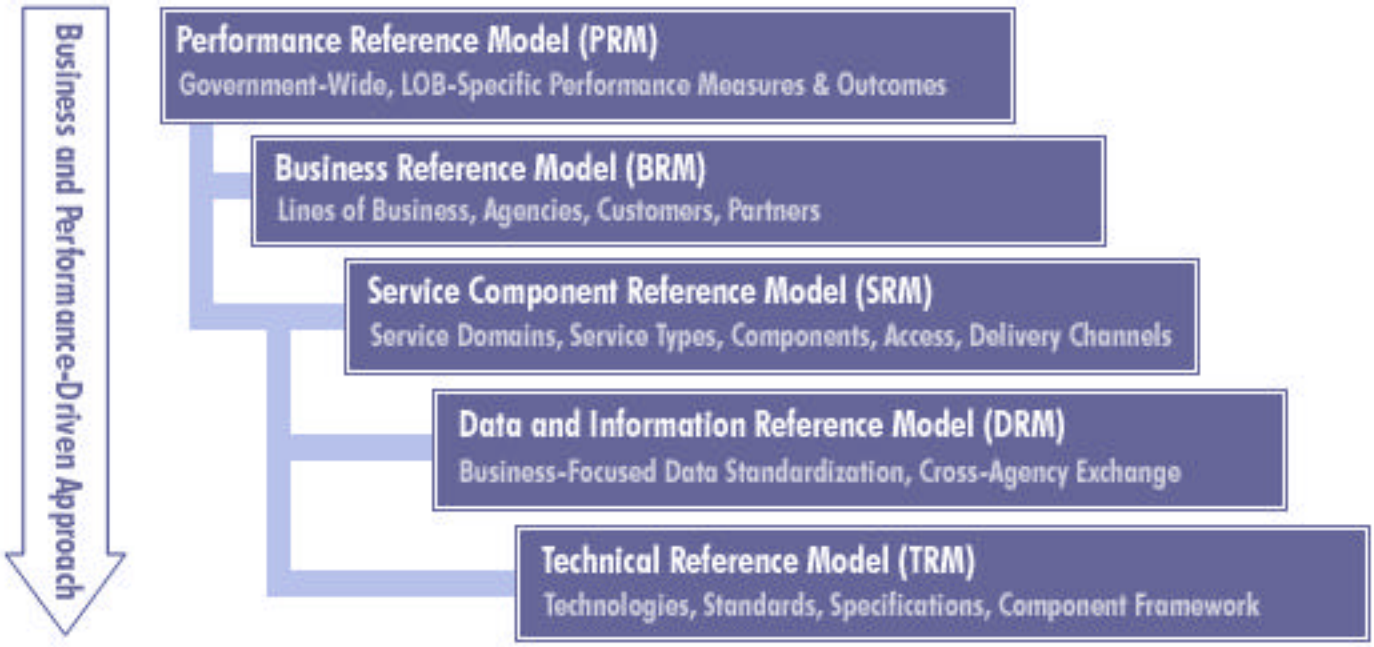
Federal Enterprise Architecture - USA

101. The USA has come out with an updated Federal Enterprise Architecture (FEA) in June 2003. As the introduction to the FEA Business Reference Model Version 2.0 explains, "The FEA is a tool that enables the Federal Government to identify opportunities to leverage technology and alleviate redundancy, or to highlight where agency overlap limits the value of IT investments. The FEA will facilitate horizontal (cross-Federal) and vertical (Federal, State, and Local Governments) integration of IT resources, and establish the "line of sight" contribution of IT to mission and program performance. The outcome will be a more citizen-centered, customer-focused government that maximizes technology investments to better achieve mission outcomes".[41]

[35] FGDC, USGS, Clearinghouse, < http://www.fgdc.gov/clearinghouse/clearinghouse.html>.
[36] G Kreizman , *Achieving the National Spatial Data Infrastructure's Vision*, Research Note 26 June 2002, Gartner.
[37] National office for the Information Economy, Commonwealth of Australia, 2002, <http://www.govonline.gov.au/projects/>.
[38] Office of the eEnvoy, Government of UK, <www.govtalk.gov.uk>.
[39] Reach. Government of Ireland, <www.reach.ie>.
[40] Le Centre De Resources et D'Echanges, <www.atica.pm.gour.fr/xml/repertoire.shtml>.
[41] Federal Enterprise Architecture Program Management Office, *The Business Reference Model Version 2.0: A Foundation for Government-wide improvement*, June 2003, p.ii.
<http://www.feapmo.gov/resources/fea_brm_release_document_rev_2.pdf>

102. The Federal Enterprise Architecture consists of a five layered structure that can be seen below:

Figure 2: Federal Enterprise Architecture



Source: Federal Enterprise Architecture, Program Management Office, http://www.feapmo.gov/fea.asp

eGIF – UK

103. The UK has introduced a Government Interoperability Framework (eGIF)[42] for spelling out the government's technical policies and specifications for achieving interoperability and ICT systems coherence across the public sector. The e-GIF defines the essential pre-requisites for joined-up and web enabled government. The framework adopts XML and XSL as the core standards for data integration and management of presentational data. The framework also sets out policies for establishing and implementing metadata across the public sector. Adherence to e-GIF specifications and policies is mandatory.

Service – wide Technical Architecture - Singapore

104. The Government of Singapore has introduced a "Service – Wide Technical Architecture" (SWTA) which is a technical framework comprising standards, policies and guidelines to help agencies in the design, acquisition and management of ICT systems. The aim is to facilitate interoperability and information sharing across agencies. Compliance by government systems with the SWTA domain architecture is projected for mid 2007.[43]

Pan – European Interoperability Framework

105. As part of eEurope 2005, there was a clear mandate to develop a Pan-European interoperability framework by end of 2003. The IDA has accordingly come out in January 2004 with a European Interoperability Framework (EIF) for Pan-European e-Government services.

[42] Office of the e-Envoy, *e-Government Interoperability Framework, version 5.0*, 25 April 2003.
[43] *Singapore e-Government: Delighting customers, connecting citizens, p.* 4.

The EIF aims at supplementing rather than replacing national interoperability guidance. Member countries will be required "to implement a pan-European dimension in their own interoperability frameworks and administrative infrastructures, to enable interoperable pan-European e-Government services"[44].

106. Three aspects of interoperability have been considered as part of the framework namely, organizational, semantic and technical. Organizational interoperability deals with defining business goals, modeling business processes and bringing about the collaboration of administrations that wish to exchange information. Semantic interoperability is concerned with ensuring that the precise meaning of exchanged information is understandable across systems. This will enable systems to combine received information with other information resources and process it in a meaningful manner. Technical interoperability deals with technical aspects like open interfaces, interconnection services, data integration and middleware, data presentation and exchange, accessibility and security services.

107. Key principles of a general nature for pan-European e-Government services have been proposed. These include accessibility through multiple channels; multilingualism; security (identification, authentication, non-repudiation, confidentiality); privacy; subsidiarity or non-interference with internal workings of administrations and EU institutions; open standards, open source and use of multilateral solutions.

108. Twelve key interoperability areas for G2C (Government to citizens) services and eight for G2B (Government to businesses) services have been identified. The former includes for example services like income tax declarations, passports, driving licenses, vehicle registrations, birth and marriage certificates and health related services. The latter includes corporation tax and VAT declarations, company registrations, customs declarations, public procurement etc.

109. The EIF is an important contribution to regional cooperation in the sphere of e-Government services and offers useful lessons for the SASEC sub-region.

110. Even in the Asian region one of the objectives of e-ASEAN is to develop a common interoperability framework that would help harmonize the data structures and e-Government applications in the ASEAN region.

Recommendation: Common Interoperability Framework

111. Apart from the obvious advantages of a unified architecture for the systematic and cost-effective development of e-Government applications, a common architecture/framework at the sub-regional/regional level can be extremely useful for collaboration among companies/ governments. A common interoperability framework can make e-Government applications more portable and replicable across borders.

112. Looking at the SASEC countries, we find that in each of the four countries there is an absence of any overarching IT architecture guiding the development of e-Government applications. It would therefore be very useful if a sub-regional interoperability framework is formulated and adopted. Such a framework will be extremely useful for exchange of data across borders. For example, in the case of medical and health databases, a common architecture in the sub-region would help electronic transfer of medical records from one country to another, when patients seek specialized attention across the border. Similarly in the case of

[44] European Interoperability Framework for pan-European eGovernment Services, IDA working document Version 4.2, January 2004, p.4. <http://europa.eu.int/ISPO/ida/export/files/en/1674.pdf>.

environmental issues or disaster management it would be extremely important for data structures in different countries of the SASEC region to be compatible with each other.

113. The adoption of a common interoperability framework would make it easier for companies engaged in development of e-Government applications to use their expertise for developing similar applications in other countries of the sub-region. Consequently, it will become much easier for private sector companies to collaborate with each other on e-Government projects.

114. We suggest that the National Institute of Smart Government (NISG) at Hyderabad should be designated as the anchor institution for developing a sub-regional interoperability framework. The NISG has been set up by the Ministry of Information Technology in partnership with NASSCOM and therefore has a public private character that is ideally suited for undertaking this task. Each of the countries in the SASEC sub-region have established organizations for dealing with e-Government. For example India has the Ministry of Information Technology and the National Informatics Centre at the Central Government level with a similar set-up in the states. In the case of Bangladesh, the Bangladesh Computer Council (BCC) is entrusted with this important role. In Bhutan it is the Division of Information Technology (DIT) which looks after matters pertaining to e-Government. Nepal has established the Nepal Information Technology Centre (NITC) for the same purpose. The NISG could closely work with these organizations and ICT associations for developing a sub-regional interoperability framework. As the private sector is involved in the development of key e-Government applications, its participation in developing the framework would greatly benefit e-Government initiatives and also private sector collaboration in the sub-region.

Recommendation: e-Government Observatory

115. A number of private sector companies interviewed, expressed the need for sharing of best practices and experiences in the development of e-Government applications. To meet a similar need, an e-Government Observatory has been set up by the European Community. The observatory has been established as a strategic initiative of the IDA (Interchange of Data between Administrations) Programme. The e-Government Observatory provides information on e-Governments strategies, initiatives, and projects in Europe and beyond. It is designed to help senior decision makers in the public and private sectors to closely follow ongoing e-Government developments. The observatory provides the following information services:

(i) e-Government News
(ii) e-Government Factsheets
(iii) Publications, including articles and case studies as well as the quarterly Newsletter
(iv) e-Government Resources, which is a repository of essential resources including policy papers, official reports and independent surveys
(v) e-Government Events

116. This could be a useful model for the SASEC sub-region for sharing of best practices and experiences pertaining to e-Government.

117. The NISG could be the nodal agency for setting up an observatory for e-Government applications developed by the private sector in the sub-region. The organisations representing the ICT industry in each of the four countries could be actively associated with this endeavor.

118. The observatory would provide a web-based platform for different companies in the sub-region to showcase e-Government applications developed by them. In order to ensure quality, it

would be important for a moderator to decide as to which applications could be positioned on the website. There would be distinct incentive for companies to put up their applications on the site as this could translate into partnerships and business opportunities for them.

119. The website should also showcase best practices in e-Government from around the world. Moreover the observatory could identify successful examples of public-private partnerships in the e-Government space for dissemination in the sub-region. This would improve the awareness of companies as to the possibilities of participating in development of e-Government applications in their respective countries. The observatory could therefore serve the dual role of an information exchange between private sector companies as also promote best practices and enhance the quality of e-Government applications being developed in the sub-region.

Recommendation: Training of Civil Servants

120. During our interactions with the private sector and also with Government functionaries, it was felt that there was a need for sensitizing government functionaries and decision makers about e-Government as well as make them aware about different models of Public Private Partnership.

121. A leading newspaper, The Independent of Bangladesh last year carried a news item titled "Mindset of officialdom bottleneck to e-governance". It stated "It is the mindset of government officials that poses the biggest bottleneck to e-Government. They are resistant to any kind of change in their familiar working environment, thinking computers are meant for the low-level typists and they often fear that computerization of different government activities might make some people redundant." [45]

122. The private sector is often excluded from participating in e-Government initiatives for want of proper understanding and knowledge on the part of senior government functionaries. It would therefore be extremely useful if a training programme for key government functionaries is devised to sensitize them about public-private partnerships in the e-Government space, and also about best practices and methodologies to be adopted for e-Government.

123. The resistance of government functionaries to partner with the private sector is not uncommon. The European Commission responding to this problem even funded a report together with the city council of Edinburgh to facilitate public private partnerships in the delivery of services to citizens.[46]

124. UK has come out with a policy framework for a mixed economy in the supply of e-Government services in May this year.[47] The office of the e-Envoy has drafted a policy describing how the private sector can help governments deliver e-Services. The document suggests twelve policy principles, and outlines roles for intermediaries that range from value added service providers to service integrators. This is the first time that a central government has defined a policy that suggests ways in which non-government enterprises from the private and non-profit sectors might increase the adoption of e-services and deliver value.

125. Successful e-Government transformation requires executive sponsorship at the highest level of government. E-Government cannot be fully successful unless the government makes it

[45] The Independent, 2 July 2003, Dhaka 16.
[46] *Debut : One connection for all your local needs, The City of Edinburgh Council, Final Report.*
[47] Office of the e-Envoy, *Policy framework for a mixed economy in the supply of e-Government services:, a consultation document*, UK, May 2003.

a political priority. Legislators too need to broaden their understanding of how technology can be used to serve the citizen as well as further the agenda of e-Government. A cadre of ICT savvy executives in the government is also necessary to provide adequate leadership to plan and execute digital government initiatives. The Government of Andhra Pradesh for example has instituted a system for training of Chief Information Officers who are senior government functionaries drawn from different departments to ensure this.

126. The NISG could be asked to develop a course curriculum for training of government functionaries in the sub-region. Linkages for this purpose could be established with top international institutions like The John F Kennedy School of Government in Harvard University and the Civil Service College in Singapore.

127. The John F Kennedy School of Government has commenced an E-Government Executive Education (3E)[48] project as a collaborative effort among public and private sector organizations to inform and strengthen the leadership and cross-boundary relationships needed for 21st century government and governance. The Institute of Public Administration and Management (IPAM) under the Civil Service College in Singapore even offers a Masters of Science in Knowledge Management in collaboration with Nanyang Technological University[49]. Further, corporate initiatives like the IBM's Institute for Electronic Government[50] established in Washington could also be involved in the training programmes. This would be important in order to present the private sector perspective while imparting training to civil servants.

128. Perhaps, it will also be useful for the NISG to structure a degree programme on the lines of an MSc in e-Government, that could be offered online and which would help enhance the skills and qualifications of government functionaries in the area of e-Government. Such an approach would be extremely beneficial for implementation of e-Government applications in the sub-region.

[48] <http://www.ksg.harvard.edu/exec_ed/3e/>
[49] <http://www.cscollege.gov.sg/products_services.html>
[50] <http://www-1.ibm.com/industries/government/ieg/>

5. Paperless Trading

129. The complex documentation required in cross-border trade can be recognized as a costly and time-consuming exercise. According to the United Nations Conference on Trade and Development, the average international transaction involves 27 to 30 different parties, 40 documents, 200 data elements (30 of which are repeated at least 30 times) and the re-keying of 60 to 70 per cent of data at least once.[51]

Trade documents in the sub-region

130. According to a study conducted for the Economic and Social Commission for Asia and the Pacific (ESCAP) such documents in the case of India and Nepal included Customs Bills of Entry, Customs Bills of Export or Shipping Bills, Customs Import and Export Declarations, Permits, Import and Export Licenses, Textiles Visas and Certificates. The main certificates were Certificates of Origin, Generalized System of Preferences (GSP) "Form As", Health Certificates, Phytosanitary Certificates, Registration Certificates, Inspection Certificates and Valuation Certificates for handicrafts. In addition the private sector was required to use trade documents like Contracts, Letters of Credit, Commercial Invoices, Pro Forma Invoices, Packing Lists, Bills of Lading and Air Way bills.[52]

131. In order to import or export one consignment in India and Nepal the types of documents could vary from 29 to 83 documents. This can be seen from Table 5 below:[53]

Table 5: Documents/Procedures for import/export for India and Nepal

	India	Nepal
Type of documents	29	83
Number of copies	118	102
Number of signatures	256	113
Manpower required	7	22
Cost of procedures	10% of consignment value	

Benefits of Paperless trading

132. Paperless trading can reduce costs while making dramatic improvements in speed and efficiency of obtaining approvals for cross border trade. Paperless trading can accelerate the participation of developing countries and small and medium sized enterprises in cross border trade, by reducing traditional impediments in terms of cost and complexity of compliance with export/import requirements. New markets could be opened up for smaller producers of perishable items as shipments are delivered faster and trade administrative costs come down.

[51] Cited in *'Paperless Trading: Benefits to APEC'*, Australia Ministry of Foreign Affairs and Trade &Chinese Ministry of Foreign Trade and Economic Cooperation, 2001, p. 6

[52] *Alignment of Trade Documents and Procedures of India, Nepal and Pakistan,* Paper prepared by Singapore Trade Development Board Consulting for ESCAP August 2000, p.5.

[53] Ibid, p. 5

Fruit and vegetable growers could trade with supermarket chains because of the capacity to receive and fulfil orders electronically.

133. Paperless trading can directly impact costs by lowering paper handling charges, with fewer errors, speed-up receipt of payments, reduce charges for trade finance and insurance and lower inventories. The cost advantages are higher for smaller shipments as compared to bulk shipments. This is due to the high fixed cost of completing paperwork requirements manually.

134. With increasing globalisation manufacturers rely upon suppliers located in different jurisdictions to deliver components to the production line on time. An emerging area of competitiveness for contract manufacturers located in developing economies is to participate in these 'just in time' manufacturing supply chains. This makes it more important for governments to provide trade related services online. Companies like Dell could track their suppliers in developing countries like India and Bangladesh as bottlenecks in customs clearance are eliminated through the application of paperless trade technologies. Firms like Li and Fung (Hong Kong) integrate spinners, dyers, knitters, weavers, finishers, sewers and printers, as well as wholesalers across the East Asian region using computerized system linking suppliers.

Singapore TradeNet

135. A good example of how the introduction of Paperless trading can bring about dramatic improvements in convenience for traders is Singapore's TradeNet. Before the introduction of TradeNet in Singapore in 1989, traders were required to submit up to 21 different forms to 23 different agencies, a process that could take 15 to 20 days to complete. After the introduction of TradeNet, traders now enjoy the efficiency of having all the necessary approvals granted by the Singaporean Government in under 10 minutes. According to estimates made by IBM Corporation, TradeNet saves Singapore traders around US$1 billion per year in internal productivity savings.

136. Singapore is now engaged in developing a Singapore Info Port – a national collaborative platform that will allow seamless integration of the existing TradeNet system with trade financing and trade services systems. Through such a platform, businesses in Singapore will be able to achieve end-to-end paperless trading, from invoicing to delivery and payment.[54]

Hong Kong's Tradelink

137. Hong Kong has created a new agency Tradelink[55] Electronic Commerce Ltd., for providing online trade administration services. Tradelink was created as a joint venture between the Hong Kong Special Administrative Region and private sector shareholders. Currently the government holds about 42 percent share in Tradelink. By mid 2002, Tradelink had a customer base of over 53,000 companies and handled more than 70,000 transactions per day.

138. Both the Singapore and Hong Kong systems were previously based on a older Electronic Data Interchange (EDI) technology. Recently, they have been expanded to include Internet-based protocols allowing the smallest firms to access services through a standard PC with Internet access.

[54] *Singapore 2012. The Living Digital Hub…. Where iT works!,* Economic Review Committee, ICT working Group, p. 10 – available at <http://www.mti.gov.sg/public/PDF/CMT/ERC_SVS_ICT_MainReport.pdf?gid=128&cid=1287>.
[55] <www.tradelink.com.hk**>.**

Taiwan's Trade Van

139. Paperless trading services in Taiwan are provided through TradeVan which offers the local trading community an almost seamless connection with agencies involved in providing approvals for cross border trade. Taiwan has also sponsored projects such as TaiWeb aimed at linking second tier suppliers with computer assembly firms such as Hewlett Packard and IBM.

China's Golden Gate Project

140. In February 1996, the State Council in China officially established the Golden Gate Project for using IT and networking technology for streamlining cross-border procedures. The objective of the project was to establish automated systems to manage electronic customs clearances, trade data processing and other functions in cross border trade. In May 2001, the Chinese Ministry of Foreign Trade and Economic Cooperation established a Department of International Electronic Commerce Administration with the aim of promoting paperless trading and the formulation of relevant domestic legislation and standards.

Mexico

141. While a number of developed economies are making progress in implementing paperless trading systems, even developing economies such as Mexico are rapidly moving towards providing paperless services to the trade community. Mexico hopes to provide such services to the trading community by the year 2004.

India

142. India joined the EDI movement in early 1992 when it obtained the observer status in the Asia Pacific Council for Facilitation of Procedures and Practices for Administration, Commerce and Transport (AFACT) known as Asia EDIFACT Board. The Department of Commerce has taken various initiatives to develop electronic commerce/EDI. A EC/EDI Council of India has been established consisting of all key government departments and representatives of trade and industry. It is responsible for laying down the policy framework and direction for

(i) promotion and propagation of EDI and electronic commerce,
(ii) creating awareness and education among potential EC/EDI functionaries and users,
(iii) streamlining procedures and practices,
(iv) attending to legal issues,
(v) human resources development and
(vi) any other issue connected with EDI and electronic commerce.

143. The Government has also set up Message Development Groups. These groups have been established for ports, airports, financial entities, customs and the private sector. In order to facilitate a coordinated approach to EDI, the following departments/organizations are participating in the EDI implementation project.

(i) Customs
(ii) Directorate General of Foreign Trade (DGFT)
(iii) Directorate General of Commercial Intelligence and Statistics (DGCI&S).
(iv) Apparel Export Promotion Council/Cotton & Textile Export Promotion Council etc.
(v) Port Trusts
(vi) Airports Authority of India (AAI)
(vii) Container Corporation of India (CONCOR)
(viii) Reserve Bank of India (RBI)
(ix) Scheduled Banks

(x) Airlines
(xi) Indian Railways
(xii) CHA/Freight Forwarders
(xiii) Export Promotion Organization

144. Information and data is exchanged electronically between customs and agencies like the Directorate General of Foreign Trade (DGFT) and the Directorate General of Commercial Intelligence and Statistics (DGCI &S). At customs locations in Delhi, airlines are filing the export general manifest (EGM) and the Apparel Export Promotion Council (AEPC) is transmitting quota details on a trial basis through the EC/ EDI Gateway. The message exchange between customs, banks and custodians (like ports and airports) is taking place through message exchange servers between the respective LANs. A facility is being provided for importers, exporters and Custom House Agents to use an e–Commerce Gateway for filing their documents. Customs stations at Nhava Sheva, Chennai and Mumbai have automated stations and such facilities are being extended to more ports in a phased manner.

145. The DGFT entered into a tie-up with SafeScrypt Ltd, in December 2002 for becoming PKI enabled. This would enable Exim notifications, public notices and licenses issued by the DGFT to be electronically transmitted with digital signatures. Together with an Electronic Fund Transfer facility, traders would be able to transmit their applications along with the application fee without physically visiting either a bank or the office of the DGFT. Despite these developments, India's paperless trading system is not as comprehensive as Singapore's Tradenet since the connectivity between different government departments is weak.

Other SASEC countries

146. Bangladesh and Nepal are participating in the ASYCUDA (Automatic System for Customs Data) project which is a programme for modernizing and computerizing customs procedure developed by UNCTAD. A regional support and training centre for the programme is located in Kuala Lumpur. According to the data collected by the ESCAP secretariat the status of EDI and electronic commerce applications in Bhutan and Nepal in 2001 was as shown below.

Table 6: Status of EDI and e-Commerce applications in Bhutan and Nepal (2001)

Sl. No.	Status Item	Bhutan	Nepal
1	Port procedure computerized	--	--
2	Traders can input data electronically (Port EDI)	--	--
3	Customs procedure computerized	No	No
4	Traders can input data electronically (Customers EDI)	No	No
5	All parties electronically linked	No	No
6	Electronic trade in transport services	No	No

Source: Review of developments in Transport and Communications in the ESCAP region 1996 – 2001, United Nations, New York, 2001, p.126.

147. The Agreement on a South Asian Free Trade Area (SAFTA) does mention under Article 8 that the contracting states would consider simplification and harmonization of customs

clearance procedure, harmonization of national customs classification based on HS coding system and simplification and harmonization of import licensing and registration procedures.[56]

148. However, much more would need to be done to migrate to a Paperless-trading regime in the region. At present most of the business is manually transacted across the borders of SASEC countries. Declarations are manually filed and recorded, assessments and payments are separately and manually undertaken and clearances are manually given as well.[57] Unless the SASEC countries go about adopting Paperless-trading systems they are likely to lose competitiveness in the emerging global economy. "There is a risk of a divide emerging in the region in which developed economies that embrace paperless trading begin to trade with each other more intensively as electronic transactions become seamless. This would negatively affect the interests of developing economies that may have difficulties introducing paperless trading systems. This would also impose higher costs to businesses in developing economies and make them less able to participate in the global economy."[58]

Legal Issues

149. In order to engage in paperless trading and cross-border e-commerce transactions there are key legal issues that need to be addressed. India has enacted the Information Technology (IT) Act 2000. The Act seeks to create the Public Key Infrastructure for electronic authentication through digital signatures and also addresses frauds in cyber space. The Controller of Certifying Authorities (CCA) set up under the IT Act has established the National Root Infrastructure, which would be used for digitally signing the certificates of all the certifying authorities. From February 2002, four Certifying Authority licenses have been issued to operate under the Root. These are Safescrypt Limited, National Informatics Centre (NIC), Institute for Development and Research in Banking Technology (IDRBT) and Tata Consultancy Services (TCS).

150. The National Policy on Information and Communication Technology (ICT) for Bangladesh mentions that an "ICT Act should be enacted immediately to protect against computer crimes such as computer fraud, hacking, piracy, damage to programs and data and introducing /spreading computer viruses".[59] It also mentions the need for formulation of new laws and or amendments to existing ones to ensure security of data. The policy proposes to put in place a legal framework to provide the guiding principles, rules and legislations for e-Commerce.[60]

151. It is understood that the National ICT Act for Bangladesh is pending with the Ministry of Law and is likely to be enacted in the near future.

152. In the case of Bhutan, a comprehensive Act covering digital signatures, data privacy, security, convergence and cyber crime has been drafted. The Information, Communications and Media Act will be submitted to the National Assembly in July 2004.

153. The IT Policy 2000 for Nepal mentions that the "Necessary legal infrastructure shall be created for the promotion of telemedicine, distance learning, teleprocessing and e-

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[56] SAARC, Agreement on South Asian Free Trade Area (SAFTA), Article 8. <http://www.saarc-sec.org/summit12/saftaagreement.htm>

[57] Florian A.Alburo, Promoting Trade in SASEC: A Report on Non-Tariff and Non-Trade Barriers, presented at the Second Meeting of the South Asia Business Forum, January 21, 2004, Dhaka, p.15.

[58] Australian Ministry of Foreign Affairs and Trade & Chinese Ministry of Foreign Trade and Economic Cooperation 'Paperless Trading: Benefits to APEC', 2001, p. 27.

[59] Ministry of Science and Information &Communication Technology*, National Policy on Information and Communication Technology (ICT),* Government of the Peoples' Republic of Bangladesh, October 2002, p. 14.

[60] Ibid p. 12.

Commerce."[61] Nepal has drafted an IT bill, which is reportedly pending for approval with the government.

Recommendation: Legal Infrastructure Working Group

154. With regard to ICT legislation in the SASEC countries, there is every need to harmonize national laws to facilitate trade and investment in the sub-region. A number of legal issues are involved in cross-border paperless trading. For example, if two parties in Bangladesh and in India each use digital signatures issued by their own local CAs to sign an electronic contract, it will be important that such certificates are mutually recognized in the two countries. Coordination is therefore necessary in creating a compatible legal and regulatory environment. The laws relevant in this context would relate to Electronic Transactions, Digital signatures, computer related crime, data protection, electronic funds transfer and universal access.

155. A good example of regional level coordination on legal issues relevant to e-Commerce is the e-ASEAN framework agreement of 24th November 2000 which states that member countries will need to:

(i) put in place national laws and policies relating to electronic commerce transactions based on international norms;
(ii) facilitate the establishment of mutual recognition of digital signature frameworks;
(iii) facilitate secure regional electronic transactions, payments and settlements, through mechanisms such as electronic payment gateways;
(iv) adopt measures to protect intellectual property rights arising from electronic commerce;
(v) take measures to promote personal data protections and consumer privacy; and
(vi) encourage the use of ADR mechanisms for on-line transactions.

156. It will be necessary for a Legal Infrastructure Working Group to be constituted duly represented by each of the SASEC countries to look into all the above issues as these will have direct implications on cross border electronic transactions.

Recommendation: Subregional e-Commerce Alliance

157. Some of the issues relating to Paperless trading could be effectively tackled at a sub-regional level by participating in regional alliances. A good example of this approach is the Pan Asian e-Commerce Alliance that was formed in July 2000 by CrimsonLogic (Singapore), Trade Van Information Services (Taiwan) and Trade link Electronic Commerce Ltd. (Hong Kong). Subsequently two other members namely China International Electronic Commerce Centre (CIECC) and Korea Trade Networks (KTNET) have joined the alliance. The alliance aims at promoting and providing secure, trusted, reliable and value added IT infrastructure and facilitates to enhance seamless cross border trade. The combined membership of the parties now covers 120,000 organizations representing almost all active trading enterprises in the Asian market.

158. The charter of the Pan Asian Alliance (PAA) includes:

(i) To enable secure and reliable transmission of trade and logistics documents. This includes the mutual recognition of digital certificates issued by members' Certificate Authorities for use in electronic documents exchanged among the parties;

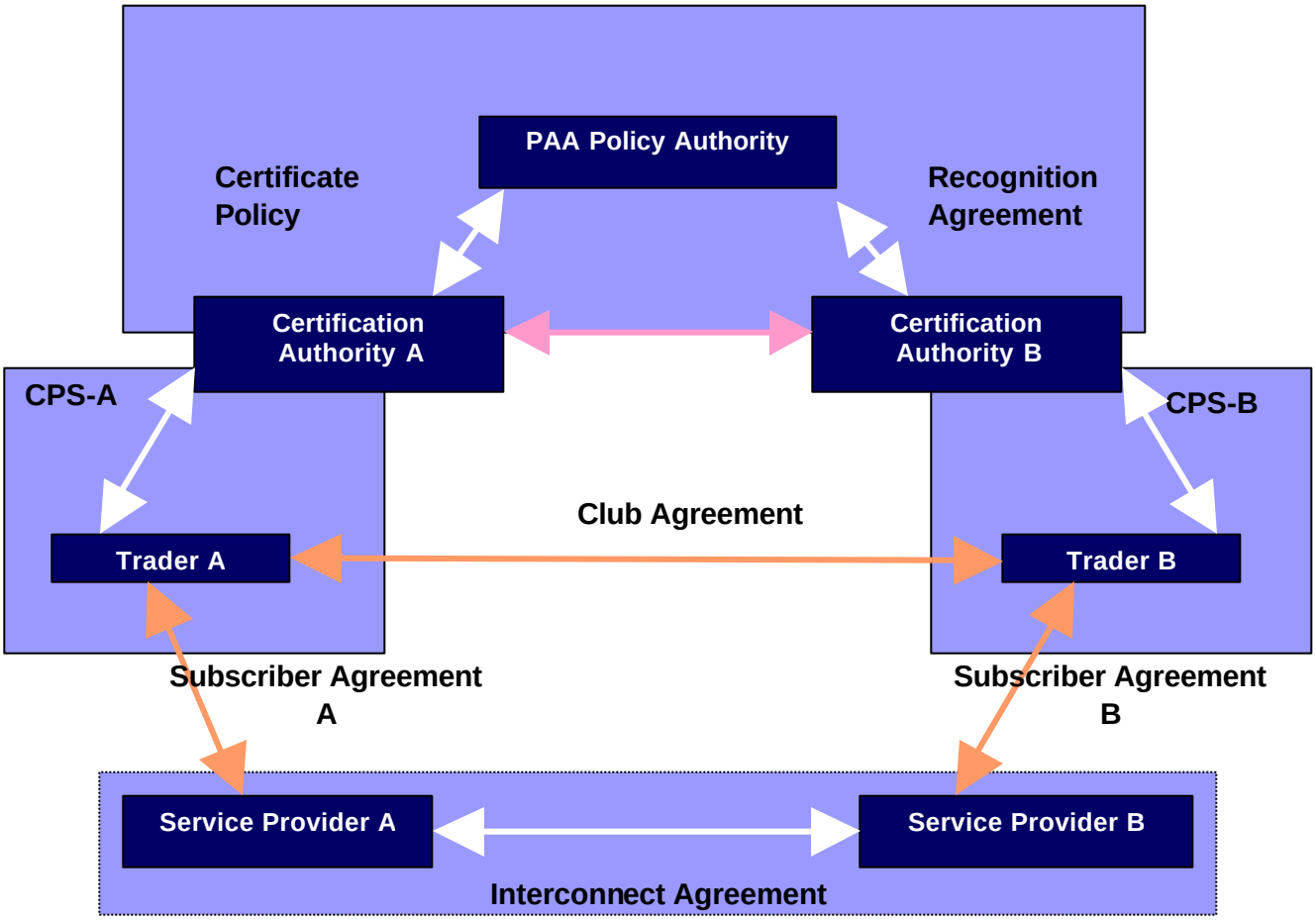
[61] Ministry of Science and Technology, *Information Technology Policy 2057 (2000),* His Majesty's Government of Nepal, para 6.5.2.

(ii) To allow inter-connection of network services to provide e-Commerce transaction application services for the business community; and
(iii) To create a Pan-Asian portal to enable global B2B connection and communication.

159. The Alliance supports mutual recognition of digital certificates issued by the participating certificate authorities. A PAA Certificate Authority has been set up by the members for regulating and ratifying different Certificate Authorities participating in the Alliance. The PAA Certificate Authority administers the common certificate policy that sets the minimum requirements to be met for participation as a PAA Recognized Certificate Authority. In addition to the common Certificate Policy four other agreements have been drawn up to establish the legal structure of cross–border transactions under the PAA framework. These are a recognition agreement, a subscriber agreement, a Club agreement and an interconnection agreement. This structure can be seen in Figure 3 below.

Figure 3

Legal Structure of PAA transaction



Source: Report on Legal Issues in Cross-Border e-Commerce Transactions, Asia PKI Forum, 302.

160. It is suggested that the SASEC countries should seriously examine participating in the Pan Asian eCommerce Alliance. Alternatively, a sub-regional alliance could be set up to facilitate a migration to Paperless trading. The private sector should be actively involved in this

process. The Paperless trading environment would only be possible with private sector cross-border collaboration. This is therefore well suited for a collaborative approach among ICT companies in the sub-region.

6. IT Enabled Services

161. Business Process Outsourcing (BPO) has emerged as one of the most important areas promising huge opportunities for developing countries. BPO can be defined as a Contractual Service to manage, deliver and operate one or more business processes or functions. With rapidly expanding telecom networks, IT intensive processes/ functions are becoming easier to outsource. IT enabled services refer to services delivered over telecom networks for a range of business areas and verticals.

162. India has become a leading location for the outsourcing of corporate business operations especially in terms of software development, IT enabled services and research and development. Off-shoring to India has the advantage of not only significant cost savings and productivity gains but, also improvements in quality. Of course the primary driver for business process off-shoring continues to be labour cost arbitrage. The differential in wages between locations in the US or UK and India is more than 70-80 percent for offshoreable processes. Even after taking into account-increased costs due to telecommunications and remote management, savings of 40 to 60% for off-shored processes are common.[62]

The offshoring debate

163. Recently companies that offset uncompetitive high taxes and labour costs in the West by outsourcing jobs to low-wage countries are coming under increasing political pressure. The Democratic contender for the US Presidency, John Kerry has even called CEOs of such companies as "Benedict Arnolds", referring to the US general who turned traitor in the American War of Independence! Kerry has vowed sweeping tax reforms that would eliminate tax breaks that encourage companies to move jobs overseas and use the savings to encourage companies to create jobs in the US. The German Chancellor Gerhard Schroeder recently dubbed plans by companies particularly in the high tech sector to relocate jobs to Eastern Europe as "unpatriotic".

164. The US Congress in January 2004 passed a law requiring that government functions shifted to contractors had to go to contractors in the United States. In Indiana and New Jersey this year, two state government contracts to move call center work offshore were cancelled under political pressure. 28 US states have passed anti-offshoring Bills. These bills passed at the state level have not had much impact on Indian BPO business, because government contracts both federal and state, account for less than one percent of the total outsourcing done out of the country. Despite these controversies, the European Union has said that it backs western outsourcing of jobs to countries like India, Mexico and China where labor costs are lower.

165. Notwithstanding the emotional underpinnings of the offshoring debate, a report by the McKinsey Global Institute establishes how the US captures a net additional value for every dollar of spend outsourced. This accrues to the US economy through reduced costs, increased revenues, repatriated earnings and the redeployment of additional labor.

166. For every dollar of spend offshored, 58 cents are captured as net cost reduction to businesses, for identical or better quality of service. Offshore service providers buy an additional

[62] *NASSCOM – McKinsey Report 2002*, p. 232.

5 cents worth of goods and services from the US. 4 cents come back to the US as earnings repatriated by service providers incorporated in the US. The US economy also captures an additional 45 to 47 cents from the new jobs that are generated. The McKinsey report goes on to say that "Far from being bad for the United States, offshoring creates net additional value for the US economy that did not exist before, a full 12-14 cents on every dollar offshored. Indeed, of the full US$1.45 to US$1.47 of the value created globally from offshoring US$1.00 of US labor cost, the US captures US$1.12 to US$1.14, while the receiving country captures, on average, just 33 cents."[63]

167. Another study by Global Insight prepared for the Information Technology Association of America found that the global sourcing of computer software and services was expected to increase from approximately US$10 billion in 2003 to US$31 billion in 2008. The study asserted that global sourcing contributed significantly to the real Gross Domestic Product in the United States, adding US$33.6 billion in 2003. This contribution was expected to increase to US$124.2 billion by 2008. The net increase in total employment from global IT software and service outsourcing in 2003 was 90,000 new jobs – expected to grow to 317,000 net new jobs in 2008. The study found that in the final analysis, "The cost saving and use of offshore resources lower inflation, increase productivity and lower interest rates. This boosts business and consumer spending and increases economic activity."[64]It would therefore be unwise to enact protectionist legislation or regulations as a result of the political pressures being created by a period of economic transition.

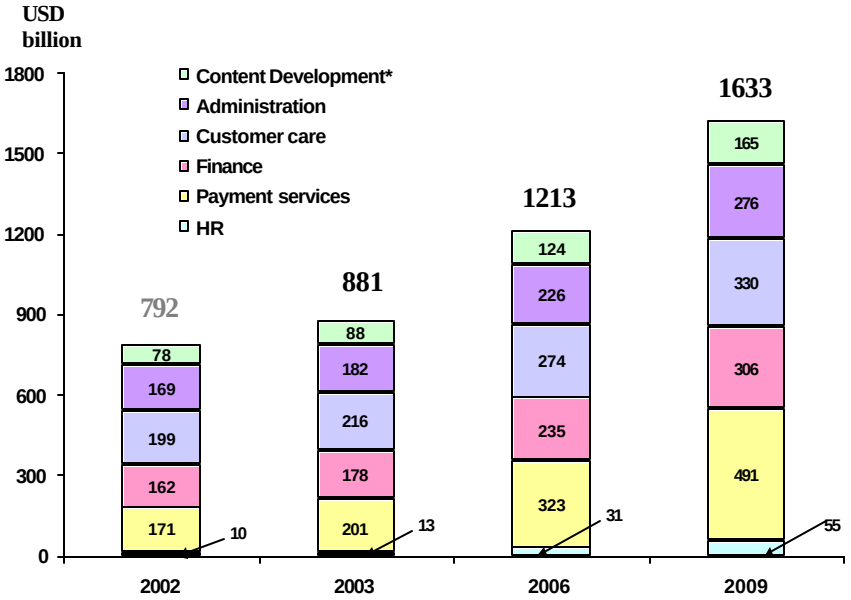
168. A recent survey of 182 companies by the Chicago based management consulting firm DiamondCluster International, found that while 86% of the respondents expected the use of offshore IT outsourcing to increase over the next 12 months, 85% of buyers and 81% of providers were concerned that legislation or political pressure might prevent them from taking advantage of the wage arbitrage opportunities associated with offshore outsourcing.[65] In our view the economic case for offshoring is so compelling as compared to the prevailing protectionist sentiment on the issue, that offshoring will continue to offer opportunities to countries like India.

The Global ITES Market

169. Figure 4 below presents estimates made by IDC for the global ITES market.[66] According to the estimates, the market is expected to grow at a CAGR of 11 percent over the period 2003-2012. The main categories of the IT enabled services market have also been presented in Figure 4 with estimates for growth in each such category. With the global ITES market poised to become a trillion dollar market, significant potential exists for offshoring of ITES to developing countries in the SASEC sub-region.

[63] McKinsey Global Institute, *Offshoring: Is it a win-win game?*, San Francisco, August 2003 p.9.
[64] Global Insight, *The Impact of offshore Software and Services Outsourcing on the US Economy and the IT Industry,* March 2004, Highlights, p.1.
[65] Reported by Reuters 26 March, 2004.
[66] Source: *NASSCOM-KPMG Study Choosing a location for ITES operations in India*, February 2004, p.23.

Figure 4: Global IT Enabled Services



* Content-development services include remote design services for VLSI / embedded systems, security / control systems etc.

Source: IDC. NASSCOM. KPMG. 2003 - 2004

Potential for Off-shoring across Industry verticals

170. Significant potential exists across different industry verticals for savings through off-shoring. Table 7 below shows the cost savings by off-shoring to India in respect of some important industry verticals. It can be seen from Table 7 and Figure 5 that insurance and banking generate the bulk of the savings because of the amenability of off-shoring their processes.

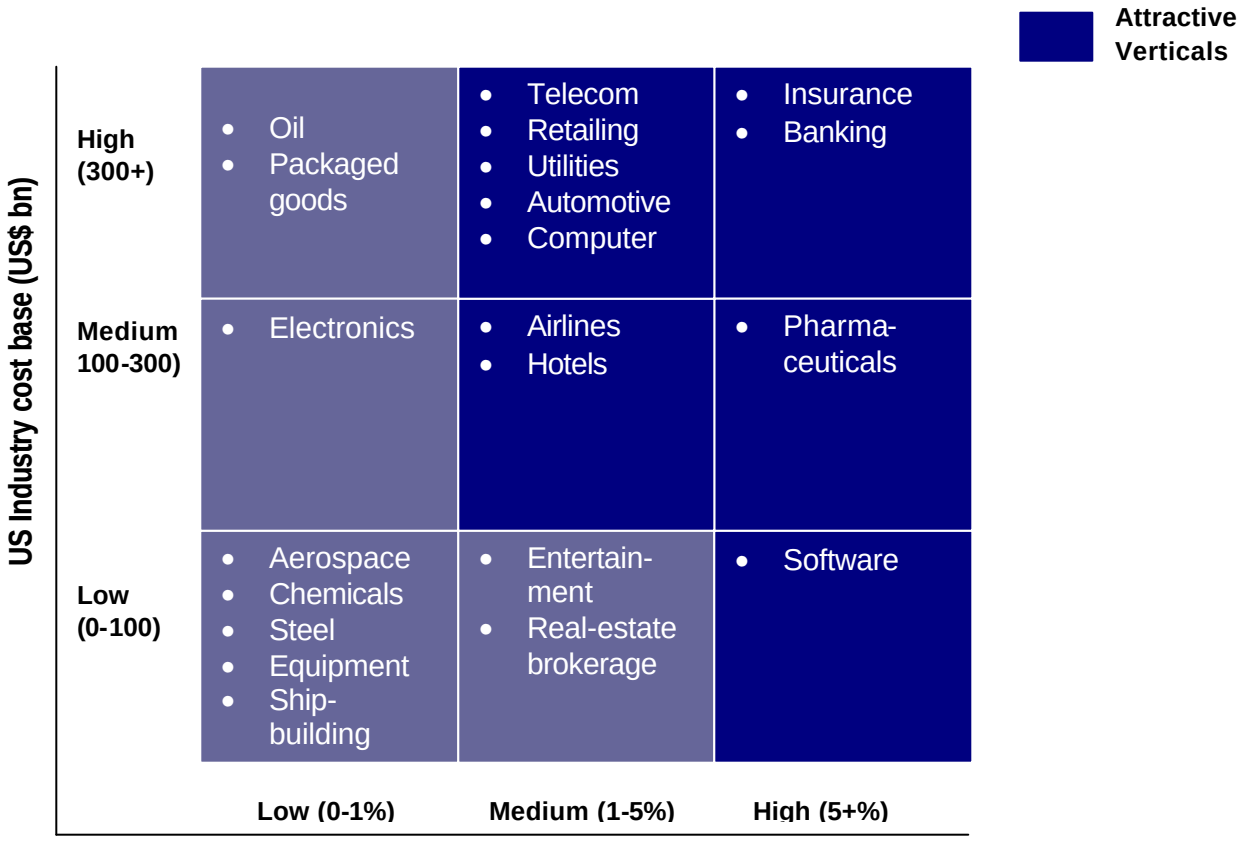
Table 7: Cost savings across verticals by off-shoring to India

Sector	Overall cost saving (Percent)	Increase in earnings before interest, taxes, depreciation and amortization (Multiple)	Key opportunity areas
Insurance	10.0 to 15.0	3.5x	Claims processing Servicing Call centre operations
Banking	8.0 to 12.0**	1.5x	Call centre operations Loan processing (consumer, corporate, mortgage)
Pharmaceuticals	5.0 to 6. 5	1.3x	Research and development
Telecom	1.5 to 2.5	1.1x	Call centre operations Billing
Automotive	1.0 to 2.0	1.1x	Engineering and design Accounts payable/ receivable
Airlines	0.8 to 1.5	1.2x	Revenue accounting Call centre operations Frequent flyer programmes

** Non-interest expenses

Source: NASSCOM – McKinsey Report 2002, p.233.

Figure 5: Offshoring opportunities across multiple verticals



Source: National Association of Software and Service Companies (NASSCOM)– Mckinsey Report 2002, p.236.

The offshoring opportunity in ITES

McKinsey & Co.

171. According to estimates made by McKinsey & Co., significant opportunities exist for offshoring in several ITES areas in the immediate term.

Table 8: ITES opportunities in the medium term

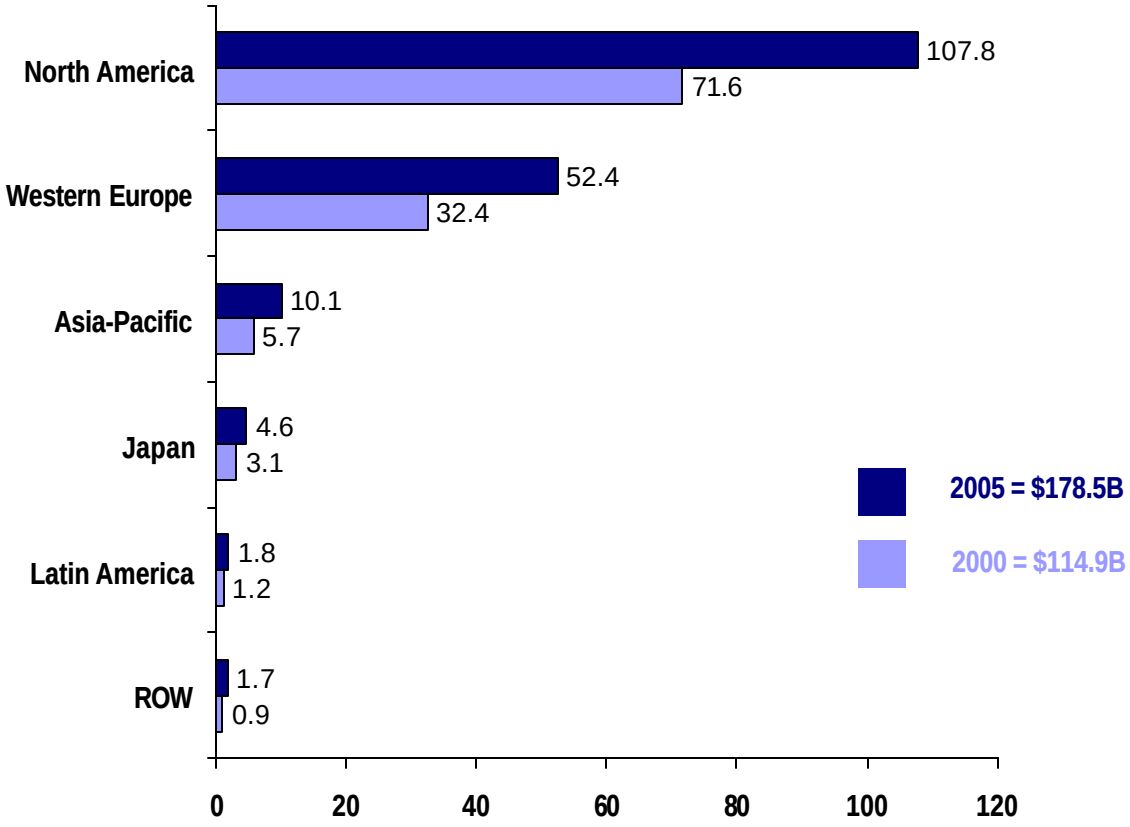
Overall Rank for India	Process	Worldwide Addressable market 2005 ; US$bn
1	Credit/Debit card services	45-50
2	Inbound call centres	70-75
3	Engineering and design	65-70
4	Benefits administration	25-30
5	Telesales/Telemarketing	20-25
6	Web sales and marketing	30-35
7	Payroll services	30-35
8	Database marketing/Customer analysis	15-20
9	Claims processing	10-15
10	Billing services	15-20

Source: NASSCOM – McKinsey Report 2002, p.24.

Gartner

172. The Gartner Group has estimated that the BPO opportunity will increase from US$122 billion in the current year to US$178.5 billion by 2005. BPO forecasts by geography, according to *Gartner* are given in Figure 6 below:

Figure 6: BPO forecasts by geography
Billions of Dollars



Source: Offshore BPO-Hype or reality, Sujay Chohan, VP & Research Director BPO, Gartner Group – Presentation made on 1st October 2002, at Kathmandu Nepal.

Giga

173. According to Market Research Firm Giga Information Group now owned by Forester Research Inc., 3.3 million US jobs will shift to India, Russia, China and the Philippines over the next 15 years as companies outsource business processes.

India's Success

174. India has emerged as the world's largest supplier of IT offshoring and business process offshoring services, accounting for 25 percent of the global offshoring market. The global offshoring market was estimated to grow to over US$200 billion by 2008 and India was expected to gain further market share according to McKinsey & Co.

175. India has a number of success stories in the field of IT enabled services/BPO. GE Capital, American Express, Citibank, Conseco, Convergys, British Airways, HSBC and Dell Computers are among the many companies that have taken advantage of India's capabilities. Citi group formed eServe International for offshoring business processes to India in 1999. The business has grown from 1200 employees in 1999 to more than 3200 in 2003. eServe supports Citi Group in 25 countries from its global contact centres in Mumbai, four call centres and two

global processing sites. This support extends to Internet enabled customer-care solutions, transaction and technology services. GE Capital International Services (GECIS) offers basic financial transaction services and contact centre facilities, in-house to GE. GECIS has expanded its service offerings to include finance and accounting, complex transaction processing such as mortgage loans and insurance claims and call centre services including outbound calls. GECIS plans to increase its workforce to 20,000 by the end of the current year. Offices in Mexico, China and Hungary now report to GECIS-India as the GE's Centre of Excellence for outsourcing. GECIS' service offerings have become increasingly complex, analytical and knowledge based. GECIS India conducts actuarial analysis, risk modeling, data mining and statutory financial reporting. BPO players like eValue Serve today employ highly skilled graduates from elite academic institutions like the Indian Institutes of Technology (IITs) and the Indian Institutes of Management (IIMs) to offer high value add analytical services for companies internationally.

Co-location

176. According to A.T. Kearney an evaluation of locational decisions for off-shoring business processes "shows that leading companies are increasingly following multi-country strategies to ensure business continuity. For example, in the event of a natural disaster in Delhi, a comparable workforce in Manila could perform the same business process without interruption. By the same token, companies find it useful to identify sub-categories of countries that are most apt to meet their specific needs."[67]

177. This trend for co-locating ITES facilities in more than one country can be a distinct opportunity for countries in the sub-region.

178. In an assessment by Hill and Associates of the environment for ITES /BPO in the SASEC countries, it was found that all countries in the sub-region had potential to benefit from ITES/ BPO except for Bhutan. In the case of Bhutan, the lack of skilled manpower was considered a major handicap. Appendix 4 provides details of factors conducive to ITES/ BPO in each country of the sub-region as also factors unfavorable to the industry.

179. The telecom infrastructure in the sub-region is certainly improving. In the case of Bhutan and Nepal the terrestrial networks are connected with India and have access to international gateways located within India. It would also be advantageous for Bangladesh to connect with the Indian terrestrial networks in order to provide better quality of service for international companies off-shoring their business processes to the country. Bangladesh has decided to participate in the SEA-ME-WE 4, undersea cable project, which will become operational only in 2005. It would be advantageous for Bangladesh to enhance its infrastructure capabilities in telecom by connecting with the Indian terrestrial networks without waiting for SEA-ME–WE 4 to become available for international traffic.

Recommendation: International Events on ITES

180. There is a need for greater interaction between companies in the sub-region in order to develop a better understanding of capabilities and opportunities. It is desirable that NASSCOM should be approached to facilitate a special conference track focused on the sub-region as part of its ITES/BPO annual event. This will help to showcase the capabilities available in the SASEC countries and provide opportunities for twinning of companies from Bangladesh, Bhutan and Nepal with Indian companies engaged in BPO/ITES.

[67] AT Kearney, *Where to locate: Selecting a Country For Offshore Business Processing*, 2003, p. 2.

Recommendation: ITES Training and Certification

181. The availability of talent and skills is key to locational decisions with regard to ITES/BPO. A pool of trained manpower together with the compulsions of co-location would open up distinct opportunities for private sector collaboration in the sub-region. States like Andhra Pradesh have begun to make efforts to establish linkages with industry for training of a large number of people to address opportunities in the ITES/BPO sector. Andhra Pradesh has established an Institute of ITES Training that operates under the aegis of APFIRST an organization set up to attract foreign investments into Andhra Pradesh. The Institute of ITES Training could be an anchor institution for collaborating with universities and international companies for offering specialized ITES/BPO training programmes in the sub-region. These courses could range from training for call centre agents to niche areas in Finance, Insurance, HR, Health services, etc.

182. The Institute for ITES training has entered into an MoU with the University of Philippines for collaborating on training programmes catering to the ITES/BPO opportunity. It has also teamed up with Quality Assurance International (QAI) to conduct mid-level training programmes to prepare a cadre of capable Project Managers for the industry. Major companies would be more than willing to sponsor candidates for such training.

183. While considering training and certification for the ITES sector, to begin with third party certification could be explored through a number of agencies. The American Payroll Association[68] for example, offers the Certified Payroll Professional and the Fundamental Payroll Certification programmes. Similarly certification from the Service & Support Professionals Association (SSPA)[69] and the Help Desk Institute (HDI) for telemarketing and customer support functions could be tied up. The American Association of Healthcare Administrative Management (AAHAM)[70] offers programs like the Certified Patients Account Manager (CPAM) and the Certified Clinic Account Manager (CCAM). The National Association of Securities Dealers (NASD)[71] has an Institute for Professional Development which also offers certificate programmes. In the Insurance sector, the Life Office Management Association (LOMA)[72] has a wide range of certification programmes. Recently in February 2004, LOMA announced a partnership with the China Life Insurance Company to setup China's biggest corporate university. The International Institute for Insurance and Finance[73] at Hyderabad could also be involved for certification in the insurance sector. These are just a few examples of how internationally recognised certification programmes in IT enabled services could be used for creating a pool of trained manpower in the SASEC sub-region.

184. This approach would be extremely useful for developing the skills that are necessary for ITES/BPO in the sub-region. With telecommunications and other elements of infrastructure coming up to speed, the availability of trained manpower would help attract ITES investments into sub-region. In view of the fact that there are no restrictions for employment to citizens of Bhutan and Nepal in India, trained personnel could also take up jobs in the interim with Indian companies/MNC subsidiaries engaged in BPO/ITES.

Recommendation: Data Centres

[68] <http://www.americanpayroll.org/about.html>
[69] <http://www.thesspa.com>
[70] <http://www.aaham.org>
[71] <http://www.nasd.com>
[72] <http://www.loma.org>
[73] <http://www.iiifindia.com/>

185. Governments will be required to utilize the services of data centres as they progressively expand their e-Government activities. Instead of setting up and managing data centres themselves it would be better for governments to be anchor clients for data centres to be set up by the private sector. Some of the top international players in this field include IBM Global Services, Computer Sciences Corp., EDS, Perot Systems, Affiliated Computer Services, CGI, Unisys, Hewlett-Packard, (i) Structure, Northrop Grumman, Acxiom, Lockheed Martin, Systems Management Specialists and Infocrossing.[74] Internationally many governments are realizing the advantages of availing the services of data centres established and managed by the private sector. For example, data pertaining to Florida in the US is maintained by Convergys. In 2001, Pennsylvania began consolidation of its 17 data centres into one operations centre involving IBM and Unisys as part of a seven-year contract costing US$520 million. Similarly the City of Chicago outsourced its data centre to a private sector company Acxiom and has achieved significant gains in terms of cost reduction and improvement of quality of services, by virtue of this decision. Of course data centre outsourcing will require a careful consideration of issues like data security, disaster recovery, equipment moves, new equipment, swing equipment, software license transfer fees, besides connectivity requirements. However, the availability of sophisticated data centres managed by the private sector in the countries of the sub-region would be valuable to support collaborative ITES/BPO activities. To cite an example, GE maintains records of its voice conversations pertaining to its call centre in Gurgaon in a data centre in Shanghai.

Recommendation: HR BPO for smaller ICT companies

186. The ICT sector is a people intensive sector. The most important resource for ICT companies are their employees. It is therefore extremely important that the talent pool available with ICT companies is managed in an efficient and professional manner. This is vital to the success of these companies. The Human Resources function in becoming a High-touch and High-tech function for servicing the unique individual needs of employees relying on technology to help achieve the objective. This serves the dual purpose of providing quality service to the employees and also provides access to best practices in HR for the companies.

187. According to Gartner by 2005, 85 percent of US enterprises will outsource at least one component of their HR function.[75] The HR BPO market was slated to grow from US$25 billion in 2002 to US$ 37.8 billion in 2007.[76] A reason for smaller ICT companies in considering BPO is that such services help them to focus on their core business and their customers. Competent BPO vendors can for example, take care of regulatory compliances and the risk management that it entails.

188. While HR BPO services are viable for large players, it is difficult for small ICT companies to afford the knowledge and expertise of top HR firms. However an HR BPO could be established with assistance from the ADB/other aid agencies for servicing the HR requirements of ICT companies in the sub-region. Such ICT companies could then have access to HR best practices and be able to indent advice and support from HR firms. Such an approach could succeed as access in terms of connectivity is becoming cheaper and employees in the ICT

[74] R.Matlus, W.Maurer, L.Scardino, B.Caldwell, *Magic Quadrant for Data Center Outsourcing 4Q03*, Gartner Group, November 12, 2003.

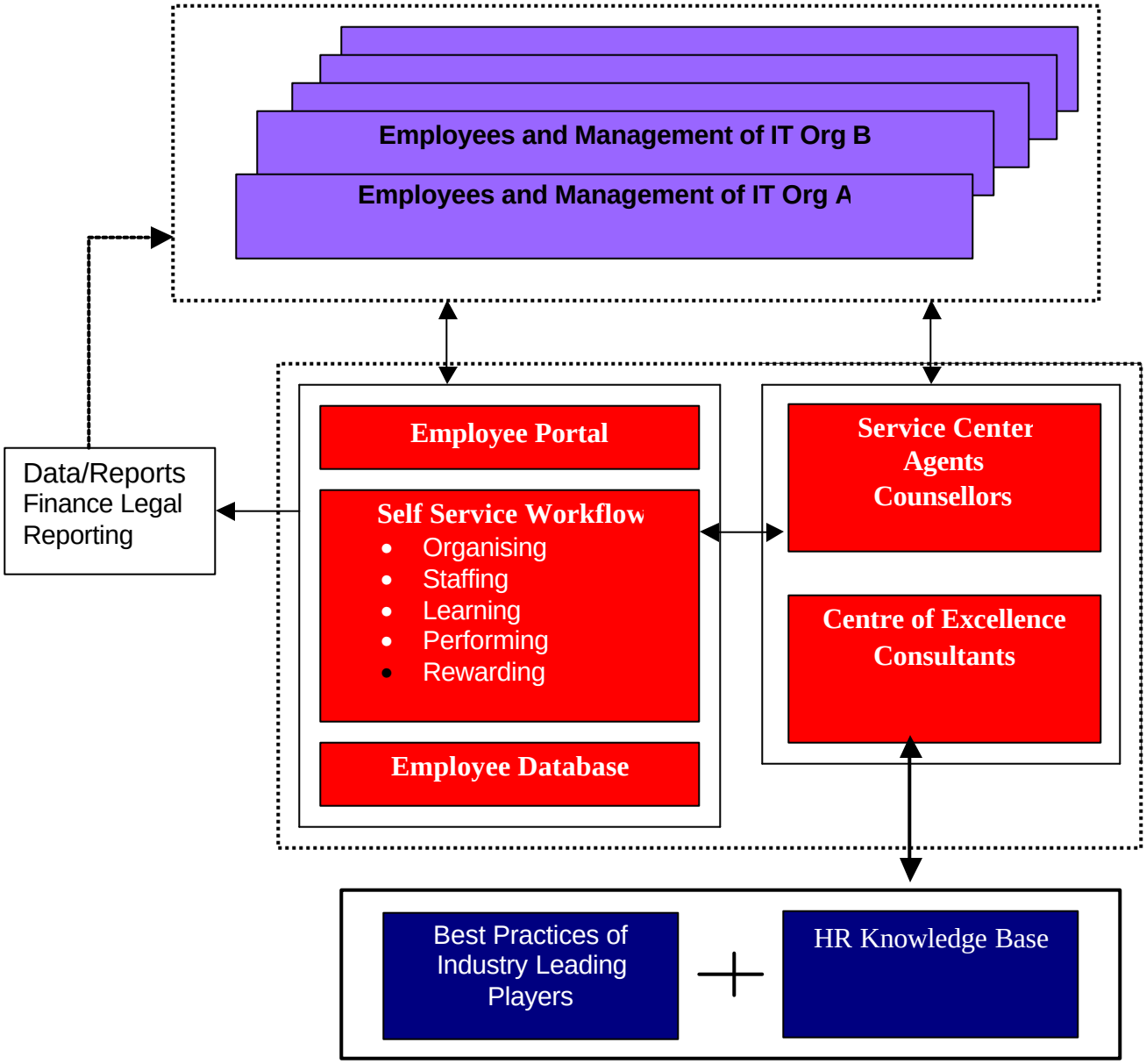
[75] R. Brown, J. Holincheck, *The HR Business Process Outsourcing Market in Booming*, Gartner Group, 9 July 2003, p.1.

[76] ibid p.2.

sector are comfortable with the use of computers and the concept of self-service. Moreover, there are common processes, practices and culture identified with the ICT industry.

189. The schematic below presents a view of the proposed HR BPO.

Figure 7: HR Support to ICT Companies



190. Figure 7 shows how different organisations can avail of common services as part of a HR BPO. The HR BPO could maintain an employees portal and could service HR needs of various SMEs through agents, counsellors and consultants. The HR BPO could provide access to best practices and an updated knowledge base to smaller ICT companies in the sub-region.

191. An HR BPO approach for the SME segment in the ICT sector will help implement cutting edge management processes and HR practices at a low cost. This will lead to process maturity and capacity building, making it easier for SMEs to be good employers and attract top class talent for working on their projects. It will also help them to deal with HR issues in a more professional and efficient manner

192. The success of the above approach is dependent on the fact that there should be enough employee numbers to make this a commercially viable initiative. At present the market in the SASEC sub-region has not matured enough for SMEs to embrace HR outsourcing in a major way. It would be desirable to encourage HR outsourcing for SMEs to help them become more successful. A beginning could be made by tying up with one of the leading HR BPO firms to offer such services with part of the funding coming from aid agencies or organizations like the South Asia Enterprise Development Facility so as to make the HR BPO a more attractive proposition for SMEs in the SASEC sub-region.

193. There are different categories of BPO vendors engaged in delivering outsourced HR services. Consultants include companies like Accenture, Bearing Point, Cap Gemini Ernst & Young, Deloitte Consulting and IBM Business Consulting Services. Then there are IT outsourcers, examples of which are Affiliated Computer Services, Computer Sciences Corp., EDS and Unisys. Exult and Xchanging are examples of pure play vendors that generate all their revenues from BPO. There are a number of payroll and benefit, providers. Examples of such process specialists include Aon, Automatic Data Processing, Ceridian, Convergys Employee Care, Fidelity Employer Services, Hewitt, Intuit, Mellon HR Solutions, Onvoi Business Solutions, Paychex, RebusHR, SHPS, Spherion, Synhrgy, SourceNet Solutions and Vsource. An important set of providers meld Internet based delivery with a BPO business focus. These include Administaff, ADP Emerging Business Services, Employease, Trinet, Talx and Workscape. Some of the Indian companies like Progeon and Spectramind have also begun offering such services.[77]

[77] See, R.Brown, J.Holincheck, *The HR Business Process Outsourcing Market Is Booming*, Gartner Group, 9 July 2003, p.6.

7. ICT Education

194. The most important resource for the ICT industry is skilled manpower. The availability of internationally benchmarked ICT skills will facilitate investments by ICT companies into countries of the sub-region. For example, if high quality manpower is available in Bangladesh, Nepal and Bhutan, top Indian software houses would find it attractive to invest in software development facilities in these countries. The expansion of network connectivity is making possible new forms of collaboration between academic institutions and new methods of pedagogy and delivery of content. The private sector is increasingly getting involved in education. Over 40 percent of Fortune 500 companies have implemented a corporate university.

Demand for ICT Professionals

195. The requirements for specialized education and training will continue to grow in view of the huge demand for knowledge workers globally. Table 9 below presents the fastest growing occupations in the US over the period 2000-2010.

Table 9: Fastest Growing Occupations in the US (2000-2010)

Occupation	Employment (thousands of jobs) 2000	2010	Change
Computer software engineers, apps	380	760	100%
Computer support specialists	506	996	97%
Computer software engineers, systems	317	601	90%
Computer systems administrators	229	416	82%
Data communications analysts	119	211	77%
Desktop publishers	38	63	67%
Database administrators	106	176	66%
Personal and home care aides	414	672	62%
Computer systems analysts	431	689	60%
Medical assistants	329	516	57%

Source: US Bureau of Labour Statistics, Office of Occupational Statistics and Employment Projections.

196. As can be seen from these figures the demand for IT professionals will continue to grow in the coming years.

Online education

197. The access to higher education is increasing rapidly. Table 10 below shows a sample of countries with the percentage of students who will have access to higher education by 2020. As can be seen from the Table, countries like US and Malaysia hope to have over 40 percent of students in higher education by 2020. It is anticipated that online courses will capture at least half of this number offering a potentially US$200 + billion opportunity by 2020.

Table 10: Global Higher Education Landscape
Access to Higher Education (18-22 Year Old Students)

Country	Current Percentage	Percentage of Students in 2020	No.of Students in 2020 (million)
China	3%	20%	24.0
Malaysia	14%	40%	8.3
India	4%	8%	11.0
Hong Kong	15%	20%	0.1
US	42%	45%	16.1

Source: US Census Bureau, World Bank, Government of Hong Kong.

ICT education in the subregion

Bangladesh

Demand for IT Professionals

198. A joint survey was conducted by the Bangladesh Computer Council and the Bangladesh Bureau of Statistics in 1999 on IT professionals. The availability of IT professionals in the country is shown in Table 11 below:[78]

[78] E-readiness and Need Assessment by Bangladesh Country Gateway, August 2002.

Table 11: Availability of IT Professionals in Bangladesh (1999)

Category	Number
Data Entry Operators	8372
Teachers	3065
Administrators	2386
Programmers	1221
Hardware Engineers	979
Database experts	870
DTP operators	782
System Analysis	485
Network Experts	432
Others	127
Total	**18719**

199. In the year 2002-03 vacancies in the IT sector registered a positive trend at 2,524 compared to 1,432 in the previous year. Many technical positions like System administrator, Network administrator and C++ developer were highly in demand. The demand for qualified IT professionals was expected to grow in view of the computerization of government departments and the corporate sector, especially banking and insurance.

IT Education

200. Currently, IT education is offered through the following agencies:
(i) Degree courses through IT departments of government/private universities;
(ii) Diploma/Certificate courses from private education/training institutes; and
(iii) Diploma courses in IT from polytechnics.

201. The major training players in the private sector are APTECH with 46 centres, NIIT with 23 centres, DIIT, Grameenstar, Informatics, and New Horizon.

202. The intake of students in computer science courses in the different Universities of Bangladesh are shown in Table 12 below.

Table 12: Number of students studying IT in different universities in Bangladesh (1998-99)

	1st year Hon's			2nd year Hon's			3rd year Hon's			Final Masters Degree		
	M	**F**	**Total**	**M**	**F**	**Total**	**M**	**F**	**Total**	**M**	**F**	**Total**
University of Dhaka	56	10	66	25	3	28	11	2	13	-	-	-
University of Jahangirnagar	27	6	33	22	12	34	19	14	33	11	13	24
University of Rajshahi	25	1	26	25	6	31	19	1	20	14	4	18
University of Engineering & Technology, Dhaka*										444	45	489
Total	**108**	**17**	**125**	**72**	**21**	**93**	**49**	**17**	**66**	**469**	**62**	**531**

*' Includes Ph.D., M.Phil and M.Sc students.
Source: Statistical Yearbook of Bangladesh (2000).

203. It has been observed that the quality of ICT education and training in Bangladesh is not upto the mark.[79] The quality of teachers at all levels and the quality of students at the University level left much to be desired. Following a skill determination test developed by IBM, it was found that the average skill level of teachers/institutes was only 2.83 on a 5-point scale. A TechBangla survey (2000) found that 81 percent of ICT professionals and teachers planned to move to a foreign country. The corresponding percentage for students was 85.2 percent. According to the Global Competitiveness Report 2003-2004, Bangladesh ranked 95 out of 102 countries surveyed with regard to brain drain.[80] The ICT penetration in schools at the primary, secondary and higher secondary levels was not satisfactory.

Bhutan

204. Computers have been introduced in some schools. Each of the 35 high schools has on an average 4 computers but no Internet connectivity. Sherubtse College and the two National Institutes of Education at Paro and Samtse have more than 40 computers each. There is a plan to provide at least one computer to every school in Bhutan. Of course providing Internet to some of the remote and rural schools is not feasible due to technical challenges and limited resources. The government has committed an annual Nu.5 million for the computerisation of schools programme. Most of the high schools have started optional computer courses. Sherubtse College runs a degree programme in computer science. It has also introduced a postgraduate degree in IT for teachers. More than 100 teachers have been trained in this course.

[79] Centre for Policy Dialogue, *Policy Brief on "Information and Communication Technology"* August 2001, pp. 20-26.
[80] World Economic Forum, *The Global Competitiveness Report 2003-2004,* New York, Oxford University Press, 2004 p.263.

Table 13: Educational Institutions in Bhutan

SN	Institutions	Nos	Enrolment	Teachers
1	Community/Primary Schools	268	49,654	1,436
2	Junior High Schools	64	43,275	1,234
3	High Schools	31	21,444	807
4	Private Schools	12	2,927	163
5	Sherubtse College	1	623	61
6	NIE	2	975	77

Source: *Ninth Plan Main document, Education Sector.*

205. Most of the IT training institutes are in Thimphu and are operated by the private sector. Of the 18 IT training institutes only one, the Royal Institute of Management is a government Institute. The Royal Institute of Management plans and coordinates diploma programmes on information technology and also administers short tailor-made IT courses mainly for in-service personnel. Its Centre for Information Technology is also a focal point for the Cisco Networking Academy Programme.

206. The intake of private IT training institutes for 2002-03 was estimated at 2,209 according to the e-readiness report for Bhutan.[81] Table 14 below presents some of the IT training courses conducted by one of the private training institutions, the Rigsam Institute of Information Technology (RIIT) during 2002-03.

[81] Division of Information Technology, *Bhutan e-readiness Assessment Final Report,* 30 June 2003, p. 67-68.

Table 14: IT training courses offered by RIIT

Course Title	Duration	M	F	Total
1.Commercial Accounting Course with Computer	12 months	18	33	51
2.Operating Level Certificate Course English	3 months	2	7	9
3.Operating Level Certificate Course Dzongkha	3 months	1	2	3
4. Tally 6.2 Accounting Package	1 month	3	2	5
5. Data Base & Programming	12 months	1	4	5
6. Hardware Course	12 months	0	1	1
7.Commercial Accounting Course with Computer	12 months	4	5	9
8. Dzongkha Secretarial Course with Computer	45 days	27	3	30
9. Advanced Ms Office 2000 Course	7 days	11	9	20
TOTAL		**67**	**66**	**133**

Source: Bhutan e-readiness Assessment.

India

207. The Task force on HRD in IT estimated that 0.26 million post graduates (including MCAs[82]), 0.78 million graduates and 0.74 million Diploma holders in IT and related areas would be added to the system by 2008. The projections are based on the assumption that 50 percent of the students from Electronics and Communications and 30 percent from other engineering disciplines would work in the IT software sector. The task force projected that 1.05 million IT graduates (Post-graduate, MCA, and Under-graduate) would be available for the IT sector while 0.74 million graduates would be available for the IT enabled services sector by 2008 from Institutions recognized by the All India Council for Technical Education (AICTE).

208. While the numbers of IT trained manpower were impressive there were concerns about the non-availability of faculty and its poor quality. According to a survey done for AICTE approved Institutions, the teacher-student ratio varied from 1:39 to 1:52 (average being 1:45) for IT courses, against AICTE norms of 1:15. This shortage would be further aggravated with the expansion and rapid growth of intake in IT courses. The Task Force on HRD in IT felt that there was a need to upgrade computing and networking facilities at the institutions identified for training of IT manpower. The Task Force proposed a cluster approach to synergise the strengths of different institutions in the country. It recommended that there should be a sharing of faculty, courseware, good instructional resources and information resources in the country.

[82] Refers to Masters in Computer Applications.

The Task Force suggested that a national cluster of around 65 institutions should be formed including the 6 Indian Institutes of Technology (IITs), 2 Indian Institutes of Information Technology (IIITs), the Indian Institute of Science (IISc) and the 6 Indian Institutes of Management (IIMs) for this purpose.

Nepal

209. Nepal has traditionally lacked a sound education system with many students going abroad for higher education. However, in the last couple of years, IT education has been introduced by the Tribhuvan University (860), Kathmandu University (110), Purbanchal University (940) and the Pokhara University (1212). The annual intake of these Universities for IT programmes is shown in brackets. The courses offered by these universities include Bachelor in Computer Applications, Bachelor in Computer and Information Systems, Bachelor of Information Technology, Bachelor of Engineering and Information Technology, Bachelor of Information Management and Bachelor in Computer Engineering.

210. One study on IT education in Nepal found that the quality of IT education was not effectively supervised by the Universities, the availability of qualified faculty was a major constraint, the infrastructure for teaching IT courses was inadequate, and educational institutions lacked good Internet access. Further there were no linkages between the IT industry and educational institutions.[83]

Distance learning

211. With improvements in telecom networks, it will increasingly become possible to provide world-class education to countries of the SASEC sub-region using distance-learning methodologies. A good example of a government initiative to provide high quality ICT education is the MSIT programme being administered by the Government of Andhra Pradesh. The programme has been developed in collaboration with the Carnegie Mellon University (CMU) and provides content from CMU with local hand holding through mentors trained by the CMU.

212. It has been found that in the case of online education, students consider the following conditions to be important for meeting their higher education needs:

(i) Good international brand – a globally recognized degree is important to be competitive in the global job market. The best jobs are available with multinational companies, which prefer a globally accepted degree.
(ii) Placement services – The ultimate return on educational investment is the job that a student gets at the end of his/her degree. Consequently, placement services linked with top IT companies are important while deciding on a particular educational degree.
(iii) It is important to have the most up-to-date knowledge made available as part of the degree.
(iv) The facility to interact and collaborate with professors and classmates to maximize learning is also important.

[83] Dr. Subarna Shakya and Deepak Rauniar, *Information Technology Education in Nepal: An Inner Perspective,* The Electronic Journal of Information Systems in Developing Countries, (2002), pp. 8,5, 1-11.

Virtual Universities

African Virtual University

213. A number of examples of successful virtual universities are now available internationally. For example, the African Virtual University (AVU) is a technology based distance-learning network that started in 1997 as a project of the World Bank. Partner institutions in Africa provide academic, administrative, technical and student support services as well as the infrastructure needed for AVU operations at the country level. The World Bank has donated computers to universities in the AVU network. The AVU focuses on areas critical to economic development in the Global Knowledge Economy that are not adequately catered to by existing institutions. The initial focus is on science, engineering and technology, teacher training and health education.

Monterry Tech

214. The Universidad Virtual del Sistema Technologico de Monterrey of Mexico extends educational services to Mexico, Latin America, USA and Canada. Undergraduate, graduate and continuous education courses are offered by the university. The virtual university was created by the Monterrey Institute of Technology and started offering distance education programmes in 1989.

University of Phoenix Online

215. The University of Phoenix Online also began operations in 1989. The University of Phoenix online offers 11 accredited degree programmes in business education, information technology and nursing. The University of Phoenix Online faculty includes over 8,000 instructors from across the US. The performance of the University of Phoenix Online on the stock markets is indicative of the optimism about on-line education in the capital markets.

Figure 8: Performance of University of Phoenix Online on the stock markets

National Technological University

216. A good model for online education is the National Technological University (NTU)[84] at Fort Collins, Colorado, USA. The NTU offers a wide range of academic courses from a working alliance of more than 50 universities – including 7 of the top 25 graduate engineering programmes as listed in US News and World Report. The University offers over 200 courses/ programmes on the web.

Recommendation: Virtual Tech University

217. It will be useful to set up a virtual university for catering to the educational needs of the sub-region, focused primarily on ICT education. The Government of India has been setting up centres of excellence in ICT as part of its aid programme. The Atal Bihari Vajpayee Centre of Excellence for Communications and Information Technology has been established in Ulaan Baator, Mongolia at a cost of US$1 million. An Indo-Ghana Kofi Anan Centre of Excellence for Communications and Information Technology is being set up at Accra, Ghana at an estimated cost of US$2 million. An Information Technology Education Centre is also being set up at Port Louis, Mauritius. The Government of India plans to set up similar institutes of excellence in ICT in the sub-region. An institute of excellence in ICT was announced for Nepal during the visit of the erstwhile Prime Minister of Nepal to India in 2002. The details of how this Institute of Excellence will be established are still being worked out. Apart from such institutes, the Government of India should seriously consider establishing a Virtual Tech University providing high quality ICT education not only in India but also to countries in the sub-region. The Virtual Tech University could tie up with some of the best universities internationally for offering high quality education to students.

218. A possible model for the Virtual Tech University could be the NTU. The NTU is a virtual university with only an administrative office, while its consortium partners are geographically distributed around the US. Similarly, the Virtual Tech University could leverage the strengths of the IITs and IIITs in India and involve the private sector in delivering high quality ICT education.

219. The NTU is recommended in view of its excellent linkages with existing educational institutions while maintaining a very small core of administrative functions. Such a lean organization is ideally suited to cater to quality education in the sub-region as it can minimize overheads while maximizing value through international linkages.

Recommendation: Bridge Programmes between academic institutions and corporates

220. Linkages between multinational companies and conventional universities in the region should be established. According to the Global Competitiveness Report, one of the weakest links of the educational systems in the sub-region is the lack of partnership between academic programmes and the industry. While India ranked 51st out of 102 countries surveyed in terms of university/industry collaboration, Bangladesh ranked 94th.[85]

221. A number of top IT companies run programmes that would be useful for enhancing the quality of technical education in the sub-region. For example, the CISCO Networking Academy Programme is an e-learning programme that provides students with Internet technology skills. Initially, created to prepare students for the Cisco Certified Network Associate (CCNA) and Cisco Certified Network Professional (CCNP) degrees, the Academy curriculum has expanded to include optional courses like Fundamentals of Web design, sponsored by Adobe Systems; IT

[84] <http://www.ntu.edu>.
[85] E-readiness and Need Assessment by Bangladesh Country Gateway, August 2002, pp.195 and 263.

Essentials: PC Hardware and Software, IT Essentials: Networking Operating Systems sponsored by HP; Fundamentals of Voice and Data Cabling sponsored by Panduit and Fundamentals of UNIX and Fundamentals of Java sponsored by Sun Micro systems. The Cisco Academy programme also partners with UNDP and the World Bank Group.

222. Microsoft has launched a Microsoft IT Academy Programme. The programme is open to accredited academic institutions including schools and higher education institutions throughout the world. Currently three packages are available to institutions. These include *IT ProPlus*, which provides desktop skills to networking and developer skills for IT professionals. The *IT Pro Programme* empowers high schools to deliver entry-level training for networking and developer careers. The *Office Specialist Programme* offers desktop productivity training to students in schools.

223. Sun has also been establishing competency centres in different locations. For example Sun Micro systems has partnered with the Infocomm Development Authority of Singapore for establishing a Java Smart Services Lab and a Java Wireless Competency Centre. The programme's main objective is to grow the expertise of local enterprises to become world-class developers and exporters of IT products and services for Singapore.

224. Bridge programmes between academic institutions and top corporates in the sub-region would go a long way in improving the quality of ICT education. Such courses would also provide students with an exposure to cutting edge technologies being developed by top IT companies.

8. Telemedicine

225. The global healthcare industry with a turnover of around US$2.8 billion is the largest service industry in the world. With expanding global networks, the electronic delivery of health services or telehealth is becoming more and more mainstream. Tele-health integrates telecommunication systems with the practice of protecting and promoting health. Telemedicine incorporates these systems into curative medicine. Common applications using telecommunication networks in health include teleradiology, telepathology, telenuclear medicine, telepsychiatry, distance medical education and conferencing. The advantages of telemedicine include lower treatment costs and better access to specialists especially for rural or remote populations.

Crossborder initiatives

226. The global demand for tele-health services is estimated at US$1.25 trillion.[86] According to the Telemedicine Information Exchange there are at least 216 telehealth/telemedicine programmes worldwide.[87] A number of cross border initiatives have incorporated IT into the delivery of health services. The King Faisal Specialty Hospital and Resource Centre in Saudi Arabia links up with several top university hospitals and commercial enterprises in the US who diagnose data and images and provide support in emergencies through videoconferencing. The Singapore General Hospital has a tie-up with the Stanford University Hospital for second opinion and medical education. Some of the Japanese specialist hospitals have linked with healthcare sites in Cambodia, Fiji, Papua New Guinea and Thailand. Australia has a telemedicine export programme with a consortium that includes the University of New South Wales, Sky TV, NEC, Australia and Seacom Australia. Australia is collaborating with Chinese hospitals in order to support tele-consultations, exchange of records, lab tests and telediagnosis. Canada has been focusing on telehealth as part of its health sector strategy. More than 300 Canadian companies are involved in tele-health, targeting markets mainly in the US, EU and Japan.

227. Telediagnostic, surveillance and consultation services are currently being provided by hospitals in the United States to hospitals in Central America and the Eastern Mediterranean. Indian physicians provide tele-pathology services to hospitals in Bangladesh and Nepal. Telediagnostic services are being provided by hospitals in China's coastal provinces for patients in Macao, Taiwan and some Southeast Asian countries.

Health Net

228. Health Net is provided by a non-profit organisation Satellife, with assistance from local and international donors. It provides services such as physician collaborations, medical databases, consultation and referral scheduling, epidemic alerts, medical libraries, e-mail and shared research-reporting databases. Health Net is now used in more than 150 countries worldwide. Health Net has become a valuable source of information on the treatment of AIDS and tropical diseases, essential drugs, paediatrics and public health promotion.

[86] Rupa Chanda, *Trade in Health services,* Indian Council for Research on International Economic Relations, November 2001, p. 5.
[87] < http://tie.telemed.org>.

Bangladesh

229. The health system in Bangladesh comprises a range of public and private health care providers. The government health system is organized in four tiers - Medical College Hospitals, District Hospitals, Thana Health Complexes, and Union Health and Family Welfare Centres. Private sector providers include NGOs, and other non-profit entities, traditional and homeopathic providers, qualified pharmacists and unlicensed drug sellers, qualified and unqualified modern care providers and government doctors engaging in private practice.

Table 15 below indicates the availability of medical facilities in Bangladesh.

Table 15: Availability of Medical facilities (1999)

Hospitals	Number
Government	663
Private	626
Government Dispensaries	1397
Beds in	
Government Hospitals	31772
Private Hospitals	11371
Registered Doctors (MBBS, BDS)	30864
Registered Nurses	17446
Registered midwives	15235
Registered lady health visitors	93460

Source: 2000 Statistical Year Book of Bangladesh. p.553.

230. Telemedicine services are gaining increasing acceptance in Bangladesh. A private company called Bangladesh Telemedicine Services has come out with an ambitious project to set up telemedicine centres and network them with 200 specialists in Dhaka. For the first stage, 50 telemedicine centres are planned within a 120-mile radius of Dhaka.[88] In Bangladesh the local MEDINET system provides access to hundreds of medical journals by e-mail for less than US$ 1.5 per month.

231. An estimated 50,000 patients from Bangladesh come to India seeking treatment every year. Patients from Bangladesh are estimated to have spent US$ 1.4 million on treatment in India in 1998-99 mostly for specialized treatment concerning heart diseases, cancer and kidney diseases. This figure is an underestimate as it reflects only official endorsements of foreign currency by the Bangladesh Central Bank for medical purposes.[89]

[88] Alfred Hermida *Telemedicine lifeline for village,* BBC News, 21 October 2002, < http://news.bbc.co.uk/1/hi/technology/2288619.stm >.

[89] Rupa Chanda, *Trade in Health Services,* Working Paper No.70, Indian Council for Research on International Economic Relations, November 2001, pp. 44-45.

Bhutan

232. Medical infrastructure in Bhutan has expanded rapidly since the 1970s but continues to be inadequate. The low density of population, spread over mountainous terrain, raises the cost of infrastructure and delivery of health services.

233. Table 16 provides details of the health facilities available in Bhutan in 2000.

Table 16: Health facilities in Bhutan (2000)

Resources	Numbers
Doctors	109
Drungtsho	31
Dzongkhag health supervisory officers	22
General mid nurse and health assistants	294
Technicians	226
Others	576
Total workers	**1258**
Health Infrastructure	
Hospitals	29
Indigenous hospital	1
Basic health units	160
Out reach clinics	447
Indigenous hospital units	18
Total facilities	**655**

Source: Ninth Plan Main Document (2002 – 2007), Planning Commission, Royal Government of Bhutan. P.76.

234. As can be seen from the table only 109 doctors were available in the country. The number of doctors per 10,000 population is approximately 1.8. The Royal Government of Bhutan has therefore initiated use of telemedicine for improving access to medical services for citizens. In November 2000, a telelink between the Mongar Regional Referral Hospital and the Jigme Dorji Wangchuck National Referral was established. The Government of Bhutan recognizes that telemedicine will be highly beneficial for diagnostic purposes given the shortage of specialists in the country.

India

235. The health scenario in India offers great potential for the use of telemedicine for providing medical services. While 620 million people live in rural areas, specialists do not prefer working in rural areas and are largely available in urban/semi-urban areas. The bed population ratio is 1:1,333 as against an ideal of 1:500. For the population of the country, 2 million beds are required as against which only 0.7 million beds are available. India has about 4.8 physicians and 4.5 nurses per 10,000 people. India spends 5.2 percent of its GDP on healthcare which is the largest service industry in terms of revenues, and the second largest after education in terms of employment.

236. India has witnessed a number of telemedicine programmes both in the government and in the private sector. Apollo Hospitals, a major chain of hospitals has been experimenting with telemedicine. One of the first projects taken up by Apollo Hospitals was started in a village called Aragonda, 16 kms from Chittoor in the state of Andhra Pradesh, with a population of about 5,000. A 40-bedded hospital available at Aragonda was equipped with a CT Scan, a modern ultra-sound, ECHO, automated laboratory equipment, an incubator, automated ECG, etc. Starting from simple web cameras and ISDN telephone lines, the village hospital today has a state of art video conferencing system and a VSAT satellite installed by the Indian Space Research Organisation (ISRO). About 200 teleconsultations have been provided to Aragonda from specialists and super specialists from Chennai.

237. Narayana Hrudayalaya, a super specialty cardiac care hospital in Bangalore has a joint venture with the ISRO and six state governments for telemedicine consultancy. The hospital also provides specialist advice to patients in Malaysia and Mauritius using telecommunication networks.

Nepal

238. Nepal has a population of 23.6 million of which 88% live in the rural areas. The patient-doctor ratio is 1:18,389 while the patient-hospital bed ratio is 1:2,349. The total expenditure on health as a percentage of GDP is about 5.4%. Nepal too has been experimenting with the use of telemedicine.

Information Technology Infrastructure for Health

239. The health scenario in the SASEC countries consists of multiple players and disparate systems. Health care is provided by government, charity, missionary and corporate hospitals apart from private clinics. The primary, secondary and tertiary systems of health care also tend to work in isolation from one another. The health care delivery systems largely follow paper based transactions with a few exceptions of some privately managed hospitals. In a highly information sensitive industry like health care, the presence of numerous manual and computerized systems make it difficult to share information and render the system highly inefficient. Patients at times are required to undergo repetitive tests in the absence of proper records. An Information Technology Infrastructure for Health (ITIH) would address the information needs of various stakeholders, e.g., government, hospitals, insurance companies, patients, vendors and others making the health care delivery system more efficient.

240. A number of countries have standardized health information. The United States enacted the Health Insurance Portability & Accountability Act (HIPAA) in 1996 and introduced standardization in administrative procedures. HIPAA has introduced standardization of electronic data on health of patients, administration and financial transactions. It aims at creating unique health identifiers for individuals, employees, health plans and health care

providers. It prescribes security standards to protect confidentiality and integrity of "individually identifiable health information", past present or future.

241. The UK outlined its health strategy in 1998 and accorded top priority to creation of electronic health records and a national electronic health library. Canada set up an Advisory Council on Health Infrastructure in 1997. Australia as part of an action plan, Health online focused on standardization of health information in 1999.

242. In keeping with this trend a large number of universities internationally have introduced courses on medical and health informatics.

243. India's Department of Information Technology, with support from Apollo Health Street Limited (AHSL) has prepared a "Framework for Information Technology Infrastructure for Health in India" (ITIH). The report has recommended the following key areas for standardization under ITIH:

a. Billing formats
b. Clinical standards
c. Data elements
d. Health Identifiers
e. Messaging standards for exchanging health information and
f. Minimum data sets.

244. It has also recommended the implementation of an educational framework and a legal framework.

245. The ITIH would also prove extremely useful for telemedicine. The Government of India has taken up an initiative to evolve standards for telemedicine under the aegis of the "Committee for standardization of Digital Information". As telemedicine involves capture, storage, transmission and display/broadcast health information, it is important to set standards and frame proper policies.

Recommendation: Promoting linkages

246. In view of the large number of patients who come to India for specialized treatment from Bangladesh, Nepal and Bhutan, it would be desirable to encourage the use of telemedicine for providing specialist consultation facilities to referral hospitals.

247. It is suggested that an initiative should be taken to bring hospitals, medical practitioners and policy makers on a common platform to explore the possibilities of delivering cross-border telemedicine services to patients in the region. The SABF could take the initiative in organizing such an interaction.

Recommendation: Harmonising laws and health information standards

248. One of the most important components for e-health is the maintenance of electronic health records. It is important that a sub-regional approach be adopted for such records so that in the case of specialist consultation outside the country, relevant records can be easily accessed.

249. It is desirable to adopt common standards for health information in countries of the sub-region. Further, it would also be necessary to adopt a harmonized legal framework for dealing

with telemedicine. For example, it would be necessary to set up a licensing regime to effectively regulate health care providers who participate in telemedicine, including the appointment/ establishment of an authority that will specify the standards of practice and enforce and maintain them. Legislation would be essential in order to deal with various aspects of telemedicine including specifying when a doctor-patient relationship comes into existence and its impact on medical malpractice/negligence. It would also be necessary to specify minimum technical standards to be adhered to by all persons practicing telemedicine either solely or under the supervision of a doctor licensed to practice telemedicine. Quality control mechanisms mandating a minimum level of expertise to be monitored on a continuing basis would also have to be put in place. Manuals for maintenance of records and information related to the practice of telemedicine as well as confidential information obtained from patients would have to be safe guarded. It is therefore extremely important that countries in the sub-region should co-ordinate on this important area in order to improve the quality of health care services available to their citizens.

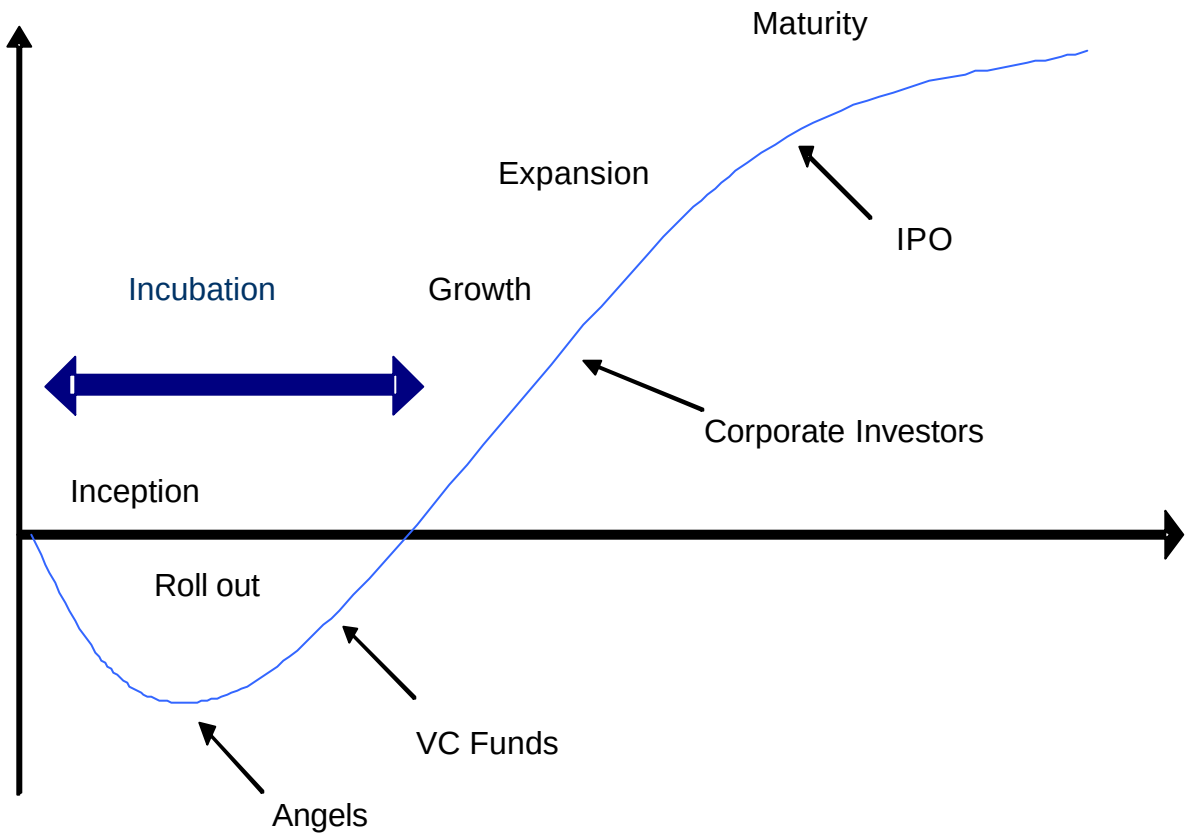
9. Incubation Initiative

250. There is a distinct need to support start-ups in the ICT space in the SASEC sub-region. Unless the countries of the sub-region are able to accelerate the growth and development of the ICT industry they will lose out in the knowledge economy. If the countries of the SASEC region do not have a viable technology sector, the best and brightest young people will leave shortly after acquiring qualifications in technology disciplines thus adding to the process of brain drain.

Incubators

251. Business incubators can accelerate the successful development of entrepreneurial companies through an array of support services and resources. Incubators typically provide access to rental space and flexible leases, shared business services and equipment, technology support services and financial assistance.

Figure 9: Life cycle for Products and Services



252. As can be seen from Figure 9 above, incubation can play a critical role at the initial stages of the life cycle. A start-up company beginning with an idea can have better access to funds from Venture Capitalists (VCs) and angel investors and can realize a faster growth to expansion and maturity through incubation. Once the business breaks even it becomes easier to attract investors and even go in for an IPO to raise funds from the stock markets.

Accelerators

253. New models of business incubation have begun to emerge in the early 1990s. During the dot.com era 'accelerators' were deployed for business incubation. The incentive was to bring start-ups to the revenue producing stage as quickly as possible. McKinsey & Co. for example started an accelerator venture targeting start-ups that already had some funding and solid management teams.

Eco Nets

254. Another model of incubation is the "Eco Net" a term coined by Red Herring in 2000. Eco Nets are incubators that retain control of start-ups after their IPOs, arranging their companies into networks of tightly knit yet loosely controlled conglomerates. Eco Nets function similar to the Japanese system called Keiretsu - a group whose members rely on each other for synergy. Eco Nets typically do not focus on a specific area of business but instead rely upon a diverse portfolio. Prominent examples of Eco Nets are Safeguard Scientifics Inc, Cambridge Technologies and CompuCom Systems Inc.

Meta Companies

255. Another approach to incubation is the 'meta company'. The term meta-company describes a for-profit incubator model that combines the key features of an incubator, a VC firm and a diversified operating company. Meta companies typically focus on a single area of business. The goal of a company is to reduce new venture risk by managing it rather than by diversifying broadly. Comstellar Technologies is an example of a meta company focused on the communications industry. Raza Foundries, a broadband incubator also falls in this category.

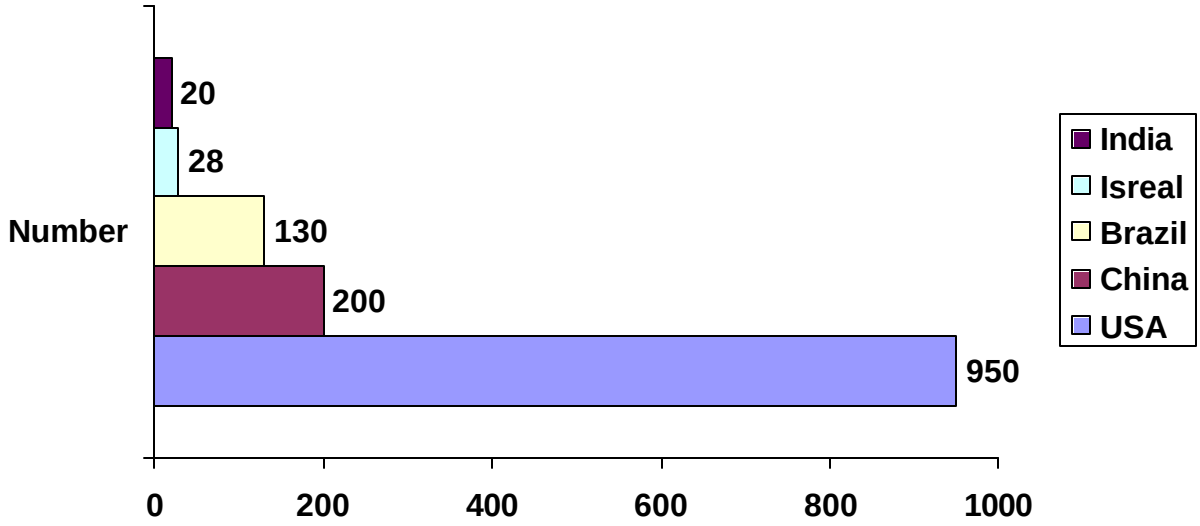
Vendor Capital

256. A number of corporates like Intel have set up corporate venture arms as business development divisions. Corporate venture funding also known as "Vendor Capital" has witnessed increasing demand from start-ups seeking funding. Corporates tend to invest in firms positioned to promote or improve the competitive edge of their subsidiaries and business customers.

Government Support

257. Some of the governments have been playing a significant role in assisting start-ups by providing early-stage financing. Australia has for instance the Innovation Investment Fund that supports small, high-tech companies at the seed, early start-up, and expansion stages with venture capital. The country has also "Build on IT strengths" which is an incubator programme. Austria has set up an Austrian Industrial Research Promotion Fund a programme that supports technology oriented start-ups with capital and know-how. The National Bank for Foreign Trade in Mexico has invested in supporting small and medium-sized Mexican enterprises. Greece has a New Economy Development Fund, which was created to co-finance the formation of venture capital funds. Israel has set up a venture capital company for attracting foreign capital for investment in local companies. The Economic Development Board in Singapore also serves as a venture capital entity. The Singaporean government has additionally set up a Technopreneurship Investment Fund. The Korean government has an IT Venture Investment Mart for providing venture capital to promising information and communications businesses. The Chinese government has a National Incubation Programme (TORCH Programme) launched in 1998 under the Ministry of Science and Technology.

Figure 10: Number of Business Incubators (2000)



Source: Economist June 21st 2003.

VC funding on the rebound

258. The dotcom bust adversely affected VC investments. In 1999 annual VC returns, consisting of realised profits and rise in the value of retained holdings, reached 146 percent. In sharp contrast, in the first three quarters of 2003, the average American VC firm showed a return of minus 17.8 percent.[90] However, VC funding is picking up once again and interestingly nearly all Information Technology new business plans include some element of offshoring. "Doing software-development work in India seems like a perfect fit when start ups are receiving smaller amounts of money at wider intervals."[91]

259. In order to reduce risks, venture capitalists have begun to increasingly use a portfolio approach in which individual VC firms team up with others to pool risks. For example, more than a dozen VC firms took part in the third round funding of US$25 million for Cambridge Silicon Radio.

Incubation in the Sub-region

260. A number of incubation initiatives have been taken up in the sub-region, especially in India and in Bangladesh. An International Business Incubation Systems (IBIS) programme developed by UNIDO in India forges alliances between Indian entrepreneurs and foreign SMEs to promote start-ups. The programme matches entrepreneurial and technical skills available in India, with the technical and managerial know-how and investment funds of successful SMEs from developed countries.

261. Some of the leading incubators in India include the Software Technology Parks of India, HatchingIT, ICICI Infotech Incubation Centre, Indiaco (P) Ltd., NurtureIT, Iponics and ARCI

[90] The Economist, April 3rd-9th 2004, p.63
[91] Ibid, p.65

technology incubator. Incubators have also been started in the IITs and the IIMs in collaboration with funding institutions like the Small Industries Development Bank of India (SIDBI). Bangladesh has recently started an incubation initiative that provides subsidized office space for start-up companies in ICT.

Academic Support

262. Apart from access to angel/venture capital funds, support of academic institutions can be key to the success of ICT companies. One of the best-known and most successful industry clusters, Silicon Valley in California has been developed around Stanford University and the University of California with major companies like Hewlett-Packard, Sun Microsystems and Cisco located close by. Similarly Route 128 in Massachusetts is linked to Harvard University and the Massachusetts Institute of Technology. The Helsinki University of Technology in Finland supports a cluster with Nokia as the anchor company. The University of Dublin is key to Ireland's Dublin National Digital Park with major companies like Dell and Intel. The Royal Institute of Technology in Sweden is located close to the Stockholm-Kista cluster with Ericsson as the anchor company.

Austin Technology Incubator

263. In the specific context of incubation, the Austin technology incubator (ATI) is a good example of an academic institution providing strategic, operational and infrastructure support to promising early-stage, high risk, technology based ventures. The ATI works with a variety of investors, professional service providers and industry leaders to benefit member companies. The ATI was founded in 1989 and has not only incubated companies but has also incubated incubators. The Austin technology incubator has a well-defined and highly credible admissions process where companies submit proposals to the ATI, which filters them through a success committee. Companies, which are selected for admission, find it easy to obtain venture capital funding and also academic support from the Austin University.

Recommendation: Incubation Initiative for the Sub-region

264. These experiences suggest that it would make sense for an incubation initiative to be launched in the SASEC sub-region duly providing linkages to venture capital, academic support and infrastructure assistance for start-ups. It would be worthwhile to anchor the incubation initiative in an institution like the Indian School of Business (ISB). The ISB has been set up by leading private sector companies in India and abroad. The ISB is a research oriented, independent management institution that aims to groom future generations of business leaders. The Institute has affiliations with the Wharton School, Kellogg School of Management and the London Business School. The ISB also has under its wings the Wadhwani Centre of Excellence for Entrepreneurial Development. This would therefore be an ideal institution to anchor the incubation initiative.

265. The Austin Technology Incubator has expressed its willingness to work closely with the ISB for an incubation initiative for technology companies. Some of the leading academic institutions in each of the SASEC countries, for example the Bangladesh University of Engineering Technology, the Bhutan University, and Kathmandu University could be inducted as partner institutions.

266. The ISB as an institution has the requisite stature and international profile to forge linkages with leading venture capital firms, financial institutions, incubation companies and universities for making the proposed incubation initiative a success. The institute could also

provide courses on IT entrepreneurship for guiding and mentoring IT start-ups in the sub-region apart from providing training to participating academic institutions in the sub-region on incubation. The Asian Development Bank could also consider providing some of the seed funding for incubating start-ups to mitigate business risk for venture capital financing. Successful companies incubated could eventually graduate into IPOs and could raise funds in the stock markets.

10. Fostering Business Linkages

267. Three desirable goals in the context of promoting the ICT sector in the sub-region are:

(i) To foster research excellence and provide innovative ICT solutions for the subregion's problems by taking up research projects in areas of high social and economic impact.
(ii) To foster partnerships between the sub-region's companies and research communities in ICT.
(iii) To provide exposure to ICT companies in the sub-region to cutting edge technologies and help them tap global expertise to reduce development costs and time to market for their products.

268. These goals could be effectively met by setting up a Business Linkage Fund for the sub-region.

Business Linkage Challenge Fund of the DFID

269. A number of research challenge funds are now current internationally. For example, the UK Department for International Development has set up several business challenge funds in the past two years.[92] The Business Linkages Challenge Fund (BLCF) managed by Deloitte and Touche for the DFID is a cost sharing grants scheme that gives grants to enterprises, to achieve the objective of developing commercially sustainable business linkages that bring benefits to the poor. The fund encourages and supports the formation of business linkages by enterprises in developing countries with each other and/or with international partners. The BLCF offers grants of between £50,000 to £1,000,000. The fund operates in the UK and in countries in Africa and the Caribbean.

270. The Government of UK has also established two challenge funds for projects that demonstrate innovation, joined-up Government and improved service to the public.

Some more initiatives

271. The German Gesellschaft fur Technishe Zusommenarbiet (GTZ) initiated a fund in 1999 to finance public private partnerships.[93] State governments have established Research and Development Challenge Funds. The Ontario Research and Development Challenge Fund is an example. A similar approach has been adopted by various multilateral and regional organizations. UNCTAD devoted its World Investment Report 2001 to promoting business linkages. UNIDO has launched a partnership programme approach and taken up projects for example, to create a group of competent and competitive domestic suppliers in India, in the automotive sector linked to companies like Fiat and Ford.

Recommendation: Business Linkage Fund for the sub-region

272. Learning from these experiences, we suggest the setting up of a Business Linkage Fund for the region that would be available for ICT enterprises that are registered in the SASEC

[92] <http://www.challengefunds.org>.
[93] <http://www.gtx.de/ppp/ >.

countries, that do not have a parent company in a country outside the sub-region, that are not listed companies and that have at least 30 percent local equity on shareholding. These are criteria similar to those adopted for the Infocomm Local Industry Upgrading Programme, (iLIUP) by the Singapore government.

273. The Challenge Fund could be made available for projects that meet the following eligibility criteria:

(i) Involve or facilitate links between 2 or more enterprises in 2 or more countries of the sub-region or involve or facilitate links between one or more enterprises of the sub-region with a global ICT player of repute.
(ii) Increase the competitiveness and viability of participating enterprises and also enhance employment opportunities and increase revenues from IT and IT enabled services.
(iii) Contribute to creating improved livelihood and opportunities for poor people.
(iv) Share in the linkage costs between the fund and the participating entities with the bidder contribution being at least equal to the challenge fund grant.
(v) Be sustainable after the fund has been utilized.
(vi) Be innovative.
(vii) Avoid negative impact on non-participating local businesses.
(viii) Have a maximum duration of two years.

274. These criteria are adopted by the DFID for its Business Linkages Challenge Fund.

275. An attempt should be made to involve aid organizations and governments to contribute to the Challenge Fund.

276. The Media lab Asia could have been a good anchor institution for the fund. However, in view of the recent problems faced by Media Lab Asia, the fund could be administered by an eminent panel drawn from the academia, ICT Industry and the government. The SABF could be involved in deciding the composition of the panel.

Recommendation: Business Networking initiative

277. The Government of Singapore's iLIUP Programme provides funds for promoting strategic, mutually beneficial partnerships between Singapore enterprises and MNCs. Such linkages can help Singapore SMEs to adopt better quality standards, have more sophisticated processes and be better tuned to market requirements.

278. The Infocomm Development Authority of Singapore meets the salary cost of iLIUP managers who are recruited and embedded in participating MNCs. Each iLIUP manager is tasked with forging linkages between the MNC for which he is working and Singapore SMEs. A similar approach could be adopted in the sub-region. Networking Managers embedded in leading ICT companies/MNCs could help forge linkages with SMEs in the sub-region. The possibility of getting assistance under the South Asian Enterprise Development Facility for this purpose could be explored.

11. Enlarging ICT supply

279. The FICCI report on the South Asia Growth Quadrangle identified telecom as one of the sectors, which offered immense opportunity for regional cooperation in the field of ICT. With increasing liberalization in the telecom sector in SASEC countries, new opportunities are emerging for the private sector to participate in developing telecommunications infrastructure. The development of such infrastructure is being variously funded through national and international initiatives. The source of funding for investments in telecommunications often determines the prospects for regional cooperation. For example, where India has funded telecommunications infrastructure in its neighboring countries, telecom providers from India have been actively involved in planning and implementing the networks.

280. In the case of Bhutan, the Power Grid Corporation of India Ltd., has been selected as a consultant and is also responsible for implementation to enhance the country's telecom network. Similarly, in the case of Nepal, an East West Highway Optical Fibre Project has been taken up, under grant assistance from Government of India, and TCIL an Indian Company has been entrusted with the execution of the project.

281. In the case of multilateral funding for investments in telecom infrastructure, telecom service providers of the sub-region have had to compete with companies from outside the sub-region. To cite a recent example, the Telecommunications Consultants India Ltd., did not succeed in their bid for a World Bank funded rural telephone project in Nepal. The project aimed at setting up telecom infrastructure for 534 village development committee areas in Eastern Nepal out of 893 such areas. The bid went to STM Wireless of California, which teamed up with Samart Communications of Thailand for the project.

282. The recent entry of Indian telecom players into provision of global connectivity however, offers some interesting possibilities for reduction in the cost of international bandwidth for the sub-region.

Recommendation: Interconnect with Indian private sector telecom providers for international bandwidth.

283. While Nepal and Bhutan are connected to Indian telecommunications networks, Bangladesh is currently using INTELSAT for its international communications. Bangladesh, Bhutan and Nepal would gain significantly both in terms of reliability and cost for international bandwidth, in case they tie up with existing Indian private sector providers. Connecting to the Indian terrestrial networks would immediately provide access to global carriers like SEA-ME-WE3, SAFE, FLAG, and i2i. Since Indian telecom service providers control some of these networks e.g., i2i and FLAG, international bandwidth could be provided at lower cost to countries of the sub-region. Bangladesh, Bhutan and Nepal should be encouraged to explore possibilities of cost reductions in international bandwidth through tie-up arrangements with Indian private sector telecom providers. Bharti has set up the i2i undersea cable network that connects Chennai with Singapore. Similarly, Reliance Infocomm has acquired control over FLAG, thus making it possible to offer bandwidth to international destinations. It would be beneficial for countries in the sub-region to utilize these networks established by the private sector to mutual advantage. This would also help countries like Bangladesh to immediately link up with terrestrial and undersea cable networks for its international communication

requirements. Such access could prove useful for attracting investments in IT enabled services in each of these countries.

Internet exchanges

284. Another suggestion that has been made in the past is to set up Internet regional exchanges for reducing the cost of Internet traffic within the sub-region. However, when this idea was examined, it was found that administering a regional Internet exchange would become extremely complex, and there may not be many takers for availing services of the exchange. A more decentralized model was preferred with Internet exchanges being set up locally within each country in important cities so as to achieve lower costs.

Low cost PCs

285. The PC penetration rates in countries of the SASEC sub-region are at present extremely low. It is important to increase PC penetration in the SASEC sub-region so as to bridge the digital divide and also improve usage of ICT by broad sections of the public. Thailand has launched a programme to provide one million low cost PCs for low-income families. In 2001, major PC manufacturers in Thailand in association with NECTEC (National Electronics and Computer Technology Centre) agreed to produce a low cost PC model to promote the use of ICT and the Internet. The PCs initially were provided with open source software (Red Hat Linux Operating System and Sun Microsystems's Star Office). On account of the programme, Laser Computer of Thailand, which only sells Linux on its PCs, recently surpassed Hewlett Packard as the leader in the Thai Desk Top PC Market with 300% annual growth.

286. Microsoft initially declined to offer Windows and other productivity tools at a price suitable for the programme. At the time of the low cost PC programme introduction, Microsoft did not have a Thai language version of Windows, XP Home edition, Office XP Standard, Internet Explorer or Windows Media Player. However sensing competition, Microsoft is now offering packaged software at an additional US$40, which is much below the prevailing market price. This illustrates how the purchase of large volumes of computer hardware can substantially bring down costs and improve penetration.

Recommendation: Subregional programme for introduction of low cost PCs

287. At present each of the four countries of the SASEC sub-region has programmes for introducing computers in schools and colleges. In case countries of the sub-region cooperate in procuring low cost PCs the cost of hardware and accompanying software can be brought down dramatically. This would immediately improve penetration levels of PCs in the sub-region while saving huge amounts for deployment of computers in educational institutions.

288. Carnegie Mellon University is collaborating with Trigem Computer Inc. of Korea for designing a new multifunction information appliance called a PCtvt. The PCtvt is a PC with integrated TV, digital VCR, Videophone and IP phone with a target price of under US$400 in 2004 and hopefully under US$250 by 2007. Such a device would become commercially viable if large numbers are bought for schools and low end PC users.

289. It is therefore suggested that the countries of the sub-region work jointly on a low cost PC programme, targeted on educational institutions as also at the lower end of PC users. A commitment of funding on behalf of the governments of the sub-region to buy large volumes of low cost PCs would go a long way to promoting ICT use. This could also help the local hardware industry in the sub-region.

12. Next Steps

290. Following the discussion in the previous pages, eighteen recommendations have been made for encouraging cross border private sector cooperation in the field of ICT in the SASEC sub-region. A summary of these recommendations is presented in Box 1.

291. Appendix 1 gives an extract of the recommendations made in the study. The grounds on which each recommendation has been made is presented in the form of implications for cross-border collaboration (Column b). Since a number of recommendations involve policy issues where governments have to initiate steps for facilitating cross-border private sector collaboration in ICT, these are spelt out in Column (c) of Appendix 1. It is important that the stakeholders for each recommendation are clearly identified and an anchor institution is designated for operationalizing the next steps. Accordingly, Appendix 1 also presents an anchor institution for each of the recommendations made so that the next steps for operationalizing the recommendation become easier. The action to be taken by various stakeholders for each recommendation is summarized in the last column of Appendix 1.

Box 1: Summary of Recommendations

Common Interoperability Framework

A common interoperability framework for e-government would mean adoption of IT architecture and data standards that would enable e-government applications to be portable and replicable across borders. This would make it easier for companies engaged in development of e-government applications to use their expertise for developing similar applications in other countries of the sub-region. As a result, the private sector would find it easier to collaborate with each other on e-government projects.

E-government observatory

An e-government observatory could showcase best practices in e-government from around the world and in the sub-region. It could also showcase successful examples of public private sector partnerships in the e-government space. This would help the private sector in the sub-region to adopt best practices and partner with the public sector.

Training of Civil Servants

A cadre of ICT savvy executives is necessary in the Government to provide leadership for planning and executing digital government initiatives. Training of civil servants including an exposure to public private partnerships would make it easier for the private sector to be involved in e-government initiatives.

Legal Infrastructure Working group

A legal infrastructure-working group for the sub-region could help in harmonizing national laws to facilitate trade and investment in the sub-region. Such harmonization would facilitate e-commerce in the countries of the SASEC sub-region.

Subregional e-commerce alliance

A subregional e-commerce alliance could be set up. Such an alliance would help in the mutual recognition of digital certificates and enabling secure and reliable transmission of trade and logistic documents. This would facilitate the creation of a paperless trading environment, which would also be critical to making hardware manufacture viable in these countries.

International event on ITES

There is a need for facilitating greater interactions between private sector players in the sub-region through conferences so as to facilitate twinning of companies engaged in BPO/ITES.

ITES training and certification

In order to benefit from the opportunities in the field of ITES/BPO, it is important that a trained pool of skilled manpower is available in each of the four countries of the sub-region. A common ITES training and certification program would greatly contribute to attracting investments and allowing co-location of ITES activities in the sub-region.

Data Centres

Establishment of Data Centres by the private sector would greatly help in opening up new possibilities to support collaborative ITES/BPO activities in the sub-region. The data centres could be made viable with government being an anchor client.

HR BPO for smaller ICT companies

In order to provide the SME segment in the ICT sector with cutting edge management processes and HR practices at a low cost, an HR BPO could be set up through a leading HR consultancy firm. This would be extremely useful in improving capabilities of ICT companies in the sub-region.

Virtual Tech University

A Virtual Tech University could provide high quality ICT education to countries in the sub-region. The Virtual Tech University could forge linkages with best institutions internationally for offering high quality education to students. This would also help in the mobility of professionals in the sub-region, thereby facilitating more collaboration.

Bridge programmes between academic institutions and corporates

Establishment of linkages between training programmes run by MNCs and conventional universities would enhance the quality of ICT education and would also expand opportunities for students in the sub-region.

Promoting linkages for cross border telemedicine services

There is a need to increase contact between hospitals, medical practitioners and policy makers in the subregion so as to deliver cross border telemedicine services to patients.

Harmonizing laws and health information standards

It would be extremely important to adopt a harmonized legal framework for dealing with telemedicine and also adopt common health information standards so as to facilitate greater collaboration and cooperation in the sub-region.

Incubation of start-ups

An initiative to forge linkages with venture capital firms, financial institutions, incubation companies and universities globally would be useful for providing incubation support to start-ups in the subregion.

Business Linkage Fund

A Business Linkage Fund needs to be created that would facilitate linkages between enterprises across countries of the sub-region. The fund could be focused on solutions that can contribute to improving livelihoods and economic opportunities for the people of the sub-region.

Business networking initiative

A model adopted in Singapore of embedding networking managers in leading ICT companies could prove useful for forging linkages between SMEs and leading ICT players in the sub-region.

Access of international bandwidth through India Telcos

The recent entry of Indian private sector companies like Bharti and Reliance for providing international bandwidth makes it attractive for countries like Bangladesh, Bhutan and Nepal to buy international bandwidth from these companies. The recent acquisition of FLAG by Reliance and the execution of i2i network by Bharti could possibly make international bandwidth available to countries in the sub-region at a lower cost. The Telecommunication service providers from Bangladesh, Bhutan and Nepal should be encouraged to access international bandwidth through Indian telecom providers.

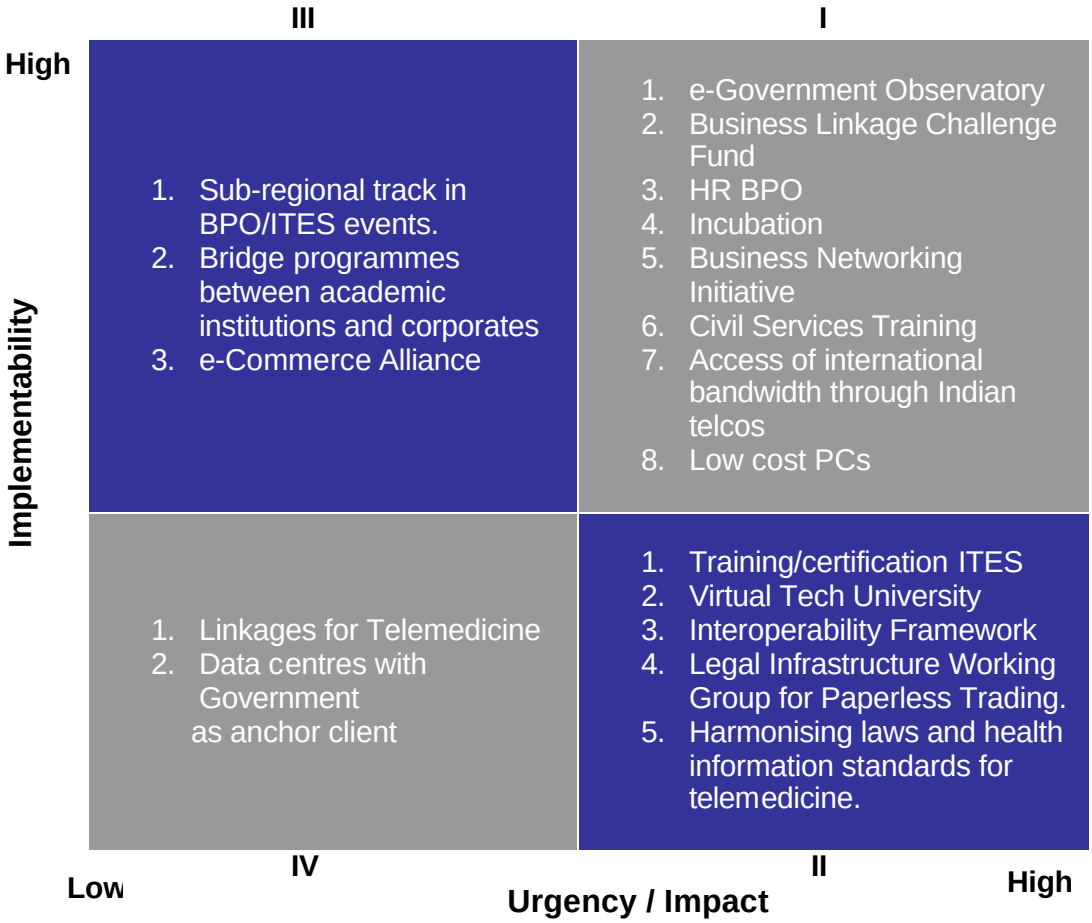
Low cost PCs

The aggregation of demands in the sub-region for provision of PCs to educational institutions could form the basis for procuring low cost PCs. The example of Thailand could be emulated and a large number of PCs could be purchased at lower cost to improve PC penetration, and also expand coverage of academic institutions for ICT education.

Prioritization of recommendations

292. Figure 11 below gives a snapshot of the recommendations made as part of the study.

Figure 11: Prioritization of recommendations



293. Prioritization of the recommendations has been made by classifying each recommendation along the two axes of urgency/impact and implementability. The recommendations have been grouped into four quadrants as can be seen in Figure 11.

High impact, high implementability

294. The setting-up of an e-Government observatory would lie in Quadrant I as it can be set up quickly and would have great impact in helping cross-border collaboration among companies. The National Institute of Smart Government set up in Hyderabad could be the nodal agency for establishing the observatory. A Business Linkage Fund would again be an extremely attractive proposition for facilitating collaboration between companies in the sub-region. Once funds are provided, it would make cross-border collaboration a very compelling option for ICT companies.

295. An HR BPO can also be set up relatively quickly and can provide services to the entire SME segment across the sub-region. Companies like Hewitt have already done some thinking and groundwork for setting up such a service and therefore the implementation can be relatively quick with wide impact.

296. Singapore has successfully implemented the approach suggested in the business networking initiative. In view of its proven success in Singapore, companies would find it easy to participate in the initiative. Their engagement of iLIUP managers could ensure a rapid rollout of the programme. This again would help develop entrepreneurial capabilities in the sub-region and would provide SMEs in the ICT sector with cutting edge applications and tools available with leading MNCs and the bigger ICT players.

297. Each of the countries in SASEC already has the infrastructure for civil services training. Successful training programmes in the context of ICT are being run by a number of institutions internationally. Consequently given availability of funds, the programme can be rolled out very quickly and can have significant impact.

298. Following de-regulation of the Indian telecom sector in 1999, the private sector has established countrywide networks and also acquired international carriers like FLAG. In view of the availability of these networks, a decision by telecom service providers from Bangladesh, Bhutan and Nepal to access international bandwidth through such networks can be taken quickly and can immediately reduce costs and enhance reliability.

299. In view of Thailand's success in introducing one million low cost PCs, it should be relatively easy to replicate a similar programme among SASEC countries. This can improve PC penetration and contribute to bridging the digital divide.

High impact, low implementability

300. Coming next to the second quadrant, training/certification programme for ITES would require detailed consultation between academic institutions and training organizations in the sub-region. While the desirability and impact of training/ certification in ITES is very high, it would take persistent effort and a fair amount of co-ordination in order to arrive at common training /certification programmes for ITES.

301. A Virtual Tech University would have high impact but would require time and effort to forge the linkages with top-flight international institutions in order to provide high quality ICT education. Moreover building consensus on courses and programmes would also be a time-consuming effort.

302. An interoperability framework across countries of the sub-region would similarly require consultation and co-ordination. Countries in Europe and ASEAN have taken significant time to arrive at an interoperability framework based on consensus. While a common framework would greatly help in development of ICT applications in the sub-region, it would nonetheless be a time-consuming and difficult exercise. This is equally true with respect to harmonizing laws for paperless trading and for health information and telemedicine.

High implementability, low impact

303. Quadrant III spells out recommendations that can be implemented easily but may not have as much impact as in the case of quadrants 1 and 2. Conducting BPO/ITES focused conferences/events and arranging bridge programmes between academic institutions and

corporates should be relatively easy. Even in the case of the e-commerce alliance, the fact that there is already a model in place in terms of Pan Asian E-Commerce Alliance would make it relatively easy to forge a common alliance. My preliminary contacts with the Pan Asian E-Commerce Alliance suggests that participation of countries of the sub-region would be welcomed as part of the existing Pan Asian e-commerce alliance. While it will be easy to be part of an alliance, the impact of this will be felt in the medium-to-long term as global trading becomes more and more paperless.

Low implementability, low impact

304. This brings us to Quadrant IV, which consists of recommendations that are low on implementability and on impact. Telemedicine to be effective requires availability of good bandwidth and a very close association between specialists and medical institutions. In view of the existing constraints on availability of bandwidth, it will take time for telemedicine to become a major success in cross border collaboration. Moreover, telemedicine will initially have to be limited to top-level medical institutions in each country and therefore its impact in the short term may to that extent be limited. Similarly, in the case of data centers, efforts will have to be made to identify private companies and provide them with the wherewithal for establishing data centres. This is likely to be difficult especially for countries like Bhutan where substantial effort will have to be made to attract companies to establish data centres.

Appendix 1: Abstract of Recommendations

Sl. No.	Recommendation	Implication for cross-border collaboration	Policy issues involved	Anchor institution	Next steps
	(a)	(b)	(c)	(d)	(e)
e-Government					
1.	Common Interoperability Framework for e-Government	Would make it easier for companies engaged in development of e-Government applications to use their expertise for developing similar applications in other countries of the sub-region. Will make e-Government applications more portable and replicable across borders.	Governments have to agree to collaborate on a Common Interoperability Framework	National Institute of Smart Government (NISG)	ADB to facilitate a meeting for getting governments on board. NISG to be asked to prepare a concept note indicating approach, timeframe and resources required.
2	e-Government Observatory	Will provide a platform for companies engaged in e-Government applications to showcase their products/services. This will make it easier for cross-border collaboration through better awareness of expertise available in the sub-region.	Nil	National Institute of Smart Government	SABF to get ICT Associations in the sub-region to collaborate. NISG to be asked to indicate approach, timeframe and resources required.

Appendix 1: Abstract of Recommendations (contd.)

Sl. No.	Recommendation	Implication for cross-border collaboration	Policy issues involved	Anchor institution	Next steps
	(a)	(b)	(c)	(d)	(e)
3.	Training of Civil Servants on e-Government	Better awareness of civil servants about e-Government applications developed in the sub-region and expertise available with different companies, as also models of public private partnerships will expand collaborative opportunities for the private sector.	Governments to agree on common training programme	National Institute of Smart Government	ADB to facilitate agreement on the part of governments to collaborate. Civil servants training institutions in the sub-region to be contacted and got involved. NISG to submit concept note indicating approach, timeframe and resources required.
Paperless Trading					
4.	Legal Infrastructure Working Group for Paperless trading	Harmonizing of laws will facilitate cross border Paperless trading and will generate business for private sector companies engaged in trade facilitation in the sub-region. Such companies will have to collaborate as part of an e-commerce alliance.	Governments to agree on setting up a Legal Infrastructure Working Group. Laws on electronic transactions, digital signatures, cyber crime, data protection, electronic funds transfer and universal access to be drafted.	National Law School, Bangalore or alternative to be decided by SABF.	SABF to facilitate setting up a Legal Infrastructure Working Group.

Appendix 1: Abstract of Recommendations (contd.)

Sl. No.	Recommendation	Implication for cross-border collaboration	Policy issues involved	Anchor institution	Next steps
	(a)	(b)	(c)	(d)	(e)
5.	Sub-regional e-commerce Alliance	Paperless trading requires collaborative alliances between companies to facilitate electronic transmission of trade and logistics documents.	Governments should agree to participate.	Pan Asian e-Commerce Alliance	ADB/SABF to get governments on board. Study to be commissioned for example by CrimsonLogic of Singapore on detailed modalities for making the alliance operational.
IT Enabled Services					
6.	Sub-regional track in BPO/ITES events	Will help develop better understanding of capabilities and opportunities for companies in the sub-region.	Nil	NASSCOM	SABF to coordinate and firm up sub-regional tracks at BPO/ITES events in consultation with NASSCOM and other ICT Associations.
7.	BPO/ITES training and certification	The availability of trained manpower will make it easier for co-location of ITES/BPO activities between India and other countries in the sub-region.	Nil	APFIRST/Alternative	SABF/ICT associations to agree on anchor institutions for training/ certification. APFIRST/alternative anchor institution to be asked to prepare a concept note indicating approach, timeframe and resources required.

Appendix 1: Abstract of Recommendations (contd.)

Sl. No.	Recommendation	Implication for cross-border collaboration	Policy issues involved	Anchor institution	Next steps
	(a)	(b)	(c)	(d)	(e)
8.	HR BPO for SMEs	Better managed companies with higher quality of talent will make cross border collaboration easier	Nil	Leading HR BPO firm	SABF to explore possibilities of funding the initiative by South Asia Enterprise Development Facility/other aid agencies. SABF to call for proposals from leading international HR firms for setting up the BPO
9.	Promotion of private sector Data Centres with governments as anchor clients	Availability of high quality infrastructure in terms of data centres will facilitate cross border collaboration by making it possible to share such facilities in the sub-region.	Governments to decide on being anchor clients for private data centres		SABF to interface with governments for convincing them to be anchor clients for data centres set up by the private sector.
ICT Education					
10.	Virtual Tech University	Availability of skilled manpower will make cross border investments in ICT easier thus leading to greater cross border collaboration	Government of India to agree to set up Virtual Tech University	Indian Institutes of Technology/ Indian Institutes of Information Technology (IIT/IIIT)	SABF to contact Government of India for setting up Virtual Tech University.

Appendix 1: Abstract of Recommendations (contd.)

Sl.No.	Recommendation	Implication for cross-border collaboration	Policy issues involved	Anchor institution	Next steps
	(a)	(b)	(c)	(d)	(e)
11.	Bridge programmes between academic institutions and corporates	-do-	Nil		SABF to identify anchor institution. Anchor institution to make contact with top corporates in ICT for working out strategies to link up with academic institutions in the sub-region.
Telemedicine					
12.	Linking medical institutions for telemedicine	Greater usage of telemedicine will help private sector health service providers to link up with their counterparts in the sub-region. Will also help companies engaged in medical informatics to collaborate.	Nil	FICCI	Regional event to be organized for bringing together medical institutions, practitioners and policy makers on a common platform.
13.	Harmonising laws and health information standards	Will make it easier for exchanging health information electronically and delivering telemedicine services in the sub-region.	Governments to agree on common health information standards and legal frameworks.	Apollo Telemedicine Networking Foundation	ADB/SABF to get governments to agree to collaborate. SABF to decide on anchor institution. Working groups for defining common information standards and legal frameworks.

Appendix 1: Abstract of Recommendations (contd.)

Sl.No	Recommendation	Implication for cross-border collaboration	Policy issues involved	Anchor institution	Next steps
	(a)	(b)	(c)	(d)	(e)
Incubation					
14.	Incubation initiative	Involvement of venture capital firms, Eco Nets, Meta companies and Vendor capital will help in forging links between ICT start ups in the sub-region.	Nil	Indian School of Business (ISB)/Alternative	SABF to ascertain willingness of governments/academic institutions to participate. SABF to decide on anchor institution. ISB/Anchor institution to provide approach, timeframe and resource requirement.
Fostering Business Linkages					
15.	Business Linkage Fund	Will help link up ICT companies in the sub-region to collaborate on high impact projects relevant to the sub-region.	Nil	Indian School of Business (ISB)	ADB to take the lead to put together a fund with governments and other aid organisations. ISB/Anchor institution to prepare approach, timeframe and resource requirement.
16.	Business Networking initiative	Will help SMEs to network with MNCs/leading ICT players.	Nil	South Asian Enterprise Development Facility (SEDF)	ADB to ascertain willingness of SEDF/other agencies to participate in the initiative. SABF to sound MNCs/leading ICT companies for their participation in the initiative.

Appendix 1: Abstract of Recommendations (contd.)

Sl.No	Recommendation	Implication for cross-border collaboration	Policy issues involved	Anchor institution	Next steps
	(a)	(b)	(c)	(d)	(e)
Enlarging ICT supply					
17.	Use of Indian terrestrial/ under-sea networks for international connectivity	Use of Indian networks like i2i and FLAG (recently acquired by Reliance) could make international bandwidth more reliable and cheaper for countries like Bangladesh, Bhutan and Nepal	Nil	Nil	Telecom service providers in Bangladesh, Bhutan and Nepal could approach Indian telcos for purchase of bandwidth at lower rates.
18.	Procurement of low cost PCs	PC penetration rates in the sub-region could be improved and more academic institutions could be covered for ICT education.	Coordination for procurement of low cost PCs	Ministry for Information Technology, Government of India.	ADB to facilitate introduction of a low cost PC programme. ICT Associations could become the central contact in each country between the Government and the private sector.

Appendix 2: e-Readiness Frameworks

General e-Readiness frameworks (no specific country study)				
Model	**Author**	**Year**	**Description**	**Focus**
E-Commerce Readiness Assessment Guide	Asian Pacific Ecnomic Cooperation (APEC) Electronic Commerce Steering Group	2000	Gauges a country's readiness for e-commerce through a 6 categories, 100 multiple-choice questions detailed questionnaire. No overall scoring. Countries are recommended to work on areas with 'less than optimal answers'.	Basic infrastructure and technology, access to necessary services, level and type of use of the Internet, promotion and facilitation activities, skills and human resources, positioning for the digital economy.
International Survey of E-Commerce	World Information Technology and Services Alliance (WITSA)	2000	Report based on a survey of technology companies on their experience with e-barriers and asking for recommendations. Provides charts and narrative accounts of the answers. Only general conclusions, no country-by-country assessment.	How ready are world markets for electronic commerce? Economic factors, regulatory environments. Issues highlighted include trust, security and privacy, technology, workforce, taxation, business process, costs and consumer attitudes.
Readiness Guide for Living in the Networked World	Computer Systems Policy Project (CSPP)	1998	Rates communities along 4 progressive stages of development in 5 categories. Based on a 23 questions' questionnaire.	Infrastructure, access, applications and services, economy, enablers.
Readiness for the Networked World	Centre for International Development (CID) at Harvard University and IBM		Rates communities along 4 progressive stages of development in 19 indices. Based on communities self-estimation. No prescription for improvement.	Network- access, learning, society, economy, policy.

Appendix 2: e-Readiness Frameworks (Contd.)

E-Readiness frameworks covering the SASEC sub-region					
Model	**Author**	**Year**	**Description**	**Focus**	**Countries**
Global Technology Index	Howard A.Rubin and MetricNet	2002	Qualitative and quantitative statistics on country's technological sophistication and strength using 25 indicators in 5 categories. Ranking graphs.	Knowledge jobs, globalisation, economic dynamism and competition, transformation to a digital economy, technological innovation capacity.	49 including India. India: ranked 39th overall, though it was 2nd in terms of knowledge jobs.
E-Readiness Rankings	The Economist Intelligence Unit	2003	Tallies scores across 6 categories, five of which include a total of 29 indicators. Combines business environment rankings (70 separate indicators) with connectivity scores.	Connectivity and technology infrastructure (25%). Business environment (20%). Consumer and business adoption (20%). Social and cultural infrastructure (15%). Legal and policy environment (15%). Supporting e-services (5%).	65 Including India. India ranked 46th overall.
Global Diffusion of the Internet: Case Studies	The Mosaic Group	2001	Indicates stages of Internet growth and usage through combination of statistics, narrative description and comparison. Focuses on 6 Internet statistics.	Pervasiveness, geographic dispersion, sectoral absorption, connectivity infrastructure, organizational infrastructure, sophistication of use.	15 Including Nepal. Nepal scored 1 (on a scale of 1 to 4 with 4 being the best) in each of the categories of pervasiveness, dispersion, absorption, connectivity, and sophistication. It secured 3 with regard to organizational capability. Nepal's composite score was 8 as compared to the highest score of Singapore which was 22.

Appendix 2: e-Readiness Frameworks (Contd.)

E-Readiness frameworks covering the SASEC sub-region					
Model	**Author**	**Year**	**Description**	**Focus**	**Countries**
Ready? Net. Go! Partnerships leading the Global Economy	McConnell International	2001	Rates countries in five categories on a scale of 1 to 3. Provides extensive analysis and recommendations.	Connectivity, E-leadership, information security, human capital, e-business climate, public-private partnership.	53 including India and Bangladesh. India was categorized in the Red category for connectivity and in the Amber category for other elements. Red indicated 'substantial improvements' needed in the conditions necessary to support e-business and e-Government Amber indicated 'improvements' needed. Bangladesh was in the Red category for all elements. In India public-private partnerships were achieving e-readiness impact with regard to connectivity and e-Leadership.
Networked Readiness of Nations	INSEAD/ World Economic Forum/ Infodev	2003	Index is a composite three components: The environment for ICT offered by given country or community: Readiness of the communities' keys stakeholders (individuals, businesses and governments): and finally, the usage of ICT across these stake holders.	Environment: market, political/regulatory, infrastructure, Readiness: individual / business/ government Usage: individual/ business/government	82 including India and Bangladesh. India's rank : 37 overall Environment : 34 Readiness : 40 Usage : 43 Bangladesh's rank : 77 overall Environment : 77 Readiness : 77 Usage : 74

Appendix 2: e-Readiness Frameworks (Contd.)

E-Readiness frameworks covering the SASEC sub-region					
Model	**Author**	**Year**	**Description**	**Focus**	**Countries**
Knowledge Assessment Matrix	World Bank		Online statistical assessment using 61 indicators in 5 categories. Default scorecards and optional measurements. Only values and graphs.	Performance, economic incentive and institutional regime, education and Human Resources, innovation system, information infrastructure.	100 Including India, Nepal and Bangladesh.

Appendix 3: Comparative Data on Important Parameters Pertaining to ICT

	Bangladesh		Bhutan		India		Nepal	
Country Background information	**1995**	**2002**	**1995**	**2002**	**1995**	**2002**	**1995**	**2002**
Population, mid year (millions)	120.1	135.7	0.70	0.85	932.2	1,048.3	20.4	24.1
Poverty (% of population below US$1 a day)	-	*36.0*	-	-	-	34.7	37.7	-
Adult Literacy rate (% ages 15 and over)	37.1	41.1	-	-	53.3	58.8	36.0	44.0
Urban Population (%of total population)	22.3	26.1	6.0	7.6	26.6	28.1	10.3	12.5
GNI per capita (Atlas method, US$)	330.0	360.0	380.0	590.0	380.0	480.0	220.0	230.0
GNI per capita (PPP, US$)	1,280.0	1,720.0	-	-	1,840.0	2,570.0	1,120.0	1,350.0
GDP Growth (1990-95 and 1995 – 2002, %)	4.4	5.2	5.9	7.1	5.4	5.5	5.2	4.3
Scientists and engineers in R&D (per mill. people)	50.8	-	-	-	*133.3*	157.2	-	-
Expenditures for R&D (% of GNI)	-	-	-	-	-	1.2	-	-
ICT infrastructure & access	**1995**	**2001**	**1995**	**2001**	**2000**	**2001**	**1995**	**2001**
Telephone mainlines Per 1,000 people	2	4	9	25	13	38	4	13
In largest city (per 1,000 people)	19	30	188	*168*	95	136	69	315
Waiting list (thousands)	154	199	2	2	2,277	1,649	154	286
Revenue per line (US$)	780	593	565	604	323	198	496	246
Cost of local call (US$ per 3 minutes)	0.04	0.03	0.03	0.02	0.02	0.02	0.01	0.01
Mobile phones (per 1,000 people)	0	4	-	-	0	6	0	1
International telecommunications								
Outgoing traffic (minutes per subscriber)	116	77	166	202	29	14	175	109
Cost of calls to US (US$ per 3 mts.)	-	2.47	-	6.70	-	3.20	-	-
Daily newspapers (per 1,000 people)	8	53	-	-	-	60	8	12
Radios (per 1,000 people)	47	49	43	50	119	120	38	*39*
Television sets (per 1,000 people)	7	17	17	26	61	83	3	8

Appendix 3: Comparative Data on Important parameters pertaining to ICT (cont'd.)

	Bangladesh		Bhutan		India		Nepal	
Computers & Internet	**1995**	**2001**	**1995**	**2001**	**1995**	**2001**	**1995**	**2001**
Personal computers Per 1,000 people	-	1.9	-	5.8	1.3	5.8	1.2	3.5
Installed in education (thousands)	-	-	-	-	23.6	238.7	-	-
Internet								
Users (thousands)	-	250.0	-	3.0	250.0	7,000.0	0.2	60.0
Monthly off-peak access charges								
Service provider charge (US$)	-	17.3	-	40.1	-	10.0	-	15.8
Telephone usage charge(US$)	-	0.33	-	0.22	-	0.18	-	0.07
ICT expenditures	**1995**	**2001**	**1995**	**2001**	**1995**	**2001**	**1995**	**2001**
Total ICT (US$, millions)	-	-	-	-	7,250.0	19,662.0	-	-
ICT as% of GDP	-	-	-	-	2.1	3.9	-	-
ICT per capita (US$)	-	-	-	-	7.8	19.0	-	-
ICT business & government environment (Ratings from 1 to 7; 7 is highest/best)	**1995**	**2002**	**1995**	**2002**	**1995**	**2002**	**1995**	**2002**
Broadband internet access availablity	-	2.2	-	-	-	3.2	-	
Local specialised IT services availability	-	2.8	-	-	-	5.8	-	-
Competition in ISPs	-	4.2	-	-	-	4.5	-	-
Government online services availability	-	1.5	-	-	-	3.9	-	-
Laws relating to ICT use	-	2.1	-	-	-	4.3	-	-
Government prioritisation of ICT	-	4.4		-		5.6		
Secure servers	-	1 [a]	-	-	-	122 [a]	-	-

Notes: Figures in italics refer to an earlier year.
[a] Data refer to 2001.

Appendix 4: Hill & Associates Assessment of Environment for ITES/BPO in SASEC Countries

We approached Hill & Associates to provide us with a perspective on the factors that are conducive/unfavourable for the ITES and BPO industry in each of the four countries of the sub-region. The inputs provided by them are given below:

Bangladesh

Factors conducive to the ITES and BPO industries

- Low per unit cost of labor
- Large pool of educated and English-speaking labor force
- Emerging as a viable alternative to India with its cheaper labor force and being relatively free of geo-political risks
- Presence of many large MNCs
- Presence of several IT-training institutes
- Fibre-optic cables in major cities
- Several alternate Internet service providers to enable web-based support services
- Liberal investment policies by government no distinction between foreign and domestic investors.
- Government has identified IT as "thrust sector" and has invested on infrastructure to support these industries.
- According to a study by Boston Consulting Group (BCG), based on data generated by US Bureau of Census, Bangladesh will have a spare working population of 7 million by 2020.
- To benefit from the huge global IT market Bangladesh has opened an office in the heart of Silicon Valley. The project, with an annual budget of USUS$400,000, is supported by the World Bank and the country's commerce ministry.
- There are about 200 software companies in Bangladesh, and at least 30-40 export abroad to the US Europe, Japan, and Australia.
- Major international airport at Dhaka
- Large population of moderate Muslims
- Cultural and religious affinity with Middle East Nations – Bangladesh exports labour extensively to these countries.

Factors unfavorable to the ITES and BPO industries

- High cost of telecommunication
- Low quality of infrastructure
- Low productivity
- High levels of corruption and bureaucracy
- Meets minimal requirements in terms of telecommunication infrastructure
- Low domestic market for ITES services
- Political rivalry-inspired disruptions to business
- National disasters such as cyclones and floods frequently disrupt transportation and communication (Dhaka is unaffected by cyclones but travel to Dhaka in monsoons is difficult and only air travel can be considered reliable).

Bhutan

Factors unfavourable to the ITES and BPO industries

- Serious lack of skilled labour
- More than 90% of labour occupied in agriculture and only 5% in services
- Technologically backward
- Extremely low telecom density
- International telephone and telegraph service is by landline through India.
- Extremely low computer literacy with no more than 3000 Internet users at the end of 2002.
- Highly controlled business environment hampering foreign investment
- Isolated – No major international airport. The national airline, Druk Air, is the only airline servicing Bhutan. The only airport is at Paro, which is connected to four countries viz., India, Bangladesh, Thailand and Mynamar.
- Natural calamities – Susceptible earthquake and floods.

Nepal

Factors conducive to the ITES and BPO industries

- Nepal is the only country that allows private companies to have their own V-SATs to act as gateways into the rest of the world.
- A sizeable pool of English speaking and computer literate workforce
- Nepal has the lowest Internet rates in South Asia
- Repatriation of both profits as well as principal investments.

Factors unfavourable to the ITES and BPO industries

- Severe lack of skilled labor force
- Low levels of education, although English is widely spoken
- Technologically backward
- Political instability leading to lack of consensus on economic reforms
- Poor telecom infrastructure – Teledensity among the lowest in the world (However, Kathmandu has adequate telecom infrastructure with high quality service)
- Government indifference – no export incentives for the sector as it is not recognized as an industry, no investment in training manpower
- Corrupt bureaucratic structure
- Restrictions in areas of trade, investment and foreign exchange
- Outdated airport at Kathmandu

India

Factors conducive to the ITES and BPO industries

- Large pool of educated and skilled workforce primarily due to an advanced educational system
- India has a diverse workforce capable of undertaking work ranging from low-end contact centre work to high end software design and complex projects
- Large English – speaking population (second largest in the world)
- Low cost labour force

- High service quality
- High levels of computer literacy
- Technologically advanced urban cities – high bandwidth availability and good telecom infrastructure in urban cities
- Reducing telecom costs due to privatization and further liberalization of the sector.
- High Government support – ITES in the "top five priority" list of government
- Government incentives to foreign firms setting up operations in India – 100% foreign ownership permitted unlike in other sectors
- Global leader in adoption of Capability Maturity Model (CMM) (an international standard to assess maturity of the software processes) 55% of firms having CMM Level 5 certification are Indian
- Service providers also possess Six Sigma, ISO 900 and BS 7799 certifications
- Long established international experience for ITES
- According to a study by Boston Consulting Group (BCG), based on data generated by US Bureau of Census, India will have a surplus working population of 47 million by 2020.
- Fibre-optic links in use in major cities, four submarine cables including one linking Mumbai to Al Fujayrah, UAE.

Factors unfavourable to the ITES and BPO industries

- Geo-political risks, especially those arising from Indo-Pak tensions.
- Outsourcing to a nation with recent history of communal riots
- Rising costs, not favorable for smaller projects or for low-end generic work
- Given the recent history of communal riots, the probability of more such acts combined with a Hindu nationalist government in power will be an area of concern for Middle East countries.
- Slow infrastructure development and low infrastructure outside of established ITES centres.
- High rates of manpower attrition and turnover due to increased demand.

Appendix 5: List of Contacts
India - Meetings held during the Inception Phase

Sl. No.	Contact	Organization
1	Dr. Ashis Bhattacharya Deputy Director	National Remote Sensing Agency
2	Dr. V. Raghavswamy Group Head Land Use and Urban Studies	National Remote Sensing Agency
3	Dr. B.Bhanumurthy Head - Water Resources Division	National Remote Sensing Agency
4	Dr. L.Venkataratnam Group Director Agriculture and Soils	National Remote Sensing Agency
5	Dr. M.M.Ali Head - Oceanography Division	National Remote Sensing Agency
6	Mr. Pramod Kheda CEO	APTECH
7	Mr. Kalpathi S.Suresh Chairman and CEO	SSI
8	Ms. Ashish Garg Regional Coordinator India	World Links
9	Mr. A.V.S. Reddy Director-General	National Institute of Rural Development
10	Mr. Rajendran Chief Operating Officer	NIIT
11	Mr. Kiran Karnik President	NASSCOM, New Delhi
12	Dr. Kavitha Iyengar Senior Consultant Regional Development	ADB Delhi
13	Mr. M.A. Jeyaseelan Senior Director	FICCI
14	Ms. Amita Sarkar Deputy Director	FICCI, New Delhi
15	Mr. Thinley Penjor Deputy Chief of Mission	Royal Bhutanese Embassy New Delhi
16	Mr. G.D.Sharma Deputy Director	CII
17	Mr. Rajiv Ranjan Shah Secretary	Department of Information Technology, Government of India
18	Mr. R. Chandrasekhar Joint Secretary	Department of Information Technology, Government of India
19	Mr. Wijayananda Jayaweera Regional Communication Adviser for Asia	UNESCO
20	Mr. Ian Pringle Consultant Communication and Information Sector	UNESCO
21	Mr. Md. Shahdat Hossain Minister	Bangladesh High Commission New Delhi

Sl. No.	Contact	Organization
22	H.E. Mr. B.B. Thapa Ambassador	Royal Nepalese Embassy, New Delhi
23	Mr. R.O.Wallang Joint Secretary SAARC	Ministry of External Affairs, Government of India
24	Mr. Preetpal Singh Chairman and Managing Director	Bharat Sanchar Nigam Limited
25	Mr. Sujay Chohan Vice President, Research Director	Gartner
26	Mr. Azeem Premji Chairman	WIPRO
27	Mr. Hari Shankar	School Net
28	Mr. Ramalinga Raju	Satyam Computer Services Ltd
29	Mr. Mohan Das Pai	Infosys
30	Mr. Ghanshyam Director	Ministry of External Affairs – Nepal & Bhutan
31	Dr. Soumitra Dutta	INSEAD
32	Mr. Ajai Chowdhry Chairman & CEO	HCL Infosystems Ltd.
33	Mr. T. Sakai	Japan International Cooperation Agency
34	Mr. S. Ramadorai	TCS
35	Mr. VK Gupta Director	National Institute of Science, Communication & Information Research (NISCAIR)

Appendix 5: Bangladesh 25th June to 1st July 2003

Sl. No.	Contact	Organization
36	Mr. Anupam Ray First Secretary	High Commission of India
37	Mr. Anurag Bhushan First Secretary	High Commission of Dhaka
38	Md. Sabur Khan Managing Director	Daffodil Computers
39	Mr. Syed Marghub Murshed	Bangladesh Telecommunication Regulatory Commission
40	Mr. Ananya Raihan	Centre for Policy Dialogue(CPD)
41	SATM Badrul Hoque Chairman	Bangladesh Telegraph and Telephone Board
42	Md. Sharif Uddin Director (Overseas)	Bangladesh Telegraph and Telephone Board
43	Md. Ahraful Alim General Manager	Bangladesh Telegraph and Telephone Board
44	Syed Samiul Wadood COO	Bangladesh Online Limited
45	Ershad Chowdhury CIO	Bangladesh Online Limited
46	Supriyo Chaudhuri Location Head Bangladesh	NIIT Limited
47	Habibullah N Karim President	Bangladesh Association of Software & Information Services
48	BMM Mozharul Huq Secretary	Ministry of Disaster Management and Relief
49	Matiur Rehman Jt. Secretary (Relief & Planning)	Ministry of Disaster Management and Relief
50	Md. Abdus Salam Khan Jt. Secretary	Ministry of Disaster Management and Relief
51	Dr. Mya Maung Director General	CIRDAP
52	Engr. Syed Abdul Mayeed Chairman	Bangladesh Power Development Board
53	Deepak P. Adhikary Program Manager Business Development Services	South Asia Enterprise Development Facility
54	M. Fazlur Rahman Secretary	Ministry of Health & Family Welfare
55	Faruq Ahmed Siddiqi Secretary	Ministry of Post and Telecommunications
56	Mridul Chowdhury Information technology Group	Centre for International Development at Harvard University
57	M. Shajahan Khadem Convenor	The Institute of Engineers, Bangladesh

Sl. No.	Contact	Organization
58	Dr. M. Kaykobad Professor	Dept. of Computer Science & Engineering Bangladesh University of Engineering & Technology
59	Yussuf A Harun President	The Federation of Bangladesh Chambers of Commerce & Industry
60	Manjur Shoeb Chowdhury Member	Federation of Bangladesh Chamber of Commerce & Industry
61	Hossain Khaled Vice President	The Dhaka Chamber of Commerce & Industry
62	K. Atique E Rabbani Managing Director	TCL IT Services Ltd
63	Karar Mahmudal Hassan Secretary	Ministry of Science and Information & Communication Technology
64	Sabihuddin Ahmed Secretary	Ministry of Environment & Forests
65	Mr. Purnima Rajapakse Chief Economist	ADB
66	Tapan Chowdhury President	Metropolitan Chamber of Commerce & Industry
67	DH Azad General Manager	Square Informatix
68	Mahboob Zaman Managing Director	Datasoft Systems Bangladesh Limited
69	Munshi Md. Giasuddin Managing Director	Munshigi Com Limited
70	Zia Shamsi Director	Agni Systems Limited
71	Mohosin Rob Chowdhury General Manager-Communications Wing	Agni Systems Limited
72	Nuimuddin Chowdhury Managing Director, Advisor Board of Directors	Grameen Information Highway

Appendix 5: Bhutan 6th to 13th July 2003

Sl. No.	Contact	Organization
73	Peter Newsum, Senior Program Coordinator	SNV National Development Organisation.
74	Sangey Tenzing Managing Director	Bhutan Telecom
75	Kipchu Tshering Managing Director	Bhutan National Bank.
76	Deirdre Boyd Deputy Resident Representative	UNDP
77	Kristiina Urpalainen Programme Officer	UNDP
78	Chiristopher Faris UN Volunteer –ICT for Development Specialist	UNDP
79	Dasho Meghraj Gurung Managing Director	Bhutan Post
80	Sonam Tshering Managing Director	Bhutan Power Corporation
81	Manzar Khan Managing Director	OXFORD University Press
82	Anindya Sengupta Regional Manager (East)	OXFORD University Press
83	Tshering Dorji Secretary General	Bhutan Chamber of Commerce Industry
84	Jigme Lhendup CEO	Druk Information Technology
85	Sangay Wangchuk	Division of Information Technology
86	Prof. Ram Jakhu	McGill University
87	Umesh Pradhan	Info Tech Solutions
88	Mani Pradhan Managing Director	Digital Shangrila
89	Thinley Dorji Director	Bhutan Telecom Authority
90	Leki Dorji Minister	Ministry of Information & Communications

Appendix 5: Nepal 14th to 19th July 2003

Sl. No.	Contact	Organization
91	C.Gururaj Rao First Secretary & Head of Cancery	Embassy of India
92	Prem Nidhi Gyawali Secretary	Ministry of Science & Technology
93	Prof.Dr.Kedar Lal Shrestha Chief Advisor	Ministry of Science & Technology
94	Poorna B. Adiga Joint Secretary	Ministry of Science & Technology
95	Atma Ram Ghimire Executive Director	National Information Technology Centre
96	Pramod K. Choraria Managing Director	World Link Technologies
97	Arbinde Rajkarnicar Director – Business Development	World Link Technologies
98	Hemant Nahata Director	World Link Technologies
99	Ram Babu Pant Deputy Governor	Nepal Rastra Bank
100	Sudarshan Raj Poudyal Executive Director	Nepal Rastra Bank
101	Purushottam Ojha Joint Secretary	Ministry of Industry, Commerce & Supplies.
102	M.S. Bista Joint Secretary	Chief Monitoring & Evaluation Division Ministry of Forest & Soil Conservation Chairman Herbs Production & Processing Co. Ltd Koteshwar, Khatmandu
103	Lochan Lal Amatya President	Computer Association of Nepal
104	Pawan Tuladhar Executive Member	Computer Association of Nepal
105	Binod B.Rajbhandary General Secretary	Computer Association of Nepal
106	Biplav Man Singh First Vice President	Computer Association of Nepal
107	Krishna Chandra Paudel Deputy Director General	Department of Forest Research & Survey
108	Suresh Kumar Pudasaini Chairman	Nepal Telecommunication Authority

Sl. No.	Contact	Organization
109	Surendra Lal Hada Assistant Manager (Engg)	Nepal Telecommunication Authority
110	N.K. Shrestha GIS Advisor	Planning Commission
111	Shambhu Sharan P.Kayastha Executive Director	Nepal Administrative Staff College
112	Ram Bhakta Shrestha Director Centre for Organisation Development	Nepal Administrative Staff College
113	Dinesh Prasad Pant Director of Studies	Nepal Administrative Staff College
114	Dr. Krishna R. Khadka Director - Centre for Development Policy & Planning.	Nepal Administrative Staff College
115	Shankar P. Rajbhandari Director - Centre for Local Governance	Nepal Administrative Staff College
116	Gopal Jung Raymajhi Deputy Executive Director	Nepal Administrative Staff College
117	Mahesh K.Agarwal Managing Director	Mahesh Overseas Group
118	Kishor Kumar Agarwal Chairman – Communication & Technology Committee	Nepal Chamber of Commerce.
119	Shanker Man Singh Executive Secretary	Nepal Chamber of Commerce
120	Sanjib Raj Bhandari CEO	Mercantile Office Systems
121	Binod K.Chaudhary President	Confederation of Nepalese Industries
122	Min Bahadur Karki Director General	Confederation of Nepalese Industries
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References

Alburo, Florian A. Promoting Trade in SASEC: A Report on Non-Tariff and Non-Trade Barriers, presented at the Second Meeting of the South Asia Business Forum, January 21, 2004, Dhaka,

ASEAN (2000), "e-ASEAN Framework Agreement: The Fourth ASEAN Informal Summit", 22-25 November 2000, http://www.aseansec.org/5308.htm.

ASEAN Secretariat (2002), "Overview of the meeting of the ASEAN Telecommunications Ministers", 27-28 August 2002, <http://www.aseansec.org/7808.htm>.

ASEAN Secretariat (2003), Recommendations of the High Level Task Force on ASEAN Economic Integration, <http://www.aseansec.org/hltf.htm>

ASEAN, "ASEAN Vision 2020", <http://www.aseansec.org/1814.htm.

Asia PKI Forum (2003), Report On Legal Issues in Cross-Border E-Commerce Transactions.

Asian Development Bank (2001), Moving the Poverty Reduction Agenda Forward in Asia and Pacific: The Long Term Strategic Framework of the Asian Development Bank (2001- 2015), March 2001.

Asian Pacific Economic Cooperation (APEC) Electronic Commerce Steering Group (2000), E-Commerce Readiness Assessment Guide.

Australian Ministry of Foreign Affairs and Trade & Chinese Ministry of Foreign Trade and Economic Cooperation, 2001, Paperless Trading: Benefits to APEC.

Bangemann Report, Recommendations to the European Council: Europe and the Global Information Society

Bangladesh Country Gateway (2002), e-Readiness and Need Assessment, August 2002.

Bangladesh Power Development Board (2002), Annual Report 2001-2002.

Bangladesh Telegraph & Telephone Board (2002), Annual Report 2001-2002.

BBC News, (2002), "Technology: Telemedicine Lifeline for villages", http://news.bbc.co.uk/1/hi/technology/2288619.stm.

Bhutan, Division of Information Technology (2003), Bhutan e-readiness Assessment, Final Report, 30 June 2003.

Bhutan, Ministry of Communications (2002), Division of Information Technology (DIT), Bhutan ICT Master Plan, 2002.

Brown, R. et al., The HR Business Process Outsourcing Market in Booming, Gartner Group, 9 July 2003.

Center for International Development (CID) at Harvard University and IBM, Readiness for the Networked World.

Centre for Policy Dialogue (2001), Policy Brief on Information and Communication Technology, August 2001.

Chanda, Rupa (2001), "Trade in Health services", Indian Council for Research on International Economic Relations, November 2001.

CII (1999), India – Bangladesh: Plan for Business Co-operation, June 1999.

CII (2003), Third Meeting of MCCI – CII JEC, New Delhi, 11th March 2003.

Commonwealth of Australia (2002), "National office for the Information Economy: Projects and activity directory", http://www.govonline.gov.au/projects/

Computer Systems Policy Project (CSPP), (1998), Readiness Guide for Living in the Networked World.

DFID, "DFID Challenge Funds", http://www.challengefunds.org/.

eErope (2005): "An Information Society for All" http://europa.eu.int/comm/information_society/eeurope/news_library/pdf_files/initiative_en.pdf .

FICCI, South Asian Growth Quadrangle: Emerging opportunities for Economic Partnership 2001.

Global Insight, The Impact of offshore Software and Services Outsourcing on the US Economy and the IT Industry, March 2004.

Government of India (2003), India: E-Readiness Assessment Report 2003, Department of Information Technology, Ministry of Communications and Information Technology.

Government of India (2004), Framework for Information Technology Infrastructure for Health in India, Department of Information Technology, Ministry of Communications and Information Technology.

Government of India, Planning Commission, Tenth Five-Year Plan (2002-2007).

Government of Ireland, "Reach-Connecting people and public services", <http://www.reach.ie/>.

Government of Nepal (2000), Information Technology Policy 2057 (2000), Ministry of Science and Technology, His Majesty's Government of Nepal.

Government of the Peoples' Republic of Bangladesh (2000), Ministry of Science and Information & Communication Technology, National Policy on Information and Communication Technology, October 2002.

Government of the Peoples' Republic of Bangladesh (2002), 2000 Statistical Year Book of Bangladesh-21st Edition, Bangladesh Bureau of Statistics.

Government of the Peoples' Republic of Bangladesh (2002), Statistical Pocketbook of Bangladesh 2001, Bangladesh Bureau of Statistics.

Hermida, Alfred (2002), "Telemedicine lifeline for village", BBC News, 21 October 2002.

Hill & Associates (India) Pvt. Ltd. (2003), A study on business opportunities in ITES and BPO sectors in Bangladesh, Bhutan, India and Nepal.

Hong Kong, Tradelink Electronic Commerce Ltd (Tradelink), <http://www.tradelink.com.hk/>.

IDA, European Interoperability Framework for pan-European eGovernment Services, IDA working document Version 4.2, January 2004. <http://europa.eu.int/ISPO/ida/export/files/en/1674.pdf>.

IDC, e-Observatory site, <http://europa.eu.int/ISPO/ida/jsps/index.jsp?fuseAction=showChapter&chapterID=140&preChapterID=0>

INSEAD/ World Economic Forum/ Infodev (2003), Networked Readiness of Nations

Johnsrud, Cristy S, Theis Ryan P, Bezerra Maria, Business Incubation: Emerging Trends for Profitablity and Economic Development in the US, Central Asia and the Middle East.

Kearney AT (2003), Where to locate: Selecting a Country For Offshore Business Processing.

Khan, Dr.Md.Omar Faruque, Secretary incharge of the Ministry of Science and Information and Communications Technology, Government of the People's Republic of Bangladesh, Country Paper presented at the First Meeting of the ICT Working Group for SASEC Countries at Delhi, 15-16 March 2004.

Kreizman G (2002), "Achieving the National Spatial Data Infrastructure's Vision, Research Note 26 June 2002, Gartner.

Le Centre De Resources et D'Echanges, <http://www.atica.pm.gour.fr/xml/repertoire.shtml>.

Matlus, R., et al., Magic Quadrant for Data Center Outsourcing 4Q03, Gartner Group, November 12, 2003.

McConnell International (2001), Ready? Net. Go! Partnerships leading the Global Economy

McKinsey Global Institute, Offshoring: Is it a win-win game?, San Francisco, August 2003.

NASSCOM-KPMG Study: Choosing a location for ITES operations in India, February 2004.

NASSCOM – McKinsey Report 2002.

National Technology University (NTU), Excellence in Engineering Education, http://www.ntu.edu/.

Office of the e-Envoy, e-Government Interoperability Framework, version 5.0, 25 April 2003.

Office of the e-Envoy, Policy framework for a mixed economy in the supply of e-Government services, a consultation document, UK, May 2003.

Porter, Michael E., "Building the Microeconomic Foundations of Productivity: Findings from the Microeconomic Competitiveness Index", The Global Competitiveness Report 2002-2003, Oxford University Press, New York.

Pudasaini, S.K., Chairman, Nepal Telecommunication Authority, presentation made at the First meeting of the ICT Working Group for the SASEC countries at Delhi, March 15-16, 2004.

Rubin A,Howard and MetricNet (2002), Global Technology Index

Rupa Chanda, Trade in Health Services, Working Paper No.70, Indian Council for Research on International Economic Relations, November 2001.

SAARC (1998), Secretariat, "South Asian Association for Regional Co-operation: A Profile", Kathmandu, 1998.

SAARC, Agreement on South Asian Free Trade Area (SAFTA), <http://www.saarc-sec.org/summit12/saftaagreement.htm>.

Shakya, Subarna and Rauniar, Deepak, (2002) , "Information Technology Education in Nepal: An Inner Perspective", The Electronic Journal of Information Systems in Developing Countries.

Singapore 2012. The Living Digital Hub…. where iT works!, Economic Review Committee, ICT working Group. http://www.mti.gov.sg/public/PDF/CMT/ERC_SVS_ICT_MainReport.pdf?gid=128&cid=1287.

Singapore Trade Development Board Consulting, "Alignment of Trade Documents and Procedures of India, Nepal and Pakistan", paper prepared, for ESCAP August 2000.

Singapore, "e-Government: Delighting customers, connecting citizens".

The City of Edinburgh Council, "Debut: One connection for all your local needs", Final Report.

The Economist, April 3rd – 9th 2004, After the drought, a special report on Venture Capital.

The Economist Intelligence Unit (2003), E-Readiness Rankings

The Federal Geographic Data Committee (FGDC), USGIS, "Clearinghouse", http://www.fgdc.gov/clearinghouse/clearinghouse.html>.

The Independent, Dhaka, 2 July 2003.

The Mosaic Group (2001), Global Diffusion of the Internet: Case Studies

TIE, "Telemedicine Information Exchange", http://tie.telemed.org/.

US Department of State (2001), "Fact Sheet : e-APEC Strategy", 19 October 2001.

World Bank, Knowledge Assessment Matrix

World Economic Forum (2004), The Global Competitiveness Report 2003-2004.

World Information Technology and Services Alliance (WITSA), (2000), International Survey of E-Commerce.