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**POLICY BRIEF ON “INFORMATION AND
COMMUNICATION TECHNOLOGY”**

CPD TASK FORCE REPORT



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Acronyms	
AABEA	American Association of Bangladeshi Engineers and Architects
ADP	Annual Development Programme
ASEAN	Association of South East Asian Nations
ATM	Automated Teller Machine
B2B	Business to Business
B2C	Business to Consumer
BANSDOC	Bangladesh National Scientific Documentation Centre
BANSLINK	Bangladesh National Scientific and Library Information Network
BASIS	Bangladesh Association of Software and Information Services
BB	Bangladesh Bank
BCC	Bangladesh Computer Council
BCS	Bangladesh Computer Samity
BERNET	Bangladesh Educational Research Network
BIBM	Bangladesh Institute of Bank Management
BISDN	Broadband Integrated Services Digital Network
BIT	Bangladesh Institute of Technology
BOU	Bangladesh Open University
BS	Bachelor of Science
BTTB	Bangladesh Telephone and Telegraph Board
BUET	Bangladesh University of Engineering and Technology
CAB	Consumers Association of Bangladesh
CATV	Cable Television
CMM-SEI	Capability Maturity Model-Software Engineering Institution
CPD	Centre for Policy Dialogue
EEF	Entrepreneur Equity Fund
EPB	Export Promotion Bureau
EU	European Union
FCB	Foreign Commercial Bank
FDI	Foreign Direct Investment
GDP	Gross Domestic Product
GSM	Global System Mobile
HPI	Human Poverty Index
IAS	International Accounting Standard
ICC	International Credit Card
ICT	Information and Communication Technology
IFC	International Finance Corporation
IPR	Intellectual Property Rights
ISDN	Integrated Services Digital Network
ISO	International Standard Organization
ISP	Internet Service Provider
ITU	International Telecommunication Union
JRC	Jamilur Reza Chowdhury
LAN	Local Area Network
LDC	Least Developed Country
MICR	Magnetic Ink Character Reader
MICT	Ministry of Information and Communication Technology
MOC	Ministry of Commerce
MOE	Ministry of Education
MOF	Ministry of Finance
MOFA	Ministry of Foreign Affairs

MOHA	Ministry of Home Affairs
MOHFW	Ministry of Health and Family Welfare
MOL	Ministry of Law
MOP	Ministry of Planning
MOPT	Ministry of Post and Telecommunications
MS	Masters of Science
MST	Ministry of Science and Technology
NBFI	Non- Banking Financial Institution
NCB	National Commercial Bank
NGO	Non Government Organisation
NII	National Information Infrastructure
NRB	Non- Resident Bangladeshi
NTB	National Telecommunication Policy
OTS	Off – the – Shelf
PBX	Private Branch Exchange
PC	Personal Computer
PCB	Private Commercial Bank
PCO	Public Call Office
PHS	Personal Handy Set
PMITTF	Prime Minister’s Information Technology Task Force
PSO	Postal Services Office
PSTN	Public Switched Telecommunications Network
RB	Resident Bangladeshi
RMG	Ready- made Garments
SBIT	Silicon Bangla Information Technology
SME	Small and Medium Enterprise
GOB	Government of Bangladesh
SRO	Statutory Regulatory Order
SUST	Shahjalal University of Science and Technology
SWOT	Strength, Weakness, Opportunity, Threat
TRC	Telecommunication Regulatory Commission
UGC	University Grants Commission
UNCITRAL	United Nations Commission on International Trade Law
UNCTAD	United Nations Council for Trade and Development
US	United States
USO	Universal Service Obligation
VSAT	Very Small Aperture Terminal
WAN	Wide Area Network
WAP	Wireless Application Protocol
WHO	World Health Organisation
WTO	World Trade Organisation

Chapter I. A Framework for Policy Briefs

I.1. Background

Sustainability of the democratic process in Bangladesh, with the prospect of upcoming general election, largely depends on how the principal political parties focus their attention on policy agenda that address the well-being of people and economic development. A set of policy briefs, which ought to reflect the public concerns and expectations from a new government, has been developed to be placed before the political parties and voters, which can serve to initiate and influence the policy debate in the course of the campaign for the forthcoming parliamentary elections. The information and communication technology plays a very important role in economic development of the country. The proper policy development and its subsequent implementation for integration of ICT with economic and social activities can make a quantum shift in status of Bangladesh economy. For that reason ICT has been selected as one of the 16 priority strategic issues, on which task forces have been formed to develop policy briefs. The task force members worked together with their expertise knowledge and views to identify all the areas which deserve attention and consulted different interest groups in the course of preparation of policy briefs. Many distinguished professionals and organizations volunteered their opinion in developing action agenda for the policy brief.

II.2. Regional Consultation on Draft Policy Brief

As a part of the participatory process, the policy brief has undergone thorough dissection by the stakeholders in a regional dialogue, organized by CPD, the daily *Prothom Alo* and the *Daily Star* in Sylhet on August 16, 2001. The regional forum has provided substantial number of suggestions to be incorporated in the policy brief. The task force members have examined the suggestions scrupulously and incorporated only those recommendations, which are not overlapping with already inserted recommendations and are not well argued. In cases where the task force disagreed with the suggestion of the regional consultation, the arguments have been put in the footnote in respective action agenda. As a whole the regional consultation was very successful and majority of the suggestions were very much thoughtful and reflect the peoples' perspective.

Along with the system component wise discussion the regional consultation revealed several other issues, which also deserve attention. The regional consultation revealed concern about the political commitment and steps to make the parliament center of all political and economic activities. The regional consultation emphasized on these issues, as they are very important to realize any of the action agenda mentioned in the policy brief.

II.3. Introduction

Information is one of the nation's most critical economic resources, for service industries as well as manufacturing, for economic as well as national security. In an economy people are doing either information-related jobs, or in industries that rely heavily on information. In the era of globalization, leading towards global competition, the technologies to create, manipulate, manage and use information are of strategic importance for Bangladesh. Those technologies will help businesses remain competitive, create new jobs. They also will fuel

economic growth and foster a quantum shift in the efforts for poverty alleviation through improvement of human poverty index [HPI].

The taskforce on information and communication technology [TOICOT] in developing the policy brief was guided by three major components of development strategies:

1. Poverty alleviation;
2. Sustainable economic growth; and
3. Empowerment.

For addressing the above mentioned development strategy components, a policy framework, developed on the basis comprehensive consultation with all stakeholders and addressing all crosscutting issues, is essential.

The policy brief developed for addressing the issues related to ICT covers the following areas:

- Assessment of current scenario
- Identification of problems and issues
- Description of short term [up to two years] and mid-term [up to five years] agenda
- Identification of stakeholders for each agenda and implementation mechanism, where possible

The policy brief has emphasized on concrete policy agenda, which are implementable. Although it is very difficult to define implementability of agenda, the task force has been guided by the following principles:

1. Leadership
2. Vision
3. Ownership of the agenda
4. Political Consensus
5. Availability of financial resources
6. Availability of human resources.

The availability of resources is a relative measurement that is why they have been put later on the list. The task force believes that a visionary leadership with a public mandate and domestic ownership of the agenda can mobilize and optimize the resources for implementation of the action agenda.

I.4. Goal

Influence the pre-election policy debate regarding the development agenda and subsequent follow –up with the new government after forthcoming national election.

I.5. Scope

Admittedly, it is not possible for the task force to address all the issues, which might come under the theme. Accordingly, the task force has kept the agenda as broad-based as possible.

However, in certain issues detailed policy agenda have been formulated. The task force gathered already existing works, prepared by different forum and organizations and also current policy documents [see appendix I] as the point of departure. The task force mainly translated existing academic and applied research and views of different stakeholders into practical policy recommendations, which have been mapped on the proposed framework [see section I.6]. The task force distinguished short term [implementable within two years] and mid term [implementable within five years] action plans to be adopted and implemented by government and other stakeholders. It should be noted here that the mid term agenda are meant to be initiated immediately and completed within five years. The task force has placed those agenda in the mid term action plan whose implementation will take longer time.

I.6. A Framework

For developing a set of policy agenda the taskforce has applied a system approach and developed a framework for elaboration of individual components to address there by. In the proposed framework, national information infrastructure [NII] should be considered as basic infrastructure to bring dynamism and competitive advantage in all sectors of the economy as well as to harvest long run benefit through quality education and healthy nation building process. In the proposed model for ICT based economic development the role of information has been considered as mission critical and the creation of a "universal" national information infrastructure [NII] is the core of all development activities. In other words, the national information infrastructure is at the center of the ICT based economic development framework. All the components of the framework elaborated in the policy brief are to be stemmed from the NII.

The components of the ICT based economic development framework which are stemmed from the development of the NII are:

- Human Resource Development: ICT education, ICT training, and ICT based education;
- ICT based economy: ICT industry with its export potential, business process reengineering through ICT, human resource development for business automation, and e-commerce;
- Acceleration of poverty alleviation through ICT;
- Universalization of Quality Health Care Services through ICT;
- Financial and Payment Infrastructure: automation of financial institutions, ICT based financial products, and financing ICT industry;
- Legal infrastructure of the NII;
- Efficiency of the Government: access to government information, efficiency of government agencies, improvement of transparency of the government, online government services;
- Digital empowerment of women;
- Resource Allocation and Fiscal measures; and
- Intuitional framework for coordination of development of the NII.

The agenda for action identified in the whole policy briefs are tied with the entities who are to act on the agenda to implement them. The entities mentioned in the 'action by' column should be modified further. The task force strongly proposes to form a ***Ministry of Information and Communication Technology [MICT]***. Majority of the agenda are not

possible to implement without a dedicated government entities with full logistic supports. The Prime Minister's Task Force on ICT could not impact much due to lack of proper infrastructure. The MICT is becoming more impending as the convergence between different technologies is taking place very rapidly and information itself and the media for its transmission should be controlled or regulated form one contour. As a result, in several action agenda the task force often mentioned the MICT¹ as implementing agency.

¹ The word "proposed" should be added before MICT, where applicable.

Chapter II. Information Infrastructure

The phrase "information infrastructure" has an expansive meaning. In terms of outputs and impacts, the information infrastructure includes the transmission, storage, processing, and displaying of voice, data, and images. Physically the information infrastructure encompasses a wide and ever-increasing range of devices including cameras, scanners, keyboards, telephones, mobile phones, fax machines, computers, switches, compact disks, video and audio tape, cable, wire, satellites, optical fiber transmission lines, microwave nets, switches, televisions, monitors, printers, and much more. A connected information infrastructure may in some places be wired and in others wireless, in some parts connected via automated devices and in others by man-operated ones.

II.1. Why does Bangladesh need a national information infrastructure?

In Bangladesh's case the connectivity requirements remain at a fairly basic level. Public access to telephones remains the most limited in South Asia. The public switched telecommunications network (PSTN), the backbone of any information infrastructure, remains restricted to parts of Dhaka and the other major towns, with penetration to rural areas still sporadic and limited. Penetration of PCs, Internet connections and corporate organizations with a connected ICT infrastructure is low to the extent that even reliable sources of data on these topics is not yet available in Bangladesh. Legislation that enables financial institutions to offer networking and ICT based customer services (such as banks) is lacking, and public awareness of the benefits from tapping into such services is in some cases limited. The mobile sector is developing rapidly, but principally it is doing so as a substitute for people who can't wait for a fixed line from BTTB and can afford a mobile connection. The service is restricted to voice communication and some peripheral data services, and lacks connectivity between mobile to fixed lines in most cases.

Overall, the infrastructure developing in Bangladesh today is not only sporadic and limited to those who have an ability-to-pay (e.g. urban and mobile users), but is also not grounded by a policy or regulatory framework that is sufficiently guiding the country towards building a connected infrastructure. The virtual absence of any sort of sophisticated or high capacity information infrastructure presents the policy maker with an urgent opportunity as well as a significant challenge.

In order to ensure that efforts, those underway and those to be encouraged, to develop the information infrastructure are well targeted, it is vital that the Government develops a vision for the infrastructure it wishes to see in Bangladesh, and then ensures that policies and the regulatory framework support this. Bangladesh needs a clear approach to developing the information infrastructure since resources are scarce, demand is high and largely unmet, and time is short.

To justify the proposal to develop a national information infrastructure, we have think on the following issue:

- Bangladesh people can not participate in the global ICT revolution, since they will not be connected – there is no point in discussing our ICT potential if we do not build the highway to connect it;

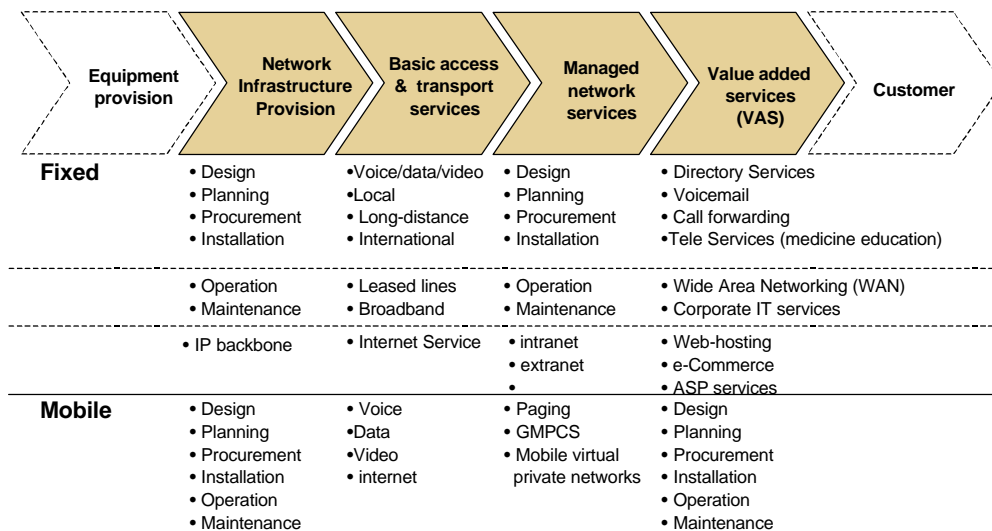
- Rural Bangladesh will suffer from the digital divide, being left further in terms of access to markets, education, social and health services; and
- Bangladeshi businesses will be left out of the "new economy " – suppliers who can not connect with our companies may go elsewhere, and we may also lose the market share to other countries who can better reach new customers.

The information infrastructure should not be seen as a channel for accessing information. Rather, access to content and data is increasingly a necessary condition to performing basic and important tasks in a connected economy. Information infrastructure is key to ensuring Bangladesh continues to play a competitive role in the world economy and to making sure that our people participate in the benefits offered by globalization.

II.2. Telecommunications

Telecommunications forms the backbone of any information infrastructure. Increasingly, as digital technology and globalization drive forward, the telecommunications industry is itself becoming increasingly intertwined, or “converged” with broadcasting and media [Figure 1].

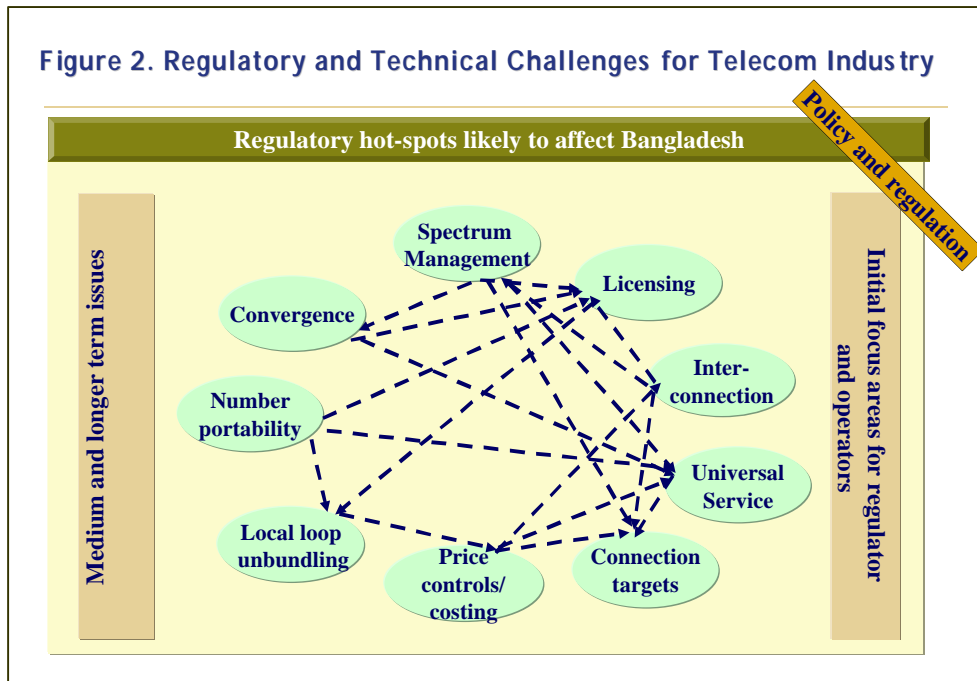
Figure 1. Value Chain of Telecommunications Industry



In Bangladesh, significantly raising people’s access to telecommunications still remains the key policy challenge. To that end, the focus of policy makers and investment is currently appropriate for the first two shaded chevrons from the left, that is Network Infrastructure Provision, and Basic Access and Transport Services.

Bearing this focus in mind, actions and priorities for the policy maker will tend to concentrate on the following subject areas, each discussed in detail below [see also figure 2]:

1. Regulatory Issues;
2. Universal access;
3. Fixed network development;
4. Mobile network development;
5. Interconnectivity;
6. National telecom Policy policy;
7. Spectrum management and Licensing;
8. Convergence;
9. The Internet;
10. Information Security and Network Reliability.



II.2.1. Regulatory Issues

Bangladesh is the only South Asian country, which had not a telecom regulator till July 08, 2001. On July 08, 2001 the TRC Act went in operation through a gazette notification. BTTB had been regulating the sector until Ministry of Posts and Telecommunications (MOPT) took over that function in 1995. The Telegraph Act of 1885 in tandem with The Wireless Act of 1933 had been the only governing tools until the National Telecommunications Policy (NTP 98) was enacted in 1998. It made little difference to the transparency of decisions, as the MOPT relies on BTTB for performing the regulatory tasks. Therefore, the state telco remains a shadow regulator, which continues hindering the growth of the competitive private sector. The NTP 98 was the first phase of reforming the country's telecom sector.

Sustainable growth of the telecom, ICT and broadcasting in Bangladesh is largely depending on effectively and independently administering these sectors from a unified platform.

Building such awareness among the industry as well as within the government is an important issue in this regard.

The government has lately allowed BTTB to launch its own GSM mobile. BTTB's GSM operation is exempted from any license fees including the spectrum charges. Interconnection with PSTN is guaranteed, as BTTB owns that network. This move has raised concern among the mobile operators. BTTB's proposed launching of PHS and GSM mobile contradicts the National Telecom Policy.

The TRC is the major element of the telecom sector reforms program. It has been conceived as the major instrument to ensure a level playing field for all telecom operators. The principal task of the TRC is to issue licenses to operators, allocation of inter-connection frequencies and fixing the tariff for different telecom services. But, till date the overlapping of regulatory and operational role of BTTB hampers severely the level playing fields in the telecom sector. After enactment of the TRC Act, MOPT signed an operating agreement with the WorldTel. But under the TRC Act, the licensing policy should be executed by the TRC. The TRC in its current form will not be able to maintain its independence. The new government should go for amendment of the TRC to ensure independence and transparency of the operations of the TRC.

Short Term Action

<i>Action Items</i>	<i>Action by</i>
Action 2.1.1. The appointment of independent TRC should be executed.	The parliament, TRC
Action 2.1.2. The following amendments should be made in the TRC Act: (a) the TRC should be accountable to the President as well as to the respective Parliamentary Committee; (b) the Chairman and Commissioners of the Commission should enjoy ministerial status and their compensation should be appropriate for bringing in high skilled expert.	The Parliament
Action 2.1.3. The regulator should be empowered to ensure targets are reflected in operator's licenses, monitored, penalized and rewarded accordingly. But the regulator has to be focused and not overburdened initially, so targets of highest importance can be selected at first.	The Parliament TRC
Action 2.1.4. Encourage TRC to focus on a small number of key issues once it is functioning. These issues can include interconnection, setting targets, tariff reform, and universal service.	The Parliament TRC

II.2.2. Universal Access

Struggling with world's one of the lowest tele-density² ratings, Bangladesh ranked 38th among the 40 countries of Asia Pacific region in 1999 [Khan A.S. 2001]. In the backdrop of 8.5% Asia-Pacific teledensity and 2.8% in South Asia, Bangladesh has a long way to go to bridge her "Missing Link". Current teledensity in Bangladesh is approximately 0.5%. Access to telephony (as opposed to tele-density) is not measured in Bangladesh, but the majority of the population does not have easy access to affordable and reliable telephony services, and where they do, it is restricted for the vast majority to a simple voice service.

Short Term Action Agenda

<i>Action Items</i>	<i>Action by</i>
Action 2.2.1. Develop a New Concept of Universal Service. The government should make a special effort to hear from public interest groups to determine how the Universal Service concept should be applied in the 21st Century. Initially a basic definition is likely to be appropriate, such as "everyone should have access to a voice telephony service within one hour's walk from their residence".	MICT, BTTB, Private Telecom Operators, NGOs, Interest groups
Action 2.2.2. To encourage greater access, the Government should focus on setting specific tele-access goals alongside increases in tele-density. A worthwhile access target may be to achieve 80 percent tele-access (for example as defined under Action 1 above), along with 5 percent tele-density. For example, Government could aggressively prioritize the one village one public telephone scheme as a key method through which to achieve a universal access goal.	MICT, BTTB, Private Telecom Operators, NGOs, Interest groups

² Teledensity refers to the number of fixed telephone lines per 100 population. Mobiles which do not provide access to fixed telephone line (Namely BTTB) are not included in the definition.

<i>Action Items</i>	<i>Action by</i>
Action 2.2.3. Government should provide responsibility to the Proposed Ministry of ICT or Ministry of Post and Telecommunications for setting universal access policies, reviewing and refining UA policies from time to time, and ensuring that the policies are relevant and using best practice from elsewhere.	The Parliament, MICT, MOPT, BTTB
Action 2.2.4. Government should require the new regulator, the TRC, to include universal access as one of the areas on which it regulates telecom service providers who are involved in fixed line and mobile services (particularly BTTB). The regulator should ensure that universal access targets and obligations are fair, understandable and measurable; that they are reflected in operator's license obligations (USO – universal service obligation); and that compliance with the requirements are monitored by the regulator.	The Parliament, MICT, MOPT, BTTB
Action 2.2.5. In order to ensure that the universal access policy is reasonable, Government or TRC should commission a universal access study in Bangladesh, or make use of work already done (by BTTB or ITU for example) in order to estimate needs and set specific targets. Targets should be specific (such as expressed in terms of installing x,000 public call offices in y years) but should not be onerous to operators or over-complicated.	The Parliament, TRC, MICT,
Action 2.2.6. Government should facilitate new last mile connectivity options in order to encourage more rapid penetration of the public switched telecommunications network (PSTN) into rural and outlying areas. For example, further use of PBX systems may be encouraged as a tool to increase tele-access amongst communities (such as apartment blocks), which can share a limited number of access lines.	The Parliament, TRC, MICT, BTTB
Action 2.2.7. All restrictions on voice and data communications should be withdrawn. Private operators should be allowed to set up international gateway for voice communications.	MICT, MOPT, BTTB
Action 2.2.8. The tariff for telephone use should be based on cost but should continue to ensure fairness and affordability. For example, local call charges should be initially kept at levels that allow affordability and encourage use of the network. As supply increases (see actions under fixed network expansion below) connection charges should gradually be reduced such that new connections are encouraged. For rationalizing the revenue from the telephone service metered local call may be introduced.	MICT, MOPT, BTTB

Mid Term Action

<i>Action Items</i>	<i>Action by</i>
Action 2.2.9. Government should ensure that operators that have to provide connectivity into rural areas are compensated for undertaking costly investments which are likely to prove loss-making. The universal access study (Action 5) may incorporate this by undertaking costing analysis, which quantifies the burden to an operator (such as BTTB) for building out the network to outlying, unprofitable areas. Compensation methods should be investigated – and models can include the universal access funding schemes being introduced elsewhere (such as in Uganda and Poland). Such schemes are typically run by the regulator, and funded through contributions from other operators and Government.	TRC, MICT, MOPT, BTTB

<i>Action Items</i>	<i>Action by</i>
Action 2.2.10. Government should examine access deficit funding specifically to ensure BTTB has adequate incentives to build out the infrastructure to unprofitable and under-served areas. In order to ensure this is done transparently, TRC may require BTTB to undertake a full service costing exercise (discussed further below).	TRC, MOPT

II.2.3. Fixed network development

The key issue in Bangladesh's telecommunications sector is the extremely poor availability of connections. Current fixed line connections number only some 600,000, and waiting lists for a new line exceed several years. The current major provider of fixed network services, BTTB, is severely under-funded, under-resourced, and lacks incentives or a proper framework to aggressively expand the network. Without significant fixed network expansion in Bangladesh, the population faces the prospect of being excluded from the benefits of the global information revolution. Participation in ICT and e-commerce will remain impossible without providing connectivity first.

Short Term Action

<i>Action Items</i>	<i>Action by</i>
Action 2.3.1. Provide BTTB with the autonomy to allocate its revenues to investments required to expand the network. Currently BTTB does not control its revenues, but they flow directly to the Ministry of Finance. BTTB has to apply for investment resources through Government planning procedures. This slows down network expansion and dilutes BTTB's incentive to pursue commercial approaches to building revenue generation and capital investment programs.	TRC, MICT, MOPT, BTTB
Action 2.3.2. Corporatize BTTB ³ . Currently BTTB is still a government board. This prevents it from using its own revenues, preventing it from borrowing on the financial markets without Government permission or guarantee, and restricting the entity to Government rules and regulations with regard to all aspects of the business including hiring and firing, pay and procurement.	TRC, MICT, MOPT
Action 2.3.3. Provide BTTB with a clear set of fixed network expansion targets, incorporated in BTTB's fixed telephony license, and monitored. Targets can be set over a 3-5 year period, expressed as annual targets, and should specify the number of lines to be installed at national, urban and rural levels. In this way the targets can ensure that minimum connectivity targets are contributed to at the rural level. The targets should be based on a rigorous demand assessment, and should be consistent with BTTB's tariff levels going forward.	TRC, Planning Commission BTTB
Action 2.3.4. Encourage where appropriate new operators to enter the fixed telecommunications market. Government needs to do this carefully and in context to its overall national telecommunications policy. Particular attention has to be provided to making sure that the amount of competition in the market (i.e. defined by the number of licensees) is balanced with the investment requirements and likely returns. In other words, licensing a large number of players may be inappropriate in some market segments since that will lead to operators expecting to have a small market share and thereby not being incentivised to invest large quantities to build the infrastructure. For example, in most developing country markets no more than 1-3 operators currently are licensed to provide fixed network services in any one part of a country.	MICT, MOPT, TRC

³ From regional consultation in Sylhet we have got the input against the corporatization of the BTTB, the forum rather proposed to find out ways to make it dynamic in its current status. Actually corporatisation can be seen as a first, but not in itself sufficient, step towards making BTTB more dynamic. The experts opined that BTTB should definitely be corporatised. Without corporatisation BTTB will not be able to: borrow funds; hire and fire outside Government's rules' exercise any autonomy over its revenues (currently they all go to Government); exercise more autonomy as required over operational issues such as planning and procurement. It would also not be able to be privatised, or listed for any share offerings. So, non corporatisation is not an option.

<i>Action Items</i>	<i>Action by</i>
Action 2.3.5. Encourage optimal use of the country's optic fiber backbone. Access to the fiber optic network would allow users to benefit from high-speed access enabling far more efficient transfer of data than allowed by BTTB's copper wire-based network. Since the fiber network is a scarce resource in Bangladesh, and allows significant potential to offer high-speed services, it is important that Government requires the operator to be obliged to provide minimum levels of service, and minimum levels of access and interconnection to other operators. Government may also require that the services provided are subject to tariff regulation, particularly if it is felt that the high-speed access network is a monopoly with the operator having recourse to charge excessive tariffs.	MICT, MOPT, TRC

Mid Term Action

<i>Action Items</i>	<i>Action by</i>
Action 2.3.6. Privatize BTTB	The Parliament, TRC, MICT, MOPT,
Action 2.3.7. Engage a strategic partner for BTTB who will bring in know-how and access to the financial resources required to expand the network. Many countries have adopted programs to introduce strategic investors to develop the national incumbent telecommunications provider, largely with success but sometimes with problems also. It is critical that engagement of a strategic investor is done transparently and with assistance from professional advisers who ensure the process appoints a quality investor, and that the approach is transparent and quick.	MOPT, BTTB, TRC
Action 2.3.8. In order to engage a strategic partner, Government has to launch a rapid and aggressive programme of preparing BTTB and preparing the market opportunity. Preparing BTTB will involve: <ul style="list-style-type: none"> ▪ Set up BTTB as a company ▪ Restructure business units as needed ▪ Prepare financial statements and undertake IAS audit ▪ Refine and develop business plans ▪ Undertake tariff reforms ▪ Prepare management/employees Preparing the opportunity and market will involve: <ul style="list-style-type: none"> ▪ Defining a suitable investor package (fixed, fixed/mobile etc) ▪ Undertaking a commercial valuation of the business ▪ Preparing information memoranda and sale documents ▪ Setting the policy parameters (build out targets etc) ▪ Undertaking selection of a suitably qualified strategic partner, preferably a qualified telecommunications operator ▪ Involving and empowering the regulator ▪ Refining and publishing the national sector policy ▪ Preparing the local financial community Enacting legislation as needed	TRC, MOPT, MICT
Action 2.3.9. Encourage more flexible technology options for fulfilling fixed licensee requirements. A number of countries have now adopted a technology-neutral approach to setting obligations to operators, so that obligations do not compel the operator to use particular technologies, equipment, network configurations, and so on. This is an important development, which fosters greater efficiency and flexibility in the sector development process. Such a move in Bangladesh, with new and current licensees is likely to be welcomed and is likely to cut investment costs and raise productivity.	TRC, MICT, MOPT

II.2.4. Mobile network development

Development of the mobile sector in Bangladesh is already rapid and driven by the private sector. A number of private operators are licensed to provide service and expansion has been funded through private sector equity and debt. Bangladesh's ability to foster such development in this sector sets a good example for other segments in this industry. However, there are numerous critical areas where the policy stance is either insufficiently clear, or requiring further development. The most pressing current issue is that mobile users are unable to call the fixed line network owned by only BTTB. BTTB has not been providing necessary interconnections to its local and long distance networks. Therefore, the call traffic of around 400,000 mobile users remains confined within the four mobile networks. Such customers represent 75% of the total mobile customers. The four years old mobile industry is poised to achieve market penetration that may outstrip BTTB by the end of 2001.

Exponential growth of mobile may appear as a promising alternative of boosting the country's ailing teledensity. The industry is, however, far away from that target.

Mobile users with universal access grew only by 15% while the subscribers without such privilege recorded 359% growth in 2000. The latter would be growing exponentially in 2001. Therefore, the *mobile intercom* users would continue representing the country's *mobile telephone* market. Proliferation of mobile without universal access is, however, not contributory to the ailing teledensity of Bangladesh. Such access divide contradicts the National Telecom Policy [see Article 2 vision (paragraph 1) and Article 3.3 Universal Access].

One of the key requirements is that Government provides clarity and transparency to current operators and future aspirants.

Short term Action

<i>Action Items</i>	<i>Action by</i>
Action 2.4.1. Government should determine and adhere to a clear competition policy for mobile. Simply opening up the sector to an unlimited number of players is likely to run the risk of diluting operators' incentives to undertake significant network development investments. If an operator regards itself as one of many, and potentially many more, it is less likely to justify business cases for major investments, given the expected dilution in market share and presence which would be coupled with many players entering the market. Most small to medium sized countries with a population level above 50million have between 3-6 nationwide cellular operators. Bangladesh, offering a far smaller market size (in terms of potential connected customers and spend per customer), probably has room in its market for 3-4 players such that each player has optimal incentives to invest. Government should determine the optimal number of players (say the 4 now operating), and limit the number of licensees to this number.	TRC, MICT, MOPT, Telecom Mobile Operators
Action 2.4.2. TRC should negotiate minimum universal service type obligations on mobile operators which include access to emergency services (fire, ambulance and police) and minimum quality of service targets.	TRC

II.2.5. Interconnectivity

Ensuring that Bangladesh's various telecom operators, both fixed and mobile, are able to (and required to) ensure that their respective networks interconnect is critical to ensuring network development that supports building a national information infrastructure.

Government should engage the TRC to treat addressing mobile-fixed interconnect issues as a priority. Currently the lack of interconnection facilities between mobile operators and BTTB is hampering network development, increasing network investment costs for mobile operators, reducing customer's ability to communicate ubiquitously, and reducing critical interconnect revenues for BTTB.

Short term Action

<i>Action Items</i>	<i>Action By</i>
Action 2.5.1. Government, through TRC, should set interconnection obligations that enable equal and fair access, adequately defined.	TRC, Mobile Operators
Action 2.5.2. The regulator should focus on fixed and mobile network integration and write interconnection obligations into operators' licenses. The regulator should also enforce compliance through legal and regulatory framework.	TRC, Mobile Operators
Action 2.5.3. A high-speed data network should be established with different technology options and interconnection scopes.	TRC
Action 2.5.4. There should be an outline of workable interconnection provisions.	TRC

II.2.6. National Telecom Policy

The NTP 98 was a first step taken by Government towards developing a clear policy stance in telecom. As a first effort it was largely open-ended and in some parts inconsistent with other aspects of policy. There was also negligible focus on the technological convergence and in many ways the policy statement did not address the key challenges facing the industry, which are reform of BTTB, privatization, and measures to encourage significant amounts of new investment. In addition, the NTP was not specific with regard to actions required to achieve the goals set out. A prime example is the teledensity target. The target did not demonstrate how teledensity improvements would be achieved, such as through setting specific targets to operators (mainly BTTB).

Internet was launched by the private ISPs in 1994. The NTP 98 was enacted four years after that. Whereas, the role of Internet has been completely ignored in the country's first telecom policy (NTP 98). It resulted diminishing the newborn Internet's economics due to BTTB's following interference:

- The ISPs were not allowed to choose the VSAT carriers other than the ones recommended by the government (BTTB).
- Besides paying the standard tariff to the VSAT operators [around USD 1000 per month], the ISPs were mandated to pay royalty to BTTB [USD 7000 per month, which was highest in the world].

Bangladesh Computer Samity (BCS) strongly campaigned against this provision and succeeded amending it in February 2000. Since then, the ISPs have been paying license fees to the MOPT [USD 3500 per annum].

One of the most effective ways to promote investments in our nation's information infrastructure is to introduce or further expand competition in communications and information markets. Vibrant competition in these markets will spur economic growth, create new businesses and benefit people in Bangladesh.

Short term Action

<i>Action Items</i>	<i>Action By</i>
Action 2.6.1. Telecom policy should focus on how to increase competition in communications markets, particularly those, such as the cable television and local telephone markets that have been dominated by monopoly. Such legislation will explicitly promote private sector infrastructure investment -- both by companies already in the market and those seeking entry.	TRC, The Parliament, MOPT
Action 2.6.2. To undertake a rigorous demand forecast for telecom services in Bangladesh, covering rural and urban areas, fixed and mobile, as well as demand for basic and advanced telecom services. Such a demand forecast should be used as a basis for setting Government policy in a robust way with regard to rollout targets, tariff reform and competition policy.	TRC, MICT, MOPT
Action 2.6.3. Set targets which emphasize increasing access, not just teledensity.	TRC
Action 2.6.4. Ensure build out targets which are set for operators are: <ul style="list-style-type: none"> ▪ based on rigorous demand analysis ▪ expressed in terms of specific urban and rural figures ▪ expressed in terms of lines connected, not installed capacity ▪ consistent with intended and likely tariff and competition scenarios ▪ sensitive to fixed-mobile substitution by customers ▪ flexible (where appropriate) to technology-sensitive solutions 	TRC, Civil Society, Stakeholders
Action 2.6.5. Focus the NTP on key impact areas, including: <ul style="list-style-type: none"> ▪ rural development ▪ education, health and other social services and activities ▪ Bangladeshi business and exporters ▪ Bangladesh's access to new markets and customers ▪ Bangladesh's role in the ICT industry ▪ creation of more responsive and efficient Government 	TRC, Civil Society, Stakeholders

II.2.7 Spectrum Management and Licensing

Many of the dramatic changes expected from the development of the information infrastructure grow out of advances in wireless technologies. The ability to access the resources of the NII at any time, from anywhere in the country, will be constrained, however, if there is an inadequate availability of spectrum. To ensure that spectrum scarcity does not impede the development of the NII, the government should place a high priority on streamlining its procedures for allocation and use of this valuable resource. BTTB officials are still administering the Frequency Allocation Board and the provision of unlicensed spectrum is still prohibited due to regulatory impediments. Radio spectrum is still being allocated in accordance with the Wireless Act of 1933.

Licensing is a key area where Government can positively influence outcomes through running licensing processes transparently and in a way that maximizes public benefit and value. At

the same time, a lack of clear licensing policies can lead to introducing too many operators in strategic areas, and too few in ones which should be liberalized, and across the board in selecting inappropriate operators who are not qualified for the business.

Short term Action Agenda

<i>Action Items</i>	<i>Action By</i>
Action 2.7.1. Streamline allocation and use of spectrum. The government should fully implement the spectrum management provisions. These provisions will provide greater flexibility in spectrum allocation, including increased sharing of spectrum between private sector and government users, increased flexibility in technical and service standards, and increased choices for licensees in employing their assigned spectrum.	TRC, All telecom operators
Action 2.7.2. Promote market principles in spectrum distribution. Further, the government should continue to support policies that place a greater reliance on market principles in distributing spectrum, particularly in the assignment process, as a superior way to apportion this scarce resource among the widely differing wireless services that will be a part of the NII. At the same time, the government should develop policies to ensure that entrepreneurs and small, rural, minority- and women-owned businesses are able to participate in spectrum auctions.	TRC, All telecom operators
Action 2.7.3. Enforce a clear and transparent licensing framework, by doing the following: <ul style="list-style-type: none"> ▪ ensure licensing policy is in line with competition policy ▪ ensure regulator has capability to issue, regulate and revoke licenses ▪ ensure regulator allocates spectrum efficiently ▪ maximize value through competitive procedures for license issue ▪ pre-package rules as clearly as possible into licenses to avoid dispute 	TRC

II.2.8. Convergence

Effectiveness of both the proposed policy is overshadowed by the lack of focus on the convergence issue. The situation would be more complicated soon after the CATV industry diversifies with the Internet and telephony services.

A recent study reflects the modest growth of telephony and Internet over CATV network in the developing economies in Asia. Unfortunately Bangladesh is not included in this survey. India, Vietnam, Indonesia and Philippines are the early starters of telephony over CATV. They continue with a double -digit annual growth-rate.

Indonesia shows an impressive Internet usage with steady growth. Indian Internet growth over CATV is modest. Three-digit annual projection of Vietnam's Internet is mind blowing from 2007. Indonesia follows Vietnam with three-digit growth at the end of this decade. Market evolution due to such network convergence may not be as precise as predicted above. It is, however, a wake up call for the legacy operators as well as for the orthodox regulators.

Convergence is leading to telecom operators, TV companies and other utilities all battling for access to the networked consumers. Although in Bangladesh the focus will remain on raising connectivity, the demand for new functionality will grow due to an emerging middle class consumer society in Bangladesh.

Short Term Action Agenda

<i>Action Items</i>	<i>Action By</i>
Action 2.8.1. Invite experts to better understand convergence issues and reflect in national telecom policy.	TRC, MICT, MOPT, All telecom Operators, ICT Industry
Action 2.8.2. The proposed ICT Ministry or MOPT should look in to regional experiences in formulating convergence policy. This knowledge sharing exercise may help us to better understand and determine policy measures.	TRC, MICT, MOPT, All telecom Operators, ICT Industry

Mid Term Action Agenda

<i>Action Items</i>	<i>Action By</i>
Action 2.8.3. The TRC may be converted into Communications Commission, which regulate three market places: telecom, ICT and broadcasting. The goal is to have one body that handles all convergence issues from a single forum and which has a better understanding of how one area of technology can impact on another. It would also have the powers of a civil court and would adjudicate on all disputes, and ensure fair and equitable services in the information technology, communications and broadcasting sectors.	Cabinet, MOPT, MICT, The Parliament
Action 2.8.4. If a convergence law is in place it would repeal The Telegraph Act, The Wireless Act, The radio broadcasting Act, The Television Broadcasting Act	Cabinet, MOPT, MICT, The Parliament

II.2.9. Internet

Poor Bandwidth: Internet in Bangladesh has grown rapidly in the last few years. The total bandwidth capacity in July, 2000 was estimated between 100 to 150 mbps, a capacity much below the desired level for an efficient transmission network [TechBangla, 2001]. The speed of Internet connection varies between 64 kbps and 2 mbps gateway access. There is a limited scope for digital cable network access yet to utilize optimum bandwidth or access to broadband services.

Access to Internet: The access to the Internet is very limited for several systemic reasons, like poor teledensity, poor electricity network, poor affordability of computer, and knowledge about the Internet. Public Internet access is limitedly available in the private telephone centers and cyber cafes. The divisional head quarters, and some district towns have access to Internet. The commercial use of Internet is limited due to the bandwidth limitation.

Affordability: An increasing competition is being observed among the ISPs. The rapid growth of different Internet services has been declining after deregulation of VSAT by BTTB. Since the deregulation of VAST, prices have come down almost 140 percent on average and are still declining. Average rate now is Taka 0.45 per minute. Several ISPs are offering flat rate services. Despite the rapid downfall in the price of the Internet services, it is still high for the general people and students.

Short Term Action Agenda

<i>Action Items</i>	<i>Action By</i>
Action 2.9.1. A crash program should be undertaken to set up Internet centers in post offices, health centers, educational institutions, public libraries, rail stations, local community centers, and NGO offices for improving the access situation. In this respect, government should go into partnership with the private sector, where government set up infrastructure and private sector ensures operational viability of the centers.	MICT, Respective Agencies
Action 2.9.2. Access to Internet exchange should be at same rate throughout the country.	TRC, MICT, ISPs
Action 2.9.3. Encourage the use of wide range of technology options for Internet access. ISDN, BISDN and xDSL technologies should be introduced in the country	TechBangla and likewise Telecom Operators, ISPs
Action 2.9.4. A high-speed national data network for the country connecting all important cities, district headquarters and important upazillas should be established. BTTB's zilla level Internet project should be implemented immediately.	MICT, MOPT, All telecom Operators, ISPs, ICT companies
Action 2.9.5. Seek technical assistance from internationally reputed companies to build proper Networking infrastructure throughout the country. The relationship with ITU should be strengthened for reducing digital divide.	MICT/MOPT
Action 2.9.6. High-speed data link to connect Bangladesh to the Global Information Superhighway should be immediately established. The whole ICT industry is shocked with prolonged delay in completion of such network..	MICT/MOPT
Action 2.9.7. All schools, colleges at zilla level and universities should be brought under Internet network. This is an emergency program to be initiated immediately.	MICT
Action 2.9.8. Incorporate telecenter and internet-ready PCO installation within operator rollout targets.	TRC, MOPT, All telecom operators

Mid Term Action Agenda

<i>Action Items</i>	<i>Action By</i>
Action 2.9.9 The high-speed national data network mentioned in the short-term agenda should be gradually extended to cover all upazillas and villages.	MICT, All telecom Operators, ISPs, ICT companies
Action 2.9.10 All schools, colleges and universities should be brought under Internet network.	MICT, All telecom Operators, ISPs, ICT companies

II.2.10. Information Security and Network Reliability

The trustworthiness and security of communications channels and networks are essential to the success of the NII. Electronic information systems can create new vulnerabilities. For example, electronic files can be broken into and copied from remote locations, and cellular phone conversations can be monitored easily. Yet these same systems, if properly designed, can offer greater security than less advanced communications channels.

The NII must be designed and managed in a way that minimizes the impact of accident or sabotage. The system must also continue to function in the event of attack or catastrophic natural disaster.

Short Term Action Agenda

<i>Action Items</i>	<i>Action By</i>
<p>Action 2.10.1. Develop a work plan to investigate what policies are necessary to ensure individual privacy, while recognizing the legitimate societal needs for information, including those of law enforcement. Develop also a work plan to investigate how the government will ensure that the infrastructure's operations are compatible with the legitimate privacy interests of its users.</p>	<p>TRC, MOL, BB, CAB, ISPs, Third Party Authentication Institutions</p>
<p>Action 2.10.2. A public key custodian should be established for ensuring network security. This action agenda is related to encryption standard and security related laws.</p>	<p>MICT, ICT Industry, Banking System, Third Party Authorizer</p>
<p>Action 2.10.3. Penal Code and ICT Act should cover computer crimes such as software piracy, unauthorized use/copying of software, computer fraud, hacking and damage to program and data and introducing/spreading computer viruses.</p>	<p>MICT, MOL, ICT Industry</p>

Chapter III. Human Resources Development

The task force identified three major areas to focus separately for policy design:

- ICT education and Training
- ICT- based education
- Universal Education for Poor

III.1. ICT Education

Problem of Quantity: Bangladesh has been trying to keep pace with the rapidly changing and high demanding ICT education explosion all over the world. Steps have been taken to implement computer education at the secondary and higher secondary levels. Two years degree programs have also computer courses. At the university level all national public universities and in particular new universities have started producing computer science graduates through opening computer science departments. The most encouraging observation is the massive and strong participation by the students and their urge to gain ICT knowledge and become computer literate [Iqbal Z, 2001]. The capacity to produce computer science graduates is very limited, only around 1300 per annum. This is not enough at all. But the potential raw material, the science graduates, in public universities are around 4500. Private universities do not produce graduates in general science discipline. Public and private sector colleges produce about 80000 science graduates each year [TechBangla, 2000]. Although for developing information infrastructure qualified human resource is a basic prerequisite, there is a mismatch in some areas of specialization. Other than Rajshahi University, the C [for communication] is missing in ICT Education. Besides, in the system development life cycle, other than the programmer there is a huge demand for project management, system engineering, software documentation and conversion specialization. But the education sector does not produce graduates for these specializations.

Quality of Education: Although Bangladesh have been quite fast in making available ICT education and training, the quality aspect is not very promising. There are two aspects to be considered: one, quality of teachers at all levels, and quality of intake at the university level. The poor intake at the university level is the consequence of poor quality primary, secondary and higher secondary education. Following a skill determination structure developed by IBM, it was found that the average skill level of teachers/instructors only 2.83 in a 5-point scale. The required score is 4 and above [TechBangla, 2000]. This figure should be an alarm for taking some immediate measures.

Poor Access to ICT: Access to ICTs at university level achieved a very limited success. The ICT penetration in primary, secondary and high secondary level is not satisfactory at all. Only a limited number of urban schools and colleges have ICT facilities for education purposes. An initiative has been for supplying computers to 3392 schools and colleges throughout the country could not be implemented for different difficulties.

Poor Industry- Education Linkage: There is a huge mismatch between the market demand and the courses offered by the education institutions. The proper coordination for exchanging workforce for on job training and refreshment in educational institutions is a must. Normally in ICT industry the newly appointed employees are gone through a rigorous in-house training to fit the work place demand. Unfortunately Bangladesh being the poor country and the software companies not having the financial backing can not afford to train an employee for six to nine months. In addition there is a constant threat that the trained employee may leave the country or switch to another company for a better offer.

Brain drain: One the one hand, we do not produce adequate number of qualified ICT professionals in our educational and training institutions to cater domestic demand, on the other hand, the migration trend of quality ICT professional is alarming. The TechBangla survey [2000] found an alarming inclination towards migration of ICT specialists and students from Bangladesh. Among the surveyed teachers and ICT professionals 81 percent plan to move to a foreign country, the percentage for students is 85.2. Unlike India, the return flux of the Non-resident Bangladeshis has not started yet although we have seen some consolidated effort as technology transfer conferences and software promotion campaign abroad.

Short Term Action Agenda

<i>Action Items</i>	<i>Action By</i>
Action 3.1.1. For enhancing the number of Graduate and Post Graduate level ICT work force at least three of the proposed 12 Science and Technology Universities should target initially ICT education. Multimedia education should also be included at university level.	MICT, MOE, ICT Industry, ICT Professionals, NRBs
Action 3.1.2. Develop educational programs focused towards market needs with up-to-date curriculum focusing on problem solving, not memorization: <ul style="list-style-type: none"> ▪ Major Market Focused Education: Implement educational program in Software Engineering, Computer Communication, and Multimedia with curriculum that incorporates the latest technology ▪ MS Program (Course Option): Emphasize on MS program. ▪ Center for Professional Development: Create “Center for Professional Development” in five Universities that can offer internationally recognized industry Certification Program and other short courses on ICT for professional development of people at any level. ▪ Strive for accreditation of the educational institutions by reputable foreign authorities. ▪ Provide low cost evening certificate programs to accommodate more students. Evening classes should not be affected by political shutdowns University level curriculum and syllabus should also focus basic skills, not only immediate market demand	MICT, MOE, ICT Industry, ICT Professionals, NRBs
Action 3.1.3. The public and private universities, the four BITs, degree level colleges affiliated to the NU, should double the education facilities [seats, teachers, logistics etc.] for creating sufficient number of ICT professionals to meet the industry demand and export demand.	MOE, Respective Institutions
Action 3.1.4. One-year postgraduate diploma courses for graduates in allied disciplines [e.g. Engineering, Physics, Mathematics] should be introduced in the five already selected public universities [viz. BUET, Dhaka, Khulna, Rajshahi and SUST]. One-year Post-graduate Diploma Courses should be introduced in all other public and private Universities.	Respective universities

<i>Action Items</i>	<i>Action By</i>
Action 3.1.5. Government should take initiative to arrange mutual recognition of certification between Bangladesh and potential foreign countries.	MOE, MOF
Action 3.1.6. Introduce “ Basic computer skills” as a compulsory subject for all students at Graduate level.	MOE, MICT
Action 3.1.7. Polytechnics and other training institutes should offer diploma in ICT.	MOE, MICT
Action 3.1.8. Unemployed youth should be encouraged for ICT training courses focusing market demand.	MOE, MICT, Directorate of Technical Education
Action 3.1.9. Diploma and trade courses should be introduced in distance education systems through ICT network under Open University.	BOU
Action 3.1.10. Basic computer courses must be introduced in the primary, secondary and higher secondary levels	MOE
Action 3.1.11. A national Specialized <i>Training of Teachers Center</i> should be established for solving the problem of acute shortage of quality teachers in ICT.	MICT, MOE
Action 3.1.12. To address the problem of quality education as a short-term measure a roll over trainers’ training program should be implemented immediately. A pool of quality teachers should be developed who will run the program. <i>Each one teach one</i> program can also be implemented to resolve the problem of resources.	MICT, MOE, Corporate entities
Action 3.1.13. In solving problem of quality teaching get NRBs involved in the educational and HR development process. Like, offering short courses, industry-academy program development, giving real life project/assignments to students, outsourcing works to university students/teachers, donating software, hardware, educational materials, scholarships, etc.	MICT, NRB organizations
Action 3.1.14. Implement effective teachers training program in teachers training institutions to enhance capability to teach advanced ICT courses.	MOE, MICT, Teachers’ Training College
Action 3.1.15. Encourage Internet based training content development for dramatic and rapid quality improvement.	MICT, MOE, ISPs, NGOs, other private organizations
Action 3.1.16. A central resource center for high level web based and face to face training should be implemented immediately	MICT, MOE
Action 3.1.17. To ensure supply of quality teachers in ICT education, Ministry of Education’s affiliation of NTRAMS should be evaluated by on expert committee and if necessary the affiliation should be revoked. The requirement of a certificate from NTRAMS to become a teacher in government schools should be immediately withdrawn.	MICT, MOE
Action 3.1.18. Industry-Academy Joint Program: Establish contact and implement industry academy program with Internationally recognized institutes. Target at least one per year. Co-op program: Establish 6 months to one-year co-op program (work experience) between institutes and industries (home and abroad) as part of the degree program. To enhance the practical knowledge of ICT applications, private industry/business concerns should be encouraged to offer internship to the students enrolled in degree programs in different Universities / BITs /Institutes. Internship Program and Industry Visit: Appropriate government authority should set compulsory internship program for all ICT educational Institutions. The ICT education institutions should arrange compulsory industry visit program. Government should allocate funds for this purpose.	MICT, Universities, ICT Training Institutions

<i>Action Items</i>	<i>Action By</i>
Action 3.1.19. Separate salary and compensation structure should be set in all levels for ICT teachers and trainers in ICT education/training institutes and ICT professionals, comparable to the private sector, in order to attract qualified people to these institutes and Universities. All such teachers and professionals should be given preference to participate in various national/international seminars/work shops/training program/conferences. Separate salary and compensation structure should be set in all levels for ICT teachers and trainers in ICT education/training institutes and ICT professionals, comparable to the private sector, in order to attract qualified people to these institutes and Universities. All such teachers and professionals should be given preference to participate in various national/international seminars/work shops/training program/conferences.	Ministry of Education, Ministry of ICT, Ministry of Finance
Action 3.1.20. University and college teachers and students should get free or subsidized access to Internet	MOE, MOF, Universities and colleges
Action 3.1.21 All universities and higher educational institutions should be networked for better access to knowledge and information	MOE, UGC, MOF, university authorities
Action 3.1.22. Ways have to be mapped put to spread ICT education to the lower income groups who fall out of university and private center education	MOE, MICT, NGOs
Action 3.1.23. ICT education as well as other education is not well equipped. A policy may be designed, where top 10 percent students will get subsidies, the rest of the students will pay for it according to merit.	MOE, MICT, education institutions

Mid Term Action Agenda

<i>Action Items</i>	<i>Action By</i>
Action 3.1.24. Primary and secondary level education should be emphasized for long run return in ICT industry and ICT for poverty alleviation	MOE, MOF, MICT

III.2. ICT Training

Missing Links in ICT Education: Bangladesh are observing an exponential growth of the ICT training institutions in the last four years, the growth rate is around 300 percent. The total investment in the ICT training facilities has exceeded already Tk. 2000 million in the last four years. But the investment is concentrated mainly in a particular area of the whole software development life cycle.

The training for development of skill in the areas, mentioned with "no" in the table below is required. So, there is a huge scope of investment in ICT training. The capacity of universities to groom science graduates is also limited in Bangladesh. So, the private investment in promoting science education can also be targeted.

Quality of Training: Although the number of ICT raining institutes is quite impressive in Bangladesh, the quality aspect is a great concern for all. The poor quality of training with exorbitantly high price creates frustration in the industry and among the young people.

Affordability of Training Facilities: The exorbitant cost of ICT training prohibits many potential trainees, especially the potential trainees in the work place.

Missing Links in ICT Skill Development

Specialty required in Software Development	Concentration of training in Bangladesh
Software Architect	No
Senior Systems Analyst	No
Senior Software Engineers	No
Senior Database Designers	No
Senior Communications/Networking Designers	No
Transaction Systems Designers	No
User Interface Designers	Yes
Testing Designers	No
Project Mangers	No
Senior Programmers	Yes
Database Programmers	Yes
Programmers	Yes
Communications Programmers	No
Documentation Specialists	No
Multimedia Programmer	Yes
Multimedia Designer	Yes
Media Specialist	Yes

Short Term Action Agenda

<i>Action Items</i>	<i>Action By</i>
Action 3.2.1. A national <i>Training of Trainers Center</i> should be established for solving the problem of acute shortage of quality trainers.	MICT
Action 3.2.2. Encourage training in the niche area, identified in the table above and priority should be according to the table content.	MICT
Action 3.2.3. ISO certification should be compulsory for the ICT training institutions for standardization of training quality.	MICT, BCC
Action 3.2.4. National Certification Examinations should be introduced for different levels of ICT personnel/professionals. This certificate should be made compulsory for all ICT training institutes and during employment process.	MICT
Action 3.2.5. For ensuring quality ICT training a central body should be established for streamlining syllabus, evaluating eligibility of training instructors and for ranking of ICT training institutions	MICT
Action 3.2.6. Establish Concrete Guidelines for Commercial ICT courses emphasizing project-experience	MICT
Action 3.2.7. Provide ICT training loans for students and working people.	MOF, Commercial Banks and other financial institutions
Action 3.2.8. For addressing the fraudulence practices in ICT training awareness campaign should be organized and the fraudulent institutions should be punished.	MICT, BCC ICT Industry, CAB
Action 3.2.9. Enforce the existing foreign exchange regulation act and regulation for foreign workers registration to stop the illegal fund transfer.	MOF, BB, Commercial Banks, ICT training institutions

III.3. ICT Based Education

We cannot expect good ICT education at the university or professional level with a poor primary, secondary or higher secondary education. Unfortunately, our basic education system is falling apart from the very bottom. The national examinations area fiasco, cheating is rampant and it is almost a socially accepted practice.

ICT as a language cuts across all disciplines and is increasingly part of the content of all disciplines. Examples include spreadsheets, GIS, CAD, mathematics system such as Mathematica and Maple. Increasingly ICT is becoming a tool of problem solving. Computer aided modeling and simulation are now powerful aids of sciences as well as economics and business.

The processes in research paradigm – literature searches, collecting relevant articles and data, discussions with other researchers, writing papers, peer review of works and finally journal publications – can now be carried out electronically from a networked PC in a researchers office. Use of ICT in education management is becoming compelling needs through out the world.

Information networks in the educational institutions are rare in Bangladesh. Bangladesh National Scientific and Library Information Network [BANSLINK] has been established under the auspices of BANSDOC for connecting the libraries of nine public universities and six other research institutions and government bodies using dial –up connection. The network is not working due to the shortage of fund. The facilities of BERNET are limited to only BUET and Dhaka University [Khan, M.H.A, 2001].

Short Term Action Agenda

<i>Action Items</i>	<i>Action By</i>
Action 3.3.1. <i>One school - one computer lab</i> for academic purpose should be introduced immediately at zilla level. Private sector should be encouraged to go into ties with educational institutions commercially for quick advancement.	MICT, MOE, Schools, Private Training institutions, NGOs
Action 3.3.2. Top most priority should get the teachers' training program for ICT based general education. The teachers training colleges should be equipped with required facilities.	MICT, MOE Schools, Private Training institutions, NGOs
Action 3.3.3. A project to bring all educational institutions under Internet connection for academic purposes should be undertaken immediately. At the initial stage all universities, BITs and polytechnic institutions should be under network.	MICT, MOE, Schools, Private Training institutions, NGOs
Action 3.3.4. Computer education should be made compulsory for all level of education from end user point of view.	MICT, MOE, Schools, Private Training institutions, NGOs
Action 3.3.5. ICT Resource centers should be developed in all universities and colleges including CD-ROM resources.	MICT, MOE, MOF, Schools, Private Training institutions, NGOs
Action 3.3.6. research Information Network among universities and research institutions should be on a sustainable basis	Universities, research institutions

Mid Term Action Agenda

<i>Action Items</i>	<i>Action By</i>
Action 3.3.6. <i>One school - one computer lab</i> for academic purpose should be introduced at upazilla and union levels. Private sector should be encouraged to go into ties with educational institutions commercially for quick advancement.	MICT, MOE, Schools, Private Training institutions, NGOs, Donor Agencies
Action 3.3.7. At the second phase of the project to bring all educational institutions under Internet connection for academic purposes, all district level schools and colleges and at the third phase all the rest educational institutions should be brought under network.	MICT, MOE, Schools, Private Training institutions, NGOs
Action 3.3.8. English should be considered as technology. Quality of English language teaching should be improved and more emphasis should be given to teach English language from the primary to university level along with Bangla.	MICT, MOE, Schools, Private Training institutions, NGOs
Action 3.3.9 Basic education quality improvement resource allocation should be improved, recruitment should be merit based, indiscriminate opening of educational institutions should be stopped.	MOE, MOF
Action 3.3.10. Our education policy lacks focus on integration of education and economic activity wise planning. A mechanism of coordination is urgent.	MOE, MOP

IV. Economy and ICT

The task force identified three areas to focus the policy issues:

- ICT Industry
- ICT for Business Process Re-engineering
- Human resources for Automation
- E-commerce

It is to be mentioned here that ICT should not be considered only in the context of export potential. Given certain circumstances, ICT may be the highest export earners. However, a narrow focus on ICT industry as an export earner might generate frustration. The ICT can reshape the way how to do day-to-day business across the industries, which ultimately can provide long term dividends for the economy.

IV.1. ICT Industry

Market: ICT as an industry is graduating now from an infant stage in Bangladesh. The business and government are still far behind the acceptable level of ICT utilization. The absence of adequate information is a major problem to measure the actual situation. ICT activities in businesses are concentrated in very limited area, viz. hardware and software marketing, software development, software services, data processing services, ICT enabled services, human resource development etc.

Short Term Action Agenda

<i>Action Items</i>	<i>Action By</i>
Action 4.1.1. Issue an S.R.O. to implement the decision of providing 15% domestic price preference for locally developed software. Experience requirements of local ICT companies bidding for work may also be relaxed.	MOC, MICT Corporate Entities
Action 4.1.2. Provide rewards and recognition to local investors and entrepreneurs in ICT sector.	MOC, MICT Corporate Entities
Action 4.1.3. A regular survey on ICT development should be undertaken by Independent authority for providing key information about the sector, at the same time about all allied fields	MICT
Action 4.1.4. A mechanism to enforce IPR Act should be developed immediately	MOL

Software Industry: Majority of the software companies [83.33 percent] has been established in between 1999 and 2000. The total revenue in the software industry was only Tk. 42. 2 million in 1997-98, including the export earning [TechBangla, 2000]. The software export in 1999 was 0.8 million USD, which increased three fold in 2000 standing at USD 2.5 million. This figure is far away of all projections in our policy documents.

Pervasive software piracy is playing negative role in developing OTS solutions with local language interface.

Short Term Action Agenda

<i>Action Items</i>	<i>Action By</i>
Action 4.1.5. Software Technology Park (STP): Build STPs, Dhaka, Sylhet and Chittagong. Provide ready-made premises to the companies, high-speed data communication facilities, reliable power supply and <i>all required amenities</i> for the business to run in world class standard.	MICT, MOC, Private Enterprises
Action 4.1.6. Foreign companies should be encouraged to set up operation in ITV and High Tech Park. Software exporting companies should be encouraged to set up office in these Village/Park at preferential terms.	MICT, MOC, EPB Private Enterprises
Action 4.1.7. Provide rewards and recognition for NRBs who bring their company business to Bangladesh.	MOC, ICT Enterprises
Action 4.1.8. The software joint ventures should be encouraged through tax holiday for five years.	MOC, ICT Enterprises, Foreign Companies

Action 4.1.9. Lobbying for FDI in ICT Industry in Bangladesh: targeted lobbying of high tech companies to create their development centers in Bangladesh, and to provide funds to develop universities and the ICT infrastructure in the country.	EPB/ MICT, NRB organization, EPB
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Adequacy of Skilled ICT Personnel: The main input of ICT industry is human skill. The adequate number of skilled human resources is a prerequisite to the ICT industry development. The inadequate supply of skilled personnel has been focused in previous section.

Short Term Action Agenda

<i>Action Items</i>	<i>Action By</i>
Action 4.1.10. Run open merit-based problem-solving competitions, which involve both high-level technical architecture design and programming.	MICT, universities, industry ICT Personnel, students

Export Potential: In view of apparent success of India in software export it is strong believe that the software and services export can become a significant source of foreign exchange earnings for Bangladesh. Since the JRC report⁴ was published three years have gone, we are yet with the dream that we are becoming a software nation very soon. But the media hyped euphoria created subjective assessment of the actual potentials.

In our policy documents a \$275 billion market size for software is projected. However, low cost and low skill segment is only 20 percent of this figure. Considering the cost portion of this 20 percent and average 10 percent growth rate of the market annually the market size forecast is between 20 – 30 billion USD. For such a market size there are at least 50 developing countries, which are fighting for. So, a reasonable potential market share for Bangladesh may be around 500 million USD. However, in a competitive environment, the mere existence of a market does not inevitably translate into a productive share for an aspirant. If we accept the hypothesis that we have a "comparative advantage" in our "intellectual" abilities, it is a "perceived advantage"; we need to transform it into marketable finished products, that is conscious painstaking process to develop skills.

Export of software services, the model followed by India – the most successful producer – is beset by various constraints for Bangladesh. The opportunity to export software packages has been far more limited. Production of packages for the domestic market is difficult given the domination of imported packages. Selling software services to the domestic market is the choice of most software enterprises, but it typically represents a survival strategy more than a development strategy. The potential area of concentration should be determined through a rigorous research form the following areas:

- Remote network consulting and management
- Finance and Accounting

⁴ JRC Report: The "Report on Export of Computer Software From Bangladesh: Problems and prospects" submitted [in September 1997] by the Committee formed by the Ministry of Commerce of GOB, is popularly known as JRC report.

- HR services
- Software
- Website services
- Data search, integration and analysis
- Engineering and design
- Customer Interaction
- Remote Education
- Animation
- Translation, transcription and localization

The multimedia data entry like medical data transcription, engineering data entry (designing of maps, architectural design, construction design, multimedia authoring etc.) as a new industry has some prospects for Bangladesh.

Short Term Action Agenda

<i>Action Items</i>	<i>Action By</i>
Action 4.1.11. To immediately arrange a market survey through a reputed international consultancy firm for identifying the export demand of Bangladeshi software and IT related services	MICT, EPB, BASIS ICT industry
Action 4.1.12. Increase the budget of market promotion fund by 100% to be administered by EPB for meeting the expenses of promoting Bangladesh as a potential source of ICT-enabled services to the overseas markets.	MOC, EPB ICT industry
Action 4.1.13. Promote STP in Bangladesh to the US, EU and ASEAN companies, benefits, offers, etc. EPB to do road show and media coverage on Bangladesh IT resources, STP, investment benefits, cost effectiveness of outsourcing jobs to Bangladeshi companies.	MOC, EPB Foreign ICT companies
Action 4.1.14. Government should ensure regular participation in major regional and International IT Exhibitions, Fairs, contact promotion programs and buyers-sellers meets and should make arrangements for sending marketing missions and launching road shows abroad.	EPB ICT industry
Action 4.1.15. Government and private sector should make a bridge between ICT related NRBs and RBs for developing export of computer related services by arranging two conventions every year.	EPB and BASIS
Action 4.1.16. Help in establishing the credibility of Bangladeshi programmers by marketing the success-stories.	EPB, Media, Bangladesh Diplomatic Missions Abroad Investors, NRB organizations
Action 4.1.17. Create Marketing Collateral: To (1) Create NRB Resource Database, (2) Create database of ICT outsourcing companies, potential customers and make them available to the BD ICT companies, (3) Have a resourceful web presence, (4) Create Promotional Materials on Hard copy, CDROM, Video, etc.	MOC, MICT, private sector Foreign companies, NRB organizations

<i>Action Items</i>	<i>Action By</i>
Action 4.1.18. To organize International Software Exhibitions, Fairs in Bangladesh	MOC, EPB, BASIS ICT Industry, foreign companies, NRB organizations
Action 4.1.19. Conduct Business conferences, seminars and industry summits. Business Conference/Seminar: To sponsor business/marketing conference organized by NRBs in Silicon Valley, USA. Both parties do active follow-up on the action items to develop infrastructure in Bangladesh and secure more business in the USA and other countries. High Tech Executive Summit: In collaboration with AABEA/SBIT to hold high tech executive summits in USA, EU and Dhaka on ICT business opportunities for Bangladesh	EPB ICT Industry, foreign companies, NRB organizations
Action 4.1.20. Encourage ICT industry members to take steps for ISO9000 and CMM-SEI certification. Set up resources for industry best practices such as quality certification and project management.	MICT, BCC
Action 4.1.21. Quality Institute: Establish Software Quality Institute and Software Engineering Institute to facilitate ISO, CMM and Software Process Improvement initiatives. Establish similar institutes for other areas such as complex project management for on-time delivery within budget.	MICT, MOF
Action 4.1.22. To support marketing efforts of Bangladeshi companies a small trade office needs to be set up in USA, EU and ASEAN countries. This office should have adequate secretarial and telecommunication facilities, support services and office space that can be booked by Bangladeshi companies for short periods (7 days to 2 months).	MICT, MOC, EPB, Bangladesh Missions abroad
Action 4.1.23. Presence in ICT Business Hubs abroad [Silicon Valley, EU, ASEAN]: To open business offices in ICT business hubs to promote ICT business and ICT companies to do business/outourcing works abroad and to lobby multinationals to invest in Bangladesh.	EPB, ICT Industry
Action 4.1.24. Undertake SWOT analysis of the ICT industry, particularly software companies, who are involved in software export.	Ministry of ICT, BASIS

IV.2. ICT for Business Process Reengineering

Poor Automation and Advanced Application: In Bangladesh, the major sectors that possess the ICT resources are government, banks, commercial organizations, NGO, and educational and training institutions. The major portion of the resources is concentrated in commercial sector. The banking institutions are the largest user of licensed software; the number is almost three times higher than in government organizations. It is generally expected that government would be the largest user of licensed software. In creation of local software market and development of a vibrant local ICT industry, the government, as the buyer, can play a significant role. In the use of customized software, the government owns the leading place, which is very much encouraging. ICT utilization in

the public and private sectors is concentrated mainly in office automation. ICT penetration in Bangladesh is very much concentrated in Dhaka city. Dhaka comprises 73 percent of total ICT utilization in Bangladesh. This utilization ratio is an indicator of uneven development picture of the country.

Although the ICT penetration is concentrated in business sector compared to other sectors of the economy, the use of ICT in the business sector with an absolute measurement is very limited. The average PC- employee ratio in the businesses is only 0.27 considering the situation only in Dhaka city; The Internet user-PC user ratio in businesses is 0.58. [TechBangla, 2000]. Computer usage pattern in businesses is concentrated on word processing and e-mail. Apart from accounting purposes, computers are not used in a major way. Only 29 percent of businesses, which have some computer use, use customized software.

Short Term Action Agenda

<i>Action Items</i>	<i>Action By</i>
Action 4.2.1. Allocate enough resources for government institutions to pioneer business process reengineering.	MOF, All ministries
Action 4.2.2. To undertake awareness program among businesses for e-commerce and business process reengineering.	MICT, MOC, Chambers, Business Associations Corporate entities
Action 4.2.3. To undertake an action program for capacity building in Bangladesh Bank for leading the development process of a modern payment system.	MOF, BB
Action 4.2.4. Create economic incentives for business for adopting ICT for medium and large firms.	MOC, MOF
Action 4.2.5. Initiate mandatory e-mail in the office environment.	All ministries and government agencies

IV.3. Human Resources for Automation

Corporate Efficiency

In efficient companies, nearly all the tasks like handling the paperwork, scheduling, filing and routine communications are now Internet-based. Employees in the organization should be given the opportunity to learn the required skills; otherwise there will be a fundamental bottleneck inside the corporate infrastructure of the country.

Long run Benefits

While much can be achieved through individual efforts, digital empowerment of employees is the responsibility of the private sector and forward-thinking government. A long-term training strategy to provide access and encourage use of technology is vital to continued prosperity for business executives. The training to use Internet will change the scenario that encourages learning, self-confidence, and empowerment. Access to on-site Internet training, along with better cheaper access to computers and online services, is critical. Employers can reap considerable long-term

benefits by instituting policies and procedures that encourage ICT learning. Not only will this encourage loyalty and productivity -- it will be an indication to the workforce that they are working for a progressive company.

Short Term Action Agenda

<i>Action Items</i>	<i>Action By</i>
Action 4.3.1. Government must step forward with subsidies. Government should support corporate initiatives through tax and other incentives that reward large companies doing the most to promote a best-wired work force, and encourage small companies to get up to speed.	MOC, NBR, MICT
Action 4.3.2. Introduce bonuses for employees who attend and complete Internet training	Ministries, private enterprises
Action 4.3.3. Arrange on-site training courses during working hours	Ministries, private enterprises
Action 4.3.4. Introduce full-payment of off-site training, with childcare provided for women.	Ministries, private enterprises
Action 4.3.5. Arrange negotiated discounts with Internet Access Providers, and computer hardware and software companies, for staff to purchase home computers.	Ministries, private enterprises
Action 4.3.6. Introduce a system of bonuses, vacation days for those employees with ICT skills who teach others in the company	Ministries, private enterprises
Action 4.3.7. Initiate an <i>Each One Teach One</i> program, for company-wide mentoring.	Ministries, private enterprises

IV.4. E-commerce

Electronic commerce is quickly emerging as a particularly visible and spectacular incarnation of globalization. The rapid expansion of electronic transactions constitutes a major opportunity for trade and development: it can be the source of a significant number of success stories by which developing countries and their enterprises can reach new levels of international competitiveness and participate more actively in the emerging global information economy. From an international trade point of view, e-commerce is posed to become a major component of cross-border flows: estimates range between 10 and 25 per cent of world trade by year 2003. Exploding e-commerce ties individuals, firms and countries closer and closer together, while those who do not try to catch the "Internet Express" run the risk of being further and further marginalized. Developing countries have great potential to compete successfully in the new global market, but unless they promptly and actively embrace the ICT revolution they will face new barriers and the risk of not just being marginalized but completely bypassed.

B2B and B2C e-commerce are potential areas for Bangladesh. B2B e-commerce is emerging as the most important with an expected market of \$7.29 trillion or 7% of world trade by 2004. B2B portals are in the process of being established which will link buyers and suppliers around with world. These portals are likely to specialize in an industry or a service. Bangladesh commodity producers could gain from the trade efficiencies by linking up with the appropriate portals.

Bangladesh should also focus on B2C e-commerce, especially in targeting the international Diaspora. Recent successes of B2C portals targeting the Diaspora include bengalcommerce.com, munshigi.com, e-mela.com etc. Selling services and virtual products online, where the entire trade cycle including inquiry, order and delivery can be achieved online, could have high potential in Bangladesh. The job site bdjobs.com is a shining example of that.

It is important to realize that success in e-commerce does not depend on access and connectivity alone. A comparison of Tanzania and Ethiopia showed that, although Tanzania had a better physical e-commerce infrastructure, Ethiopia appears to have more Internet entrepreneurs emerging, even under an inferior ICT environment. A key ingredient in taking advantage of the e-commerce revolution is the commitment of the entrepreneur to e-commerce, and the determination to find the best model for his business. Their business strategy will have to undergo changes, particularly with regard to how they market their products/services and how transactions are processed. B2B and B2C commerce opens up new markets, but due to the speed and conveniences brought by e-commerce, orders tend to be smaller, there are more orders from more clients, who are more widely spread around the world. The e-commerce culture has created a buyer that expects quicker service and delivery, and therefore critical that enterprises have access to logistics service providers who can meet these requirements.

The government too has responsibilities in making e-commerce work. Aside from the obvious issues such as the liberalization of telecommunications and the development of an information society infrastructure, governments must strive to create an e-commerce friendly environment. They must address areas such as the e-commerce legal framework, overly bureaucratic trade procedures, trade restrictions and a difficult investment climate. Companies should be incentivised to become e-commerce enabled by offering them special arrangements in processing their imports and exports, and tax allowances. Governments could go a long way in developing an e-commerce enabled business community by setting up on-line access to and submission of tenders. Trade promotion organizations such as the EPB should focus on possible e-commerce opportunities and government should facilitate or encourage the creation of education institutions to develop a population of knowledge workers.

UNCTAD and other international organizations such as the World Bank and ITC are prominent in creating awareness of e-commerce in LDCs. They should be leveraged to promote education and research in areas linked to e-commerce, assist in identifying business opportunities and provide technical assistance to the government and enterprises.

Culture and mentality are significant barriers to e-commerce. A study conducted by Booz-Allen & Hamilton for the 1997 G7 Bonn Conference showed that one of the main reasons for European (with the exception of Scandinavia, UK and Netherlands) and Japanese small and medium enterprises (SMEs) lagging those in the USA in taking on e-commerce was due to cultural and mentality issues. This barrier is even more accentuated in LDCs and caused due to a lack of education and awareness about e-commerce, a fear of the technology, a lack of familiarity of information technology and a lack of trust in the system. An analysis of e-commerce practice in SMEs by Caroline Chappell and Sylvie

Feindt of KITE (1999) found that cultural issues were considered to be the biggest barrier to e-commerce followed by cost of investment, infrastructure and concern for security.

We should learn from developing countries that have made tremendous advances in e-commerce. Venezuela has set up a Chamber of Electronic Commerce to create awareness, educate, engage in promotions, do research and development for e-commerce related activities. Similarly, Tunisia set up a National Commission for e-Commerce comprising of several working groups which focus on e-commerce awareness seminars, pilot projects, legal and financial framework revamping efforts. Sri Lanka's Export Development Board (counterpart to our EPB) has created TradeNetSL and CyberTrader to reach out to the SMEs in the country through business telecenters.

Short Term Action Agenda

<i>Action Items</i>	<i>Action By</i>
Action 4.4.1. In order to give appropriate focus and prominence to e-commerce strategy and projects in the country, a national e-commerce policy should be formulated.	Ministry of ICT
Action 4.4.2. Awareness about benefits of B2B and B2C e-commerce among businesses and consumers must be engendered through focus groups, public seminars, writings, and case studies of success stories	EPB, chambers, media, and advocacy groups
Action 4.4.3. Commodity producers should be encouraged to join international B2B portals. Business associations, chambers of commerce and EPB should promote and host portals for respective business communities prominently featuring electronic catalogs and electronic marketplaces.	Business associations, chambers, EPB, ICT Industry
Action 4.4.4. Business cybercafes should be set up in business associations and chambers.	Business associations chambers EPB
Action 4.4.5. The government and the private sector should establish community and public cybercafes to promote B2C awareness and trade.	Ministry of ICT, Ministry of Commerce, Chambers, ISPs, Private enterprises
Action 4.4.6. B2C portals for international Diaspora must be promoted and appropriate incentives should be provided for these portals. B2C portals for domestic services and virtual products must be similarly encouraged.	Ministry of Commerce, BB, EPB
Action 4.4.7. Technical assistance should be provided to already successful SME exporters for them to become e-commerce enabled. A positive way to force SME exporters to develop such ability is to establish B2G portals, which feature tenders online.	Ministry of Commerce, Donor agencies, NGOs
Action 4.4.8. Creation of e-commerce content in areas where Bangladesh excels such as music, recipes, gifts, handicrafts, fashion, etc. must be incentivized.	Chambers, EPB
Action 4.4.9. For e-commerce trading of physical goods, the transportation bottlenecks must be addressed, and more efficient port facilities and quicker customs clearance must be ensured.	Ministry of Shipping, Ministry of Civil Aviation, Customs, NBR
Action 4.4.10. Local content development must be encouraged and incentivized.	Ministry of ICT, Donor agencies

Chapter V. Acceleration of Poverty Alleviation through ICT

Lack of Information of business: The poor people as recipients and transmitter of information may use ICT very effectively. Add in the fact that ICTs normally lower communication costs substantially, and this can be seen as the main potential area for ICT application by small/micro-enterprises. This area is perceived with huge potential with poverty alleviation objectives. Small/micro-enterprises do have a significant need for both receipt and provision of information.

Unfortunately the poor entrepreneurs cannot sell their products or services of entrepreneurship in a separate market. They compete in the same market place. The lack of market information in different geographical areas in time deprives the poor farmers and entrepreneurs from not only acceptable market price but also create access or deficit in supply of products. Similarly supply of in-time, accurate and updated health care information and agricultural production information may dramatically improve the poverty alleviation situation, as it will equip the poor to fight the information barrier.

In the area of small and micro enterprise development information needs relating to *supply*, such as the availability and sources of finance, labor, technology, raw materials, and other enterprise inputs are important. Small and micro enterprise needs information about *demand*, including market opportunities and characteristics of this market demand like location, price, size, and quality. It also needs information about *other environmental factors*, like competitors, laws, etc. it is almost impossible to generate such information by poor. “New communications technologies are revolutionizing access to information - but the revolution is likely to reach everyone but the poor” (Panos 1998b). Such information can be comparatively effectively supplied through Internet based technology, where same information can be shared by as many as small and micro enterprises throughout the country.

Access to Overt Resources: Accessing ICT-carried information requires a lot of overt resources including a telecommunications infrastructure to provide network access, an electrical infrastructure to make the ICTs work, a skills infrastructure to keep all the technology working, money to buy or access the ICTs, usage skills to use the ICTs, and literacy skills to read the content. The poor simply do not have these resources. In Bangladesh where 80% of the population has no access to reliable telecommunications and electricity, it is hardly surprising that the Internet reaches few poor people.

The most popular model is the community ‘telecenter’ with an Internet-linked computer providing a multi-function resource (Talero & Gaudette 1995). This is almost non-existent in Bangladesh. It was thought that bringing them to all poor communities would be a massive operation requiring huge diversion of investments and taking at least a generation. But Pakistan is experiencing unbelievable growth. The Internet connectivity had been extended to 350 cities just in four months. In August 2000 Internet was available in only 29 cities and its rapid spread was unprecedented in the world. India has a 10-year plan to spread Internet, while Pakistan has already covered more than 80 per

cent of its population. About 1,800 Internet kiosks are being set up by the PSO at its petrol pumps and in the next phase every post office will have Internet facilities.

It is understood that use of ICTs is not possible at individual level by poor people; an enterprise level can share the information for productive purpose. So the concept of “information intermediaries” can be applicable for the scalability of ICT use. The concept of information intermediary is further feasible as the literacy level also restrict self-use of the technology. The intermediary might supply required information for the user from the online knowledge base.

The Internet based Information Model might be through Desk Top PCs in Internet Centers, the centers may be fixed or mobile. The information might be also provided through WAP mobile, as mobile phones are less expensive and already available in rural areas. Some people think about voice enabled WAP for removing language barrier.

Content and Context of information: The poor need access to new locally-contextualized information more than access to existing information from an alien context. The content's language is also an important factor. To know about the *local information requirement in different avenues an extensive survey is required.*

Short Term Action Agenda

<i>Action Items</i>	<i>Action By</i>
Action 5.1. Develop telecom infrastructure in the rural areas with different combination of technology. This infrastructure will be the part of NII.	MICT/MOPT, Private operators, NGOs
Action 5.2. Initiate immediately research for study of information requirement by poor. Study comparable successful efforts and failed attempts.	Ministry of ICT, Donor Agencies, Research organizations, Planning commission
Action 5.3. Depending on the needs of a particular community being served, model device options (size, fixed/mobile) and electricity options (batteries, solar, wind, gas, oil) should be developed and implemented.	Ministry of ICT, MOPT, ISPs,
Action 5.4. Fund developing contextualized content for poor entrepreneurs.	Content developers, Ministry of ICT
Action 5.5. Encourage set up of community-based Information Intermediary or “infomediary” in rural area by subsidizing the start up cost. For ensuring operational viability combine ICT training, e-mail service, health service, shop etc.	Respective agencies where the center will be established, Local entrepreneurs
Action 5.6. Foster creation of pilot projects covering a limited number of villages which are neither too remote nor too near an urban center, neither too poor nor too rich, based on the learning from the project named “Sustainable Access in Rural India”.	MICT, MOP, NGOs
Action 5.7. Encourage develop Bangla content for greater reach among the people of Bangladesh	MICT, Bangla Academy, Content developers

Chapter VI. Universalization of Quality Health Care Services through ICT

The NII can significantly alleviate Bangladesh's health care crisis. It is very urgent to ensure that all citizens will get health care coverage and that controls skyrocketing health care costs. The costs of doing nothing are prohibitive because health care cost increases will eat up major portion of government revenue.

These problems will not be solved without comprehensive health care reform. Better use of information technology and the development of health care applications for the NII, however, can make an important contribution to reform. Experts estimate that telecommunications applications could reduce health care costs while improving quality and increasing access.

Along with addressing the ICT based health care system, we have to consider prevailing chaotic situation in our health system, which is mostly due to lack of commitments from the part of doctors.

Telemedicine: Using telemedicine, doctors and other caregivers can consult with specialists thousands of miles away; provide diagnosis and treatment, continually upgrade their education and skills; and share medical records and x-rays. The proposed setup of Internet center in the health care centers may be used as a local hub for providing telemedicine services. The telemedicine centers will help to develop cheaper and efficient data, voice and still photography transmission facilities between rural/primary health care facilities and secondary/tertiary healthcare facilities. The telemedicine will also ensure basic laboratory facilities with system for distant analysis/transmission. The service will create an edge in curing acute diseases reducing time for treatment dramatically.

Computer-Based Patient Records: An appropriate agency can organize computer-based patient records that are critical to improving the quality and reducing the cost of health care. Currently the incidence of lost results are rampant, majority of the treatment ordered is not documented at all; most of the time a diagnosis isn't recorded; and medical record is generally unavailable during patient visits.

Internet based health care content available through rural Internet center can dramatically improve current health care support for the rural areas.

Short Term Action Agenda

<i>Action Items</i>	<i>Action By</i>
Action 6.1. Promote telemedicine in a planned way both for solvent and poor people. The telemedicine services must be researched to identify most appropriate services for the target group.	MOHFW, UNFPA, NGOs, Private entrepreneurs
Action 6.2. Initiate project to develop personal health information services.	MOHFW, Private entrepreneurs, WHO
Action 6.3. Make mandatory to keep patient records in all health service institutions.	Ministry of Health, Ministry of Law
Action 6.4. To initiate project for development of Bangla health care content to be served through the Internet for rural poor people.	MOHFW, Medical Colleges, Content developers, NGOs

Chapter VII. Financial and Payment Infrastructure

The task force considered the following components to develop policy suggestions:

1. Automation of Financial Institutions
2. ICT based financial services
3. Financing ICT Industry and ICT Based Economic Reengineering

VII.1. Automation of Financial Institutions

Poor Automation: Growth and penetration in the banking sector rapid in Bangladesh, if we look into banks' head office level data. If we go to the branch level only 19 percent branches of NCBs, 38 percent branches of PCBs, and 97 percent branches of FCBs are computerized. Overall computer density in the banking sector is only 1.64. For foreign banks the computer density is 45.34, whereas for the NCBs this figure is only 0.41. On the other hand, the PCBs' ratio is 4.94. As a whole 61.81 percent banks do not have any LAN. LAN penetration ratio for the overall banking sector [considering the branch level], only 0.07. The ideal ratio should be 1. The PCBs' LAN penetration level is 0.22. The NCBs is the unique market player with more than 50 percent market share, so, ICT penetration is most crucial for this category of banks. Only 11 percent of banks have WAN. Although at the head office level the use of banking software is 95.45 percent, the software does not feature integrated banking. The non-banking financial institutions, insurance companies' automation status are not also very enthusiastic.

Misconceived Investment: In majority of cases the investment for ICT penetration in the financial institutions is misconceived. The banks generally purchase at first hardware, then software comes as a free gift from the vendor. In most of the times, the software is not purchased on basis of requirement of business process reengineering the banks. This sort of investment practice creates frustration and squeezes scope for quantum shift. Banks are very myopic in spending for purchasing international standard software and in development of appropriate human resources.

Central Bank: The role of central bank is crucial in ICT integration the financial sector. Unfortunately, the central bank's capacity is far behind the desired level. In Bangladesh there is no ACH, which is a prerequisite for development of ICT based banking products. CIB data collection often is time consuming, which hinders efficient credit decision by banks. There are no set rules in the foreign exchange manual regarding the payment system in e-banking and e-commerce. The issues of capacity building in the central bank are crucial to take pro-active measures in this regard.

Short Term Action Agenda

<i>Action Items</i>	<i>Action By</i>
Action 7.1.1. The automation of financial institutions should be based on comprehensive strategic plan.	BB, banking and financial institutions
Action 7.1.2. The spending in ICT integration should be in the following sequences: development of RFP on the basis of system study, procurement of software on the basis of RFP, procurement of hardware which support the software operation.	Financial institutions
Action 7.1.3. If NCBs fail to be leader in ICT implementation, the modern banking sector will be merely a dream. All NCBs should have financial freedom to invest in ICT according to the in house developed plan. The interference of incompetent ministerial people in allocating budget should be stopped.	MOF, BB, NCBs
Action 7.1.4. Central bank should provide some market incentive for the banks to implement ICT in the financial sector. Bangladesh Bank may set a time line for brining the Upazilla Level Branches of the banks under network within year 2005. For this achievement Bangladesh Bank can reward the banks with appropriate market incentives.	MOF, BB
Action 7.1.5. Bangladesh Bank can set up mandate for the banks to recruit new entrants with compulsory ICT education.	BB, commercial banks
Action 7.1.6. Bangladesh Bank can set up a target to rationalize human resources in the line of ICT plan within year 2005.	BB, NCBs
Action 7.1.7. The pay structure for NCBs should be separate to attract competent ICT specialists in banks under contractual agreements.	MOF, NCBs
Action 7.1.8. There should be a comprehensive plan to modernize the operation of the central bank to support automated clearing service and update supervisory and regulatory rules for absorbing ICT based banking. Bangladesh Bank can make mandatory to use MICR for quick reconciliation of inter-bank accounts.	BB, MOF
Action 7.1.9. An awareness campaign should be organized through workshop and seminar on the importance and business value of ICT in financial institutions for creating awareness among the top management.	BB, BIBM, commercial banks
Action 7.1.10. Bangladesh Bank should work out an efficient information infrastructure for banks using different technology to ensure network connectivity among the banks and financial institutions in Bangladesh.	BB, commercial banks

VII.2. ICT Based Financial Products

A broad spectrum of electronic financial services is available in Bangladesh with different degree of penetration. Credit card services are provided by 23.1 percent of banks. Among other electronic banking services: online corporate banking (7.7 percent), electronic fund transfer (15.4 percent), ATM (31.4 percent), debit card (3.4 percent), Internet Banking (7.7 percent), and any branch banking (23.1 percent).

Last couple of years shows dramatic improvement in the awareness situation in the banking sector regarding the comprehensive application of ICT. Local software companies have been starting competition to supply useful complete banking software with the features like. However, many forms of electronic banking services are not possible to offer in Bangladesh at this moment due to the technology infrastructure and

legal infrastructure. Those products would be very useful for export-oriented industry to reduce lead-time in export and keep comparative advantage in the international market.

Online Authorization: The technology infrastructure is not capable of supporting online authorization and settlement of e-commerce transaction. The digital signature law and dispute settlement law is not in place. Many B2C e-commerce ventures cannot bring their money into Bangladesh due to the legal impediments, because the definition of export does not support for earning money without delivery of goods through border. There is no provision to open account outside country, nor there is any payment server within country to bring payment for e-commerce transaction.

Low Volume International Credit Card for Software Industry: As the international credit card issuance is restricted [virtually it becomes debit card], the software industry fails to import latest books to download latest software quickly. A low limit international credit card could solve the problem.

Short Term Action Agenda

<i>Action Items</i>	<i>Action By</i>
Action 7.2.1. A pilot project should be undertaken immediately to set up a payment server within country for receiving payment for e-commerce.	BB, Commercial Banks, Private Investors
Action 7.2.2. For attracting foreign currency through e-commerce and Internet banking Bangladesh Bank should undertake a pilot project to experiment the crosscutting issues.	BB, BIBM, commercial banks
Action 7.2.3. Permit low limit International Credit Card [ICC] for individuals against passport. Educational institutions will be facilitated to procure books and other educational materials using ICC.	MOF, BB
Action 7.2.4. Legal infrastructure is a must for implementing ICT based banking services. Bangladesh Bank along with the concerned agencies should work out a plan to develop and enact the following regulatory documents: E-banking regulation, Digital Signature Law, Dispute Settlement Law, Amendment in evidence act etc.	MOF, BB, MOL, MOC
Action 7.2.5. To form "Center for Banking Technology and Information Management" to support the banks with latest technological development in the banking world and provide expert support for ICT implementation. When banks will attempt to incorporate new ICT based banking products, the necessary training to the bankers may be provided by BIBM. So, a plan to equip BIBM to provide those support is important.	BB, BIBM

VII.3. Financing ICT Industry

Although, ICT industry has a huge potential both in local market and international market, the sector is suffering from lack of financing. The major problem is a unique nature of input structure of the ICT industry. The main resource input for the ICT industry is human resources, where as fixed cost component is comparatively low. As a result, the financial intuitions fail to address this specificity of the industry and provide financial support at desired level. The banks and financial institutions disbursed Tk. 1140.2 million for the ICT sector in the fiscal 1999-2000, which is 93 percent higher than that of the previous year. In 1998-99, the amount was Tk. 590 million. In 1989-90 the investment into ICT sector was only Tk.8.6 million. The total disbursement in the ICT sector for the last ten years was Tk. 2268 million, which is far below of the requirement

The NCBs, PCBs and NBFIs are now focusing more and more on the ICT sector and have opened advisory cells for prospective investors. All NCBs lowered the interest rate for ICT sector to 10 percent.

Bangladesh Bank set up Taka 500 million EEF for software industry. This positive step does not bring any fruitful result due to the adverse terms and conditions. Worldwide, venture capital is the most appropriate finance for the startup of ICT business. This form of finance is not available yet in Bangladesh. The ICT industry requires huge working capital for providing salary of ICT professional for a prolonged time due to the nature product life cycle. As the industry structure is different than garments and other industry, the financial products to support ICT industry should be tailor made.

Short Term Action Agenda

<i>Action Items</i>	<i>Action By</i>
Action 7.3.1. Device mechanism to provide working capital finance to the ICT industry, based on the industry specificity.	BB, financial institutions
Action 7.3.2. Provide loans to ICT enterprises, particularly the software industry against movable assets.	Financial institutions
Action 7.3.3. Rationalize rules for EEF with industry feedback of the allocated fund should be used to form venture fund.	MOF, BB
Action 7.3.4. Promote venture capital as a major source of finance for the ICT industry at start up stage. The EEF should be converted to venture capital fund for utilizing the fund	BB, BIBM, IFC

Chapter VIII. Legal Infrastructure for the NII

In developing an efficient legal infrastructure we have to keep in mind that there are lots of laws in Bangladesh, which are not enforced and used. Lawyers often do not use them.

An ICT-friendly legal framework for twenty first century e-business based economy should encompass the following documents:

1. Contract Act
2. Evidence Act
3. Penal Code
4. Patent Law
5. Secrecy Act
6. Consumer Protection Act
7. Labor Law
8. Trade Mark Act
9. Industrial Dispute Act
10. Negotiable Instrument Act
11. Foreign Exchange Regulation Act
12. Prevention of Money Laundering Bill
13. Income Tax Act

The United Nations Commission on International Trade Law (UNCITRAL) adopted in June 1996 the Model Law on E- Commerce. The law aims at facilitating E-business by providing a set of internationally acceptable rules and legal principles, which may be helpful in designing legislation to remove uncertainties arising from the application of paper-based rules and regulations in an electronic environment. The accompanying "Guide to Enactment" provides national legislators and users of E-business with further explanations of the content of the Model Law. [UNCTAD. 2000, pg. 128].

In designing the E-business legislation it is desirable to combine the scope of self-regulation and limit the scope of over – regulation. The systems approach in development (and reengineering of existing) of a market friendly confidence building legal infrastructure may be as follows:

Short Term Action Agenda

<i>Action Items</i>	<i>Action By</i>
Action 8.1. To conduct a need assessment exercise for creating enabling environment for E-business	MICT, MOC, MOL, NGOs, Donor Agencies, BASIS
Action 8.2. To develop short run (within one year) and a long run (within two- three years) plan for adoption of necessary rules and regulations.	MICT, MOC, MOL
Action 8.3. To pool local and international experts to develop laws related to E-business.	MICT, MOC, MOL, Chambers, BASIS, BB, ICT Industry, NGOs

<i>Action Items</i>	<i>Action By</i>
Action 8.4. Undertake capacity building program for lawyers who can undertake different issues to protect interest of clients and as a whole of Bangladesh in e-commerce related dispute settlement.	MOL, Donor Agencies
Action 8.5. Government should undertake crash program to patent our indigenous knowledge including ICT related intellectual property in the international arena.	M ICT, MOC, MOFA

Protection of Intellectual Property Rights: Development of an advanced information infrastructure will create unprecedented market opportunities and new challenges for our world-preminent media and information industries. The broad public interest in promoting the dissemination of information to our citizens must be balanced with the need to ensure the integrity of intellectual property rights and copyrights in information and entertainment products. This protection is crucial if these products -- whether in the form of text, images, computer programs, databases, video or sound recordings, or multimedia formats -- are to move in commerce using the full capability of the NII.

Short Term Action Agenda

<i>Action Items</i>	<i>Action By</i>
Action 8.6. Enforce IPR Act 2000 for protecting software product form piracy.	MOL, MOHA, Chambers
Action 8.7. Examine the adequacy of copyright laws. The appropriate agency should investigate how to strengthen and enforce domestic copyright laws and international intellectual property treaties to prevent piracy and to protect the integrity of intellectual property. To ensure broad access to information via the NII, the agency should study how traditional concepts of fair use should apply with respect to new media and new works.	BASIS, Chambers, Ministry of Commerce
Action 8.8. Explore ways to identify and reimburse copyright owners. The agency should explore the need for standards for the identification of copyright ownership of information products in electronic systems (e.g., electronic headers, labels or signature techniques). The government Task Force may also evaluate the need to develop an efficient system for the identification, licensing, and use of work, and for the payment of royalties for copyrighted products delivered or made available over electronic information systems.	MOF, MOL, BASIS

Chapter IX. Efficiency of the Government

It is great challenge for Bangladesh to create a government, which is effective, efficient and responsive. Moving from red tape to results will require sweeping changes: emphasizing accountability for achieving results as opposed to following rules; putting customers first; empowering employees; and reengineering how government agencies do their work. As part of this vision, the Task Force emphasizes the importance of information technology as a tool for reinventing government. "With computers and telecommunications, a government can do its job, which was even impossible to do. There are a number of ways in which "electronic government" can improve the quality of government services while cutting costs and time.

IX.1. Access to Government Information

Information is the currency of democracy. Government agencies are among the most prolific collectors and generators of information that is useful and valuable to citizens and business. Improvement of the nation's information infrastructure provides a tremendous opportunity to improve the delivery of government information to the taxpayers who paid for its collection; to provide it equitably, at a fair price, as efficiently as possible.

The government should improve every step of the process of information collection, manipulation, and dissemination. The government should fund research programs that will improve the software used for browsing, searching, describing, organizing, and managing information. But it is committed as well to applying those tools to the distribution of information that can be useful to the public in their various roles as teachers, researchers, businesspeople, consumers, rural people etc.

Short Term Action Agenda

<i>Action Items</i>	<i>Action By</i>
Action 9.1.1. Improve the accessibility of government information. The government Task Force should carefully consider the problems associated with making government information broadly accessible to the public electronically. Additionally, several inter-agency efforts have been started to ensure that the right information is stored and available. Finally, to help the public find government information, an inter-agency project should be formed to develop a virtual card catalogue that will indicate the availability of government information in whatever form it takes.	PMITTF, all Ministries
Action 9.1.2. Upgrade the infrastructure for the delivery of government information. The government should take necessary steps to promote wider distribution of its public reports. The Government Printing Office should enact legislation to improve electronic dissemination of government documents.	PMITTF, governmen t printing office
Action 9.1.3. Develop integrated electronic access to government information and services: Currently, citizen access to government information is uncoordinated and not customer-friendly. Electronic kiosks and computer bulletin boards can result in quick response, complete information, and an end to telephone tag. All policy documents should be available in the government web site.	PMITTF, MOEst.
Action 9.1.4. Extend the "Universal Service" Concept to Ensure that Information Resources Are Available to All at Affordable Prices	PMITTF, MICT

IX.2. Efficiency of Government Agencies

The time-consuming business process in government agencies not only slow down the decision making process, it also adversely affects the productivity of the national economy as a whole. Organizations suffer from delay, as a result often, business organizations face set back in the market competition. ICT can dramatically improve inter-agency coordination and increase efficient within the agencies. Government-wide e-mail can provide rapid communications among individuals and groups, break down barriers to information flows between and within agencies, allow better management of complex interagency projects, and permit more communication between government officials and the public.

Short Term Action Agenda

<i>Action Items</i>	<i>Action By</i>
Action 9.2.1. Strengthen inter-agency coordination through the compulsory use of electronic mail. To implement the e-mail communication among the agencies, an inter-agency coordinating body should be established to incorporate electronic mail into the daily work environment of government workers.	Cabinet of Ministers, MICT
Action 9.2.2 All parliament members should be provided with laptop computer with full information of constituency. The parliament members should also have personal web site for interaction with the people of the constituency.	The Parliament Secretariat
Action 9.2.3. Make available video conferencing facilities in the divisional headquarters and district headquarters.	MICT, PMITTF
Action 9.2.4. Establish a National Law Enforcement/Public Safety Network: Whether responding to natural or technological disasters, or performing search and rescue or interdiction activities, local law enforcement and public safety workers must be able to communicate with each other effectively, efficiently, and securely. Currently, local law enforcement agencies have radio systems, which cannot communicate with each other because they occupy different parts of the spectrum.	MICT, Ministry of Establishment

IX.3. Improvement of Government Transparency

The citizens right for information should not be confined within the premise of access to information only for business needs, the citizens should also know how their money paid to government as tax and levies are spent. The ICT brings huge opportunity to improve transparency of government expenditure and deals within country and also cross-borders transactions. The government is the largest single buyer of different products. The government should play a key role in developing emerging markets for information technology by adopting ICT based transactions.

Short Term Action Agenda

<i>Action Items</i>	<i>Action By</i>
Action 9.3.1. Reform the government procurement process to make government a leading-edge technology adopter.	All ministries
Action 9.3.2. To arrange posting tender documents on the web and allow submission of those documents online	Concerned ministries and agencies

IX.4. Online Government Services

Worldwide more and more services are provided online. Considering our country context online service delivery would be the best mechanism to reduce corruption, harassment of citizens, reduce straight forward theft of government funds transferred through false accounts and to “virtual employees”, etc. The online services will greatly benefit the corporate world to reduce the time to get government services and facilitate to achieve further competitive advantage.

Short Term Action Agenda

<i>Action Items</i>	<i>Action By</i>
Action 9.4.1. Commission government ICT projects: Pilot projects should be initiated for the following programs: export –import license, trademark, citizen's registration, patent, land registration	Respective Ministries, agencies

Mid Term Action Agenda

<i>Action Items</i>	<i>Action By</i>
Action 9.4.2. Different Licensing Services should be made online, e.g., export - import license, trademark, citizen's registration, patent, land registration etc.	Joint Stock registrar, Trade mark authority, City Corporations, municipal offices and local government offices
Action 9.4.3. Develop a nationwide system to deliver government benefits electronically: government can cut costs through "electronic benefits transfer" for programs such as salaries of government employees, retirement benefit, etc and also eliminate the problem of “ghost workers” or ‘virtual employees’.	Auditors’ General office

Chapter X. The Digital Empowerment of Women

In developing countries three-fourths of women have not yet pressed the "Power" button to get them into the new economy and development process. In Asia, this is not the case. Men represent 78% of all Internet users in Asia, while women account for only 22% [Brisco, 2001]. Even in the corporate world women have less access to the Internet technology. But when the women represent almost half of the productive work force we cannot ignore the access ICT for this group of population.

Historically, it is women who work in a support role in many corporate offices, handling the paperwork, scheduling, filing and routine communications. In efficient companies, nearly all these tasks are now Internet-based. If women are not given the opportunity to learn the required skills, there will be a fundamental bottleneck inside the corporate infrastructure of the country.

Women as Entrepreneurs: The Internet, more than any other technological tool, has leveled the playing field, empowering women in business by allowing them access to information and networking opportunities traditionally closed to them.

In Asia, women already head 35% of small or medium enterprises. In China, women account for 25% of all new business starts. In Japan, the percentage is much higher -- now four out of five Japanese small businesses owners are women. The Bangladesh scenario is not possible to figure out using statistics, but the figure of women entrepreneurs is also enthusiastic.

For women, the advantage of the Web is often that it can more easily allow them to start a successful home-based business that is profitable rather than marginal. The ability of women to earn income at home while raising a family -- with the technology to communicate inexpensively with customers around the world, and handle accounting and order processing online -- is adding to the attraction of the Internet for women.

The Invisible Digital Divide: Younger people and students are more likely to be "wired." But the substantial female workforce aged 25+ is facing huge challenges with technology. A management-level woman may sport a fancy computer on her desk, but often she is not comfortable or knowledgeable enough to use it. She has a secretary who prints out her e-mail so she can dictate a response. Digital Divas -- those women with technology skills -- will be the ones eligible for important promotions.

The Digital Empowerment of Women: While much can be achieved through individual efforts, digital empowerment is the responsibility of the private sector and forward-thinking government to ensure that businesswomen achieve parity with men. A long-term training strategy to provide access and encourage use of technology is vital to continued prosperity for businesswomen. The training to use Internet will change the scenario that encourages learning, self-confidence, and empowerment of women. The issues are not just of political or sociological interest, it should change the shape of economy where women contribute significantly.

Retention of ICT Work Force: The retention of ICT workforce is a major problem. For several social and other reasons mobility of women is less than of men. The development

of women ICT professional can solve the acute problem of migration of high quality ICT professional.

Short Term Action Agenda

<i>Action Items</i>	<i>Action By</i>
Action 10.1. Encourage non-profit and voluntary organizations to initiate ICT training for workingwomen.	Ministry of ICT, NGOs
Action 10.2. Introduce bonuses for women who attend and complete Internet training.	Ministries, corporate entities
Action 10.3. Introduce full-payment of off-site training, with child care provided	Ministries, corporate entities
Action 10.4. Arrange negotiated discounts with Internet access providers, and computer hardware and software companies, for staff to purchase home computers	Ministries, agencies, corporate entities

Chapter XI. Resource Allocation and Fiscal Measures

The ICT should not be considered just for export potential of software industry. There is no doubt about the importance of export potential at the advent of new threats to RMG sector, our major export earner, arising from new WTO regime after 2005. To achieve huge boom in ICT industry like in the RMG, the abovementioned action agenda should be followed with further consultation with the interest groups. However, for attaining long run benefit a careful continuous integrated efforts should be undertaken and it is not possible without proper financial and fiscal support. It is obvious that government alone cannot provide finance for the purposes. All the sources: fiscal, financial and aid, should be explored immediately.

Resource Allocation

The task force is quite aware of the fiscal conditions of the government. Understanding the constraints the task force proposes some re-allocation of resources in ADP. Besides, the government should actively seek foreign aid in promoting the ICT related development agenda. The foreign aid is comparatively easily available considering the over all shrinking aid flow to the LDCs. As a whole, a comprehensive exercise is required to assess the resource requirements and explore all possible sources: foreign aid, budget allocation in ADP, reallocation of revenue in education, sur-charge, foreign loans, etc.

Short Term Action Agenda

<i>Action Items</i>	<i>Action By</i>
Action 11.1. To assess financial requirement for implementing the action agenda identified in the policy briefs and explore possible sources.	MOF, Ministry of ICT

Fiscal Measures

Short Term Action Agenda

<i>Action Items</i>	<i>Action By</i>
Action 11.2. Allocate sufficient fund for ICT expenditure in all Govt. departments/agencies for higher productivity, efficiency and transparency. In Govt. budget management system, there should be a separate line item for ICT expenditure with a target of allocating at least 1% of GDP by 2003-04.	MOF, MOP
Action 11.3. To encourage private sector investment in ICT, 100% depreciation of ICT related investment should be allowed. Create a special fund for supporting ICT research and development activities	BOI, NBR, MOF, BB, MOP, ERD
Action 11.4. Create a special fund of Tk. 500 million for giving low interest (6% p.a.) loans to teachers and students to be disbursed by Commercial Banks and to be subsidized by Bangladesh Bank.	MOF, BB

<i>Action Items</i>	<i>Action By</i>
Action 11.5. Fund the marketing efforts, and Business offices abroad. Fund both national-level infrastructure projects and initiatives in academia.	MOF, MOP
Action 11.6. Establish ICT Education Fund: Allocate funds to institutes to achieve the targets on number of graduate to produce, teachers training, lab development and quality improvement.	MOF, MOE
Action 11.7. Allocate fund to provide interest free loan/scholarship through commercial banks to students doing BS/MS in ICT.	MOF, commercial banks
Action 11.8. Government must step forward with subsidies. Government can support corporate initiatives through tax and other incentives that reward large companies doing the most to promote a best-wired work force, and encourage small companies to get up to speed.	MOF, NBR

Chapter XII. Institutional Framework for Coordination of Development of NII

If the information infrastructure is to develop quickly and coherently, there must be close coordination among the various government entities, particularly with respect to regulatory policy. It is crucial that all government bodies -- particularly parliament, the government -- work cooperatively to forge regulatory principles that will promote deployment of the NII. As a whole, we need a pro-ICT government. Throughout the policy briefs document, we have traced that majority of action agenda are not possible without a dedicated entity. The IT Task force headed by the Prime Minister is an interim arrangement. Unfortunately after formation of the Task Force we have not observed much movement there. So, formation of a ministry is the crying need of the day. However, the task force will play a pro-active role in resolving cross-ministerial issues.

Short Term Action Agenda

<i>Action Items</i>	<i>Action By</i>
Action 12.1. Form a Ministry of Information and Communication Technology including the whole MOPT, Broadcasting form Ministry of Information and ICT from MOST. This ministry must be run by a combination ICT and business people, who have the mission and vision to create Bangladesh “An ICT Power House” that will enable take fair global market share in the ICT business and will play significant role in poverty alleviation. This ministry should have concrete goals for exporting HR resources and graduating ICT professionals and should be held accountable for meeting these goals.	The Parliament MOPT, Broadcasting [technology] Authority, ICT related authority of MOST
Action 12.2. It is quite surprising that in the proposed ICT policy, there is no word about the BCC and its role. The prevailing perception regarding the role of BCC is very negative. A clear cut statement regarding the status of BCC should be announced by the new government	MOST, ITTF

Appendixes

Appendix I: Documents Consulted for Preparation of Policy Brief

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Appendix 2: Report of Regional Consultation in Sylhet, June 16, 2001.

Report on Regional Consultation on "ICT Taskforce Report"

June 16, 2001, Sylhet

The regional dialogue was very successful with active participation of the discussants. The discussion was constructive with very specific recommendations and arguments. The discussion turned in to constructive policy debate, where the following issues were attended with particular importance:

- local vs. foreign: trainers, teacher, experts;
- proactive, supervisory role of government agencies [BCC, MST];
- issues of efficiency of BTTB;
- internet content: English vs. Bangla;
- English as a technology or Bangla;
- implementability of the policy recommendations;
- issues of political commitment of the government and allied agencies; and
- issues of globalization.

The following recommendations have been depicted from the whole discussion:

Information Infrastructure

1. The ICT park should be established in Sylhet along with Dhaka and Chittagong.
2. Fiber optic backbone should be spread throughout the country to bring the benefit of Information superhighway at everyone's doorstep.
3. BTTB should not be corporatized, rather ways should be devised to make it dynamic in its current status.
4. It is not a good idea to corporatize the BTTB, the past experiences with corporations is not very positive. Better we have to think how we can improve the service level in BTTB within existing framework.
5. The sovereignty of TRC should be ensured. All the commissions are becoming dependent on foreign consultants.
6. The financial autonomy of BTTB should be executed quickly.
7. Internet usage charge should be lowered at district town level.
8. Internet centers should be established in administrative centers, rail stations, health complexes and educational institutes.
9. Restriction from voice and data communication should be withdrawn. A mechanism of taxation may be developed for legalizing the service.

Human resource development

10. The primary level education should be emphasized for long run return in ICT.
11. For ensuring quality of ICT training a central body should be established for ranking institutions. The body should also evaluate eligibility of the training instructors.

12. ICT syllabus for training centers must be standardized by a central authority. Industry focused ICT education should be introduced by a special board for preparing syllabus.
13. University teachers and students should get free access to Internet.
14. All universities should be networked for better access to information
15. Ways have to be mapped out to spread ICT education to the low-income groups who fall out of university and private center education.
16. Many schools have computers but they do not have trainers.
17. To address the problem of quality of education at school and college level as a short-term measure a “Roll Over” trainers’ training program should be implemented immediately. We have to develop a pool of quality teachers, who will run this program [Costa Rica Model].
18. ‘Each one teach one” program can also be implemented for resolving the problem of resources.
19. Number of science and technology students should be doubled.
20. The ICT education is not well equipped as well as other education. The policy may be redesigned: top 10 percent students can get subsidies, the rest of the students will pay according to the merit.
21. Private sector led growth make the ICT education limited to a particular sector of the society. Government should come forward to Ensure balanced development of all segments of ICT education.
22. The curriculum at university level should not be changed frequently. Because, the university level education is not only for meeting the current demand in the market place, the graduates from university should be involved in R&D and also teaching. Nonetheless, a system should be designed for quick review of the curriculum and syllabus at a regular interval.
23. Where there is no basic education, it is useless to talk about ICT education at school level. A clear-cut recommendation is required for basic education.
24. One school one computer lab program should be implemented in a phased manner immediately.
25. Our education policy lacks coordination between education and application of education.
26. For education science and mathematics software should be targeted.
27. BOU should jump-start into virtual education.
28. “Human resource management” is not an acceptable terminology. Human being is not a commodity. It is an attempt to convert the human being into robot.
29. English language skill as a whole very poor in Bangladesh. In TOT along with ICT, English should be incorporated.
30. The policy brief proposes sector-based university [ICT university]. It is not justified, because the sectoral demand of specialists are not same in the long run.

Economy and ICT

31. The market for software is not only USA, also the EU and ASEAN.
32. A regular survey on ICT development should be undertaken by independent authority for providing key information about the sector, at the same time for all allied fields.
33. Data entry business should be a focus for ICT sector.
34. The ICT should not be focused only for export; it should be focused to the issues of education and other related matters.

35. Implement the IPT Act. The Act is in place, but there is no mechanism to realize the clauses through a defined procedure.
36. A well-designed plan should be implemented for software promotion abroad.

ICT for Poverty Alleviation

37. The Internet content should be developed in Bangla.

Financial Infrastructure

38. Universities are facing great problem in procuring books, hardware and software on ICT thanks to the strict financial and procurement policy of the institutes. The online procurement should be allowed and the international credit issuance should be streamlined with the requirements.

Legal Infrastructure

39. Regarding the formulation of new laws for ICT and e-commerce; there are lots of laws, but there is no procedure to implement them. For reform of laws we do not need international experts. The law commission can work for it.
40. The government should undertake crash program for patenting the indigenous knowledge.

Efficient Government

41. The ICT is a new weapon for imperialistic exploitation. It will further increase the gap between rich and poor.
42. The electronic government services can reduce the corruption at level.
43. The proposal to provide laptop and e-mail to all MPS should be dropped.
44. The policy brief should speak out something about the role of BCC. The organization failed to meet the expectation of people.

Health Care

45. The quality of health care fell dramatically. It is due to lack of commitment from the part of doctors.

Implementability

46. To implement the recommendations we need a group of skilled and dedicated people. A policy should be developed to form such group.
47. The policy brief should be focused further for politicians and policy makers, in other words it should be written in their language.
48. The proposed programs are not realistic in the current socio-economic context.
49. In the light of WTO, we should not go for ICT implementation.
50. An invalid parliament cannot do much for economic development, also for developing new laws for ICT based development.
51. The political commitment is a must for implementing the recommendations of policy briefs.

Appendix 3. List of Participants of a Regional Consultation in Sylhet, July 16,2001

1. Mr. M. Muhibur Rahman
2. Mr. M. Ahmed Kabir Chowdhury, Statistics Department, SUST
3. Mr. Nuruddin Kamal, Ex Chairman, PDB
4. Mr. Touhid-ur-Rahman, EED, SUST
5. Mr. Rafiul Hasan, Computer Science Department, SUST
6. Mr. Jamil Ahmed Chowdhury, Registrar, SUST
7. Professor Gouranga Deb Roy, Chairman, Mathematics Department, SUST
8. Professor Abul Fateh Fattah, Madan Mohan College, Sylhet
9. Professor M. Abdul Aziz, Treasurer, SUST
10. Mr. Bedananda Bhattacharya, General Secretary, CPB, Sylhet
11. Mr. Ajit K. Raut, PDB, Sylhet
12. Mr. M.A. Haque, Ganatantri Party, Sylhet
13. Mr. E. U. Shahidul Islam, Lawyer, Sylhet
14. Mr. A.S.M. Abdul Mobin, Sylhet Lawyers' Association
15. Mr. A.F.M. Kamal, Lawyer, Editor, Sylhet Kantha, Ex-Chairman, Sylhet Pourashava
16. Professor, Kabir Chowdhury, SUST
17. Brigadier general [RTd.]Jubaer Siddiqui, Principal, IBIT, Sylhet
18. Mr. B.H. Chowdhury, E-Commerce and ICT Consultant, USAID, Dhaka
19. Mr. Enam Ahmend, The Daily Star
20. Mr. Shariar Khan, The Daily Star
21. Mr. Abu Hena Chowdhury, General Secretary, Bangladesh Teachers' Association, Sylhet
22. Mr. Rafiqur Rahman Lozu, Teacher, Cultural Activist
23. Mr. M. Mahmud-ul-Haque, Aptech Computer Education
24. Mr. Aziz Ahmed Selim, Acting Editor, The Daily Jugobheri, General Secretary, Sylhet Press Club
25. Mr. Mustafiz Shafi, Staff Reporter, Prothom Alo
26. Mr. Farooque Ahmed Mehdi, Staff Reporter, Prothom Alo
27. Mr. M. Aroz Ali, Barrister, Sylhet
28. Mr. Abu Zaed Mohammad, FIVDB, Sylhet
29. Mr. Brahmananda Das, BRAC
30. Mr. Ashraful Alam Nayar, The Daily Jugobheri
31. Mr. Serajul Islam, Staff Reporter, The Daily Jogobheri
32. Mr. Abdur Razzaque raza, Staff Reporter, The Daily Jogobheri
33. Mr. Iqramul Kabir, Ekushe Television
34. Mr. Lakat Shah faridi, Bureau Chief, Jugantor
35. Mr. Abdur Rashid Renu, news Editor, Shaptahik Sileter Katha
36. Mr. Mahfuz Anam, Editor, The Daily Star
37. Mr. M. Habibur Rahman, Vice-Chancellor, SUST
38. Mr. Abu Saeed Khan, EMC
39. Mr. Anir Chowdhury, e-Vastra Corporation
40. Dr. Ananya Raihan, Associate Professor, BIBM

Appendix 4. List of Participants of a Dialogue organized on May 31, 2001 [CPD Dialogue Room] for validation of the Task Force Policy Briefs

1. Dr. A.M. Chowdhury, Chairman, SPARSO
2. Mr. Mustafa Jabbar, Ananda Computers
3. Mr. Golam Rabbani Ahmed, Computer Village
4. Mr. Mahboob Zaman, Managing Director, Datasoft Systems Bangladesh Limited
5. Mr. Nazmul Haque, Executive Director, Bangladesh Bank
6. Mr. A.T.M. Monirul Alam, BTTB
7. Probash Amin, Prothom Alo
8. Shakawat Alam, e-Biz
9. Professor Jamilur Reza Chowdhury, BRAC University
10. Mr. S.D. Khan, IIFC
11. Mr. F.Q.M. Farooq
12. Mr. B.H. Chowdhury, JOBS/IRIS of USAID
13. Professor Zafar Iqbal, Shahjalal University of Science & Technology
14. Professor Lutfar Rahman, Dhaka University
15. Mr. B.I. Lenin, Computer Bichitra
16. Mr. Abu Saeed Khan, EMC
17. Mr. Ahmad Mushfeeq Anam, X-fer Limited, representative of Netas-Nortel