WSIS+10: OVERALL REVIEW OF THE IMPLEMENTATION OF THE WSIS OUTCOMES

WSIS 10 Year Country Report by The People's Republic of Bangladesh

MAY 2014

Minister
Ministry of Posts, Telecommunications and Information Technology
Government of the People's Republic of Bangladesh

Under the great leadership of our Honorable Prime Minister Sheikh Hasina, Telecommunication & ICT development has been prioritized under "Digital Bangladesh" program. The philosophy of "Digital Bangladesh" comprises ensuring people's democracy and rights, transparency, accountability, establishing justice and ensuring delivery of government services in each door through maximum use of technology-with the ultimate goal to improve the daily lifestyle of general people. It means inclusion of all classes of people in the development and does not discriminate people in terms of technology.

Accordingly, our government formulated ICT Policy Guidelines which includes Social Equity, Productivity, Integrity, Education and Research, Employment Generation, Strengthening Export, Health Care, Universal Access, Environment, Climate and Disaster Management and Supports to ICTs. In Bangladesh 98% of the total area and 99% of its around 160 million people are under the telecom network. A total of 115.6 million of the country's population have mobile phone connectivity, 37.2 million people have internet access which make the teledensity of the country 77.52%. Broadband penetration is more than 5% i.e. more than 7.8 million people are connected through Broadband.

In order to create favorable business environment for innovative companies, Government has taken various initiatives among which conducive business environment for Hi-Tech Industries. IT park is going to be setup in divisional level. The process of awarding long term evolution (LTE) spectrum to state run telecom operator BTCL is ongoing. Subsequently, it will be spread over the entire country. I firmly believe that if we can continue this ongoing process of development then we can achieve the vision of Digital Bangladesh 2021 before the stipulated time.

At last, I wish this report will reflect the state of Telecommunication and Information Technologies prevailing in Bangladesh. My heartfelt felicitation to ITU authority for making the venture of publishing Country Reports.

Abdul Latif Siddique M.P

Chairman
Bangladesh Telecommunication Regulatory Commission

Telecommunication & ICT services in Bangladesh have been developed rapidly in terms of geographical coverage, variety of innovations and quality of service. This has been made possible by appropriate legislation and policies along with their successful implementation. Bangladesh being a country with 8th largest population having more than 160 million people is one of the most densely populated areas in the world except few city states. Yet, Bangladesh has successfully brought the appropriate technology to the people within their affordability.

In order to develop a knowledge based society, we launched a number of initiatives to explore the benefits of utilizing ICTs for service delivery. The ICT Policy cuts across numerous thematic groups, including Education, Science and Technology, Infrastructural Development, Employment Generation, Private Sector Development, Agriculture, Health including Nutrition, and Small and Medium Enterprises. And all these will be achieved with the recognition that the state must play a key role in sustaining economic development.

To mention, Telecom & ICT is a major contributing sector to national GDP which is over 6% consistently over past decade. In this sector, we have the highest FDI operating presently. As we have already earned "Self Sufficiency" on food, we can pronouncedly say that this is because of the impacts of the telecom & ICT services. Around 2.4 million employees are working day-night to nourish and develop this sector with escalated opportunities for more & more free lancers. These all are collectively contributing to the growth of our economy, hence, attributing in poverty alleviation in order to achieving MDGs and WSIS plan of action.

At last, I hope that this Country Report will represent Bangladesh in a vivid manner in regards to Telecommunication & ICT parameters. There by it will definitely help us all to interact & renew our commitments towards common desire & commitment to build a people-centred, inclusive & development oriented information society, where everyone can create, access, utilize and share information and knowl edge in promoting their sustainable development and improving their quality of life, premised on the purposes and of the Charter of the United Nations. My special thanks to ITU for making the endeavour of publishing Country Reports.

Sunil Kanti Bose

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Section I: Executive Summary

1. Introduction

Information and Communication Technologies (ICTs) were recognized by the world leaders as a key development enabler in World Summit on Information Society (WSIS) in Geneva in 2003 and in Tunis in 2005 (Tunis Commitment). In the Poverty Reduction Strategy of the country called National Strategy for Accelerated Poverty Reduction 2009 (NSAPR-II), ICTs were similarly identified and given due importance. The government's 'Digital Bangladesh by 2021' vision plans to mainstreams ICTs as a pro-poor tool to eradicate poverty, establish good governance, ensure social equity through quality education, healthcare and law enforcement for all, and prepare the country for climate change.

The government has articulated the Digital Bangladesh vision in no uncertain terms, started the process of leadership development to realize this vision and launched a number of initiatives which have demonstrated to policy makers and citizens alike the benefits of utilizing ICTs for service delivery. Moreover, the government has laid the foundation for an enabling environment with an actionable ICT Policy 2009, Right to Information Act 2009 and ICT Act 2009.

In recent years, telecommunication and ICT sectors in Bangladesh have developed rapidly in terms of coverage, variety and quality. This has been made possible by appropriate legislation and policies in place and their successful implementation through adequate investments into the sector from private and public sectors.

Bangladesh has successfully made suitable communication technologies accessible to its people at affordable price and acceptable quality. It is an astonishing phenomenon to observe people even from the deep rural areas being able to utilize telecommunication services to make an impact in their lives and lifestyles. The socio-economic impacts of communication services are quite significant. The Government has a strong commitment to peoples' aspiration and it adopts customer centric policies to make communications services more useful, more affordable and better quality.

2. Country at a Glance -Factsheet on various developments and ICT indicators including achievement of national targets for connectivity & access in the use of ICTs in promoting objectives of the Geneva Plan of Action

Bangladesh is a developing country in South Asia located between 20°34' to 26°38' north latitude and 88°01' to 92°42' east longitude. The climate is tropical and prone to monsoons. Bangladesh is divided into seven administrative divisions, which are further divided into 64 districts. With an area of 147,570 sq. km and a population of about 166,280,712 (July 2014 est., The World Fact Book, CIA), the country has a very high population density at 1,033 persons per sq. km.

2.1 Country Profile

Bangladesh	
Capital	Dhaka
Population	156,397,813 (Current, Source, BBS)
• Urban	28.4%
• Rural	71.6%
Area	147,570 sq. km
Literacy	57.7%
Economy	
• GDP (PPP)	$324.6 billion (2013 est.)
• GDP per capita (PPP)	$2,100 (2013 est.)
• GDP – Real Growth Rate	5.8% (2013 est.)
• Currency	BDT (Bangladesh Taka)
• Exchange Rate	1 US$= BDT 77.51
• Key exports	Readymade garments, knitwear, agricultural products, frozen food (fish and seafood), jute and jute goods, leather

Table 1: Country Profile of Bangladesh (The World Fact Book, CIA, 2014)

2.2 Telecom: A Thrust Sector of Bangladesh

In recent years, telecommunication services in Bangladesh have been developed rapidly in terms of coverage, variety and quality. This has been made possible by appropriate legislation and policies and their successful implementation.

Bangladesh has successfully brought the appropriate technology to its people at affordable prices. The business sector continues to grow and people are using technology for their business and personal communication even in the deep rural areas. The socio-economic impacts of communication services are evident. The Government is quite sensitive to peoples' aspiration and adopts a customer sensitive policy of providing quality service at affordable price.

2.3 Key Facts

Mobile Subscribers

115.62 Mn.

(Apr, 14)

Internet Subscribers

37.17 Mn. (Apr, 14)

Tele-density

77.28%

(May, 14)

Internet Density **27%**

(May, 14)

GDP Contribution of Telecom

3.1% (2013 est.)

m- & e- Public Exam Result and Admission:

14 Mn.+ students benefitted (2013)

Mobile Geographical Coverage

90%+

Mobile Population Coverage

99% (voice & data)

Nationwide Optical Fiber (by GoB)

5350KM (done), 11000 KM (in process)

3G licensing (5 operators)

23 ongoing national ICT Development Projects and Programs

Subscribers enjoy one of the

lowest Call

rates in the world

Target to launch own satellite

(Bangabandhu Satelite-1) by 2016

Initiatives for Development of

Women ICT Entrepreneur

7000+ ICT Graduates every year

2.4 Institutional Framework

(a) The Ministry of Posts, Telecommunications and Information Technology has the overall responsibility of determination of policies and development of telecommunications. It aims for the creation of a "Digital Bangladesh".

(b) The Bangladesh Telecommunication Regulatory Commission (BTRC) was established by the Bangladesh Telecommunication Act 2001 as an independent commission. BTRC started functioning on 31/1/2002. Its vision is to 'facilitate connecting the unconnected through quality telecommunication services at an affordable price by introducing new technologies.' BTRC issues licenses, facilitates affordable communication services, promotes ICT applications for socio-economic development and poverty reduction, encourages private public partnership etc.

2.5 Legal Framework and Policies

(a) Telecommunications Policy - 1998

The Telecommunication Policy 1998, the precursor to the Telecommunication Act of 2001, was adopted with a view to 'ensure the orderly development of the telecommunications sector through the provision of services in all the areas of the country, to satisfy the underserviced demand for telecommunications and to provide equitable opportunity and competition amongst the service providers'. The policy aimed at facilitating universal telephone services throughout the country and to meet the demands of value added services at affordable prices without compromising the quality. The policy also stressed upon the orderly and rapid growth of services.

(b) Telecommunications Regulatory Act - 2001

The Act established BTRC as an independent Commission for the purpose of development and efficient regulation of telecommunications and services in Bangladesh. This comprehensive Act deals mandate, duties and responsibilities of BTRC in detail.

(c) National ICT Policy - 2009

Expand and diversify the use of ICTs to establish a transparent, responsive and accountable government; develop skilled human resources; enhance social equity; ensure cost-effective delivery of citizen-services through public-private partnerships; and support the national goal of becoming a middle-income country within 2021 and join the ranks of the developed countries of the world within thirty years.

(d) International Long Distance Telecommunication Services (ILDTS) Policy 2010

The Vital objectives of ILDTS Policy 2010 are to provide low cost international telecommunication services using modern technologies, to encourage local businesses and enterprises in telecommunication sector and to ensure healthy and motivating revenue for all stakeholders, service providers and other related entities. In May 2010, the International Long Distance Telecommunication Services (ILDTS) Policy was adopted which aimed at managing VoIP services through Interconnection exchanges(ICXs) and International Gateway exchanges (IGWs).The policy was a revision of the 2007 ILDTS policy and was adopted to prevent illegal bypass of international termination arrangements.

(e) National Broadband Policy 2009

The vision of this policy is to build up a people- centered, development oriented information society, where everyone would be able to access, utilize, and share information and knowledge easily and efficiently. It may be realize by harnessing the potential of ICT human through broadening infrastructure, developing access network, enhancing human resource and facilitating local content development. The vision also target broadband services for competitive market based economy for ensuring people's access to information through affordable, highly advanced and secured broadband services. Broadband policy would complement targets set in the Poverty Reduction Strategy (PRS) as well as the Millennium Development Goal (MDG) and the WSIS Plan of Action.

2.6 Recent Developments

(a) Third Generation (3G) Telecommunication Technology

The Commission has awarded 3G licenses to 5 operators including the state owned mobile operator Teletalk Bangladesh Ltd. in September 2013. With the introduction of this service, it is expected to provide the rural people of the country with high speed internet connectivity as well as better and faster services of all telecommunication facilities. Within this short period of time, operators already deployed their 3G network to all district Centre of the country. 4.7 millionusers has already subscribed for the 3G services.

(b) International Connectivity and Redundancy

On the 05 January 2012, six Operators were awarded International Terrestrial Cable (ITC) Licenses beside the state owned Bangladesh Submarine Cable Company Limited (BSCCL) with a view of modernization, expansion and maintaining uninterrupted telecommunication system. Bangladesh will put a step ahead of having uninterrupted telecommunication with Regional and World telecommunication system if BSCCL and new ITC service providers operate as alternative route of each other. In last year, the price of the Bandwidth was reduced with a view to expansion of customer services and also with an expectation that when alternative Terrestrial Cable will start functioning, the price of the Bandwidth will reduce further immediately. As a result people of remote area, educational institutions and industries will have easy access with World

telecommunication system. Foreign investors will be more encouraged to invest in different sectors when we will ensure them reliable and uninterrupted telecommunication system.

(c) Introducing New Gateway Licenses

38 gateway licenses of different category have been issued in the fiscal year of 2011-2012, which already have started their commercial operation.

(d) IPTSP For the ease of IP based voice communication

37 ISPs have been issued with IPTSP licenses through which one subscriber can easily contact others.

(e) Nationwide Connectivity

To build and maintain a common telecom transmission network across the country, BTRC has issued Nationwide Optical Fiber Telecommunication Transmission Network license to Power Grid Company of Bangladesh (PGCB) and Nationwide Telecommunication Transmission Network (NTTN) license to Fiber@home and Summit Communications Ltd(SCL). These licenses have been awarded to create a countrywide telecommunication transmission network chain. Its main aim and objective are to build, develop, operate and maintain nationwide transmission backbone network to enable a commonly utilizable connectivity platform for Digital Bangladesh, while reducing national resource investment and ensuring the growth in information technology and telecommunication sector.

Countrywide connectivity of PGCB is extended through Optical Ground Wire (OPGW) placed over existing high voltage power line. On the other hand, NTTN licensee, Fiber @ Home has built almost 251 km underground Metro Ethernet Networks in important metropolitan cities and already reached 23 districts and 100 upazillas. Through Data edge network, they are providing connectivity in 64 districts for the SB passport project taking help of third party network where their presence not reach yet.

Fiber@Home has already completed 1487 km nationwide long-haul network. This long haul SDH transmission network is made up entirely of duct blown underground fiber cable of ITU-T standard specification .Their Metro network is through MPLS and FTTX (244 km) with GPON, This licensee is providing large amount of bandwidth for voice and Data as well as high quality triple play services (Voice, Data, Video) that will be delivered straight to the end user through ANS operators.

Whereas, Summit Communications Ltd. (SCL), as of June, 2012, SCL has covered in 49 upazillas through SCL's own network and access additional 231 upazillas through GP's network under Fiber Optic Transmission Lease agreement with GP.SCL Networks comprises 918 km metro city Network in Dhaka, Chittagong and Sylhet, Long haul network between Dhaka, Chittagong, Gazipur, Jessore, Khulna and Faridpur. Nationwide SCL has 19 PoPs (Point of Presence) and 3 zonal offices. Both NTTN Operators are laying underground optical fiber with most

environment friendly manner through HDD (Horizontal Directional Drilling) method which minimize public and traffic hazards. In metro cities, depth of the network is between 3-5 meters which is below all utility network layers thereby having a secure network.

(f) Increasing Growth Rate of Voice & Internet Subscription

Due to the effective role of BTRC, the mobile subscriber penetration in 2012 – 2013 has increased by 10.92% compared to that of last year and the subscriber base has reached currently 115.62 million (Approximately) and With the reduction of bandwidth price, the mobile internet subscriber base has increased by 21.12% (2012 – 2013) in particular compared to that currently Internet subscriber 37.17 million. With such rapid increase, it is expected that the country's teledensity would become 85% and the broadband internet subscribers would become 30% by 2021. The mobile and internet penetration in the country has facilitated the standard of life style in the socio-economic sphere to a greater extent and services like mobile money transfer, e-banking, agriculture, education and health sector has become affordable to the people of the country.

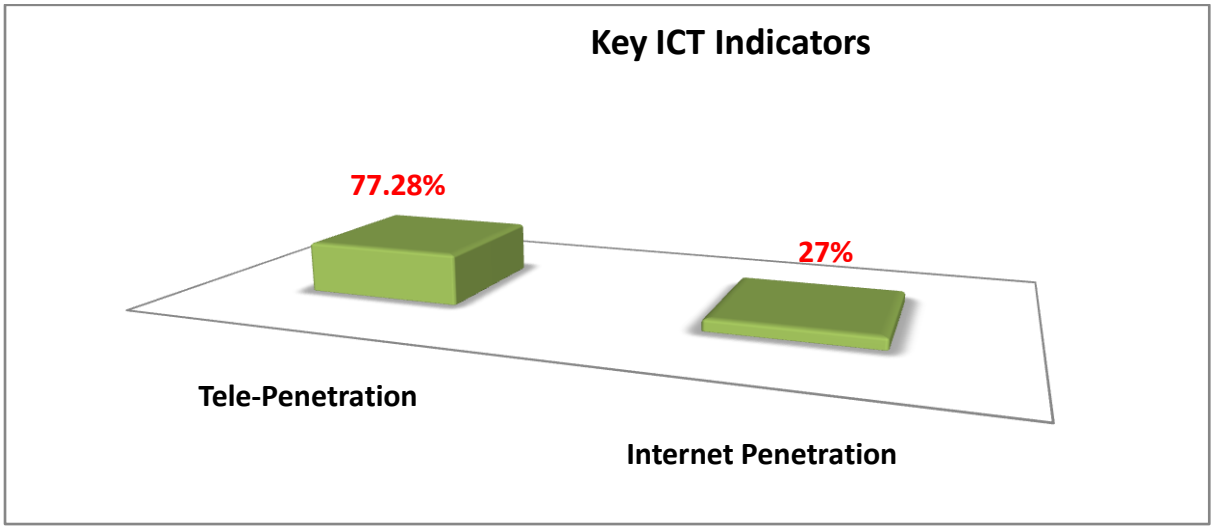


Figure 1: Key ICT Indicators (BTRC, May, 2014)

(g) Reduction of International Bandwidth Price

Internet bandwidth price has also been reduced to a great extent which has come down to Tk. 10,000 per mbps during 2011 – 2012. Currently this price is Tk.8,000 per mbps. This statistics is quite encouraging and it is expected that this trend is likely to continue in the coming days.

(h) **Drive for Own Satellite**

Steps have been undertaken to launch Bangladesh's own satellite by 2015 to provide quick and developed satellite services to the various consumers of the country. As a part of this process, considering the importance of satellite launching activities the government has taken up and approved a project titled 'Preparatory Functions and Supervision in Launching a Communication and Broadcasting Satellite' in 2011 – 2012 fiscal year.

The project is being executed by BTRC at the moment. By launching own satellite, revolutionary change in the communication technology sector of the country will be achieved along with a savings of huge amount of foreign exchange.

(i) Marching Towards Unified License Regime (ULR)

The government is determined to develop Bangladesh to a poverty-free and middle-income country with the proper use of ICT. In view of this, BTRC is already providing necessary assistance to update the National Telecom Policy 1998 and thereby making it relevant. Under the changed situation, the internal telecommunication system is being modernized for keeping pace with the modern world by ensuring high speed information flow arrangements and making new infrastructures. By doing so, Bangladesh is also marching towards Unified License Regime (ULR) like other developed countries.

(j) SMS Exchange in Local Language (Bangla) Standardization

Bangla in the mobile phone is a revolutionary step. According to the declaration of the Hon'ble Prime Minister, keeping the vision of "Digital Bangladesh" of the government in mind, initiative was taken to introduce mobile phone SMS exchange in Bangla under the patronage of the A2I project of PM office. In pursuant to this, based on the "Mobile Phone Bangla Specification" provided by BSTI, exchange of Bangla SMS in mobile phones started with effect from 21stFebruary 2012.

(k) Formation of Bangladesh Computer Security Incident Response (BD-CSIRT)

For protesting Cyber Crime, Bangladesh Computer Security Incident Response (BD-CSIRT) is formed, through which internet based crimes are suppressed. The country's seagoing ships, fishing trawlers, airlines both from home and abroad are using frequencies, call sign and radio equipment. BTRC allots them with the frequencies, radio equipment licenses and call signs. Every year these licenses are renewed. Allotment of call sign is very important and as such the Commission adopts special arrangements in allotting the same within shortest possible time. Apart from these, in order to improve and develop the modern technology based Global Maritime Distress and Safety Service (GMDSS) system, permission for importing and installing various equipment like GPS, DGPS (differential GPS) etc. are also being accorded from BTRC. As a result, communication between the land and sea /air has become much easier.

2.7 Strengthening the Regulatory Landscape for Telecommunications

BTRC is playing its role for development of the telecom system & overall controlling of the telecom sector. According to Bangladesh Telecommunication Regulatory Act-2001 Sector 31 (2) (Ta)- Intermediary directives are provided by the commission for sustaining the health environment and for increasing the customer satisfaction in telecom system .After a certain period of time, these directives in considered as permanent directives. BTRC initiates the rough guidelines/directives and other regulatory documents. Recently initiated and on process guidelines, directions and other important activities of BTRC mentioned in following section.

(a) Guidelines to National Equipment Identification Registration

The commission has started it activities for introducing operating guidelines for identification register of devices (phone set, network device) and connection (SIM/RIM card) for appraising the mobile set based crimes (set stealing, identity cancelation, dreaming subscription through mobile etc.

(b) Guidelines for Mobile Number Portability

Mobile becomes identity for a person/office after a long time of use. Under the above circumstances, the person/office can't go for better network quality, customer service and reasonable price as it will change his tale identity will be changed. Under the above circumstances, the commission has gone for ahead for introducing an operating guideline for empowering the customer through porting service. To implement Mobile Number Portability a committee has formed.

(c) Leased Internet Tariff related Intermediary Guideline

This is no alternative to the reduction of bandwidth price for extending the Internet service to the root level and for improvement of the telecommunication service Infrastructure. For this purpose, submarine cable internet bandwidth fee has been fixed at BDT 8,000 per mbps after sub sequent reducing through introduction of intermeeting guidelines.

(d) Introduction of intermediary guidelines for reduction of International outgoing call charge and call charge

Recently, International outgoing call settlement charge has been reviewed in light of customer interest and to ensure availability of international call service at a reasonable price.International outgoing call charges are under the review process. Non-resident Bangladeshis and local entrepreneurs will be specially benefitted for this step.

(e) Introduction of guideline for Do Not Disturb (DnD)

BTRC is working for introduction of do not disturb related guide lines for ensuring the customer interest. It may be noted that the introduction of this guideline will be ended very soon.

(f) Introduction of National Telecommunication Consumer protection guide line (NTCPG)

The process of NTCPG is going on. It is hoped that, after completion of this process telecom customer interest will be protected.

(g) Quality of Service (QoS)

Quality of Service comprises requirements on all the aspects of a connection, such as service response time, loss, signal-to-noise ratio, cross-talk, echo, interrupts, frequency response, loudness levels, and so on. In a

competitive scenario, the customer depends on the operator's QoS while deciding on an operator among so many. BTRC acts as a regulator and benchmarking the quality of service (QoS) by the Commission serves to provide a yardstick for comparison of QoS of different service providers and by publishing such information, it helps a discerning customer select his/her operator. This would also help an environment of healthy competition among the service providers.

To meet the above objectives, BTRC is in the process of issuing specific directives for mobile operators. They shall have to submit to the Commission its compliance reports of benchmark standards in respect of each Quality of Service parameter specified in the directive, which, if the Commission wants may publish too. Besides, to ascertain the QoS, BTRC has already started monitoring the networks of all mobile operators using its own drive test equipment and issued some directions to the operators to improve the QoS of certain areas.

(h) Infrastructure Sharing

BTRC has been encouraging the telecommunication service providers to create an environment friendly framework for better cooperation in infrastructure sharing by reducing land use as well as optimizing the use of existing infrastructure and facilities. This would result in avoiding duplication of investment for network facilities, reducing cost of network deployment and increasing efficiency in the use of network infrastructure. Of late, most telecom operators are sharing their infrastructure rather than building separate ones which is mutually benefiting both operators in terms of providing faster and cost effective services to their valued subscribers.

In accordance with the BTRC's infrastructure sharing policy, mobile operators are executing passive infrastructure sharing agreements with each other with the scope of sharing, whenever feasible, tower, space, room and generator. Each service provider has to maintain liaison with others on a regular basis to explore and share future infrastructure opportunities following BTRC guidelines. These agreements are helping both infrastructure seeker and provider to share resources as much as possible within the scope defined by BTRC.

2.8 International Relation & ITU Projects

(a) Significant Market Power (SMP) Project

SMP regulation is such a process through which pure competitive condition is maintained in the market. Here, the large operators do not get chance for monopoly business; on the other hand, new & small scale operators get the opportunity for providing their customer service in a friendly atmosphere. ITU is at the final stage for introducing the SMP regulation related draft guidelines. Everyone is opining that this step by BTRC will play a role for ensuring a competitive condition in the Telecom sector of Bangladesh.

(b) Cost Modeling, Inter connection framework & Tariff Policy Project

Cost Modeling Project's main aim is to determine the Tariff by Cost Based Analysis. BTRC under the Guidance of ITU has started Cost Modeling, Interconnection Framework & Tariff Policy Project. Regulator with the help of this model has determined the service charge by considering the relationship between Operator's Capital Expenditure and Network & Operational Expenditure. A team comprising of ITU Consultant & a team of BTRC is working on this project for introducing an effective Cost Model for Bangladesh's Fixed & Mobile Network. BTRC is determining the Telecom Service Charge by using its own cost model. It may be hoped that a specific guideline regarding this matter will be introduced very soon.

2.9 Response to Target Questionnaire

(a) Target 3. Connect all scientific and research centers with ICTs:

Indicator	2013	2012
3.1: Proportion of public scientific and research centers with broadband Internet access (%)	100	100
3.2: Presence of a national research and education network (NREN), by bandwidth (Mbit/s)	113	105
3.3: Proportion of public scientific and research centers with Internet access to a NREN (%)	N/A	N/A

(b) Target 4. Connect all public libraries, museums, post offices and national archives with ICTs:

Indicator	2013	2012
4.1: Proportion of public libraries with broadband Internet access (%)	100	100
4.2: Proportion of public libraries providing public Internet access (%)	Not Available	Not Available
4.3: Proportion of public libraries with a web presence (%)	100	100
4.4: Proportion of museums with broadband Internet access (%)	100	100
4.5: Proportion of museums with a web presence (%)	100	100

(c) Target 5. Connect all health centers and hospitals with ICTs:

Indicator	2013	2012	2011	2010
5.1: Proportion of public hospitals with Internet access, by type of access (%)	100	100	100	100
5.2: Proportion of public health centers with Internet access, by type of access (%)	25.72	0	0	0
5.3: Level of use of computers and the Internet to manage individual patient information.	1.01	0	0	0

(d) Target 6. Connect all central government departments and establish websites:

Indicator	2013	2012
6.1: Proportion of persons employed in central government organizations routinely using computers (%)	100	100
6.2: Proportion of persons employed in central government organizations routinely using the Internet (%)	100	100
6.3: Proportion of central government organizations with a Local Area Network (LAN) (%)	80	80
6.4: Proportion of central government organizations with an intranet (%)	0	0
6.5: Proportion of central government organizations with Internet access, by type of access (%)	100	100
6.6: Proportion of central government organizations with a web presence (%)	100	100
6.7: Level of development of online service delivery by national governments.	n/a	n/a

3. WSIS and MDG Implementation at National Level, including national ICT strategies towards and beyond 2015

"Vision 2021"

The vision of Bangladesh in 2021 is to become a middle-income country replete with signs of economic progress but a country where democratic institutions have taken root, and citizens enjoy fundamental rights and freedoms guaranteed by the constitution.

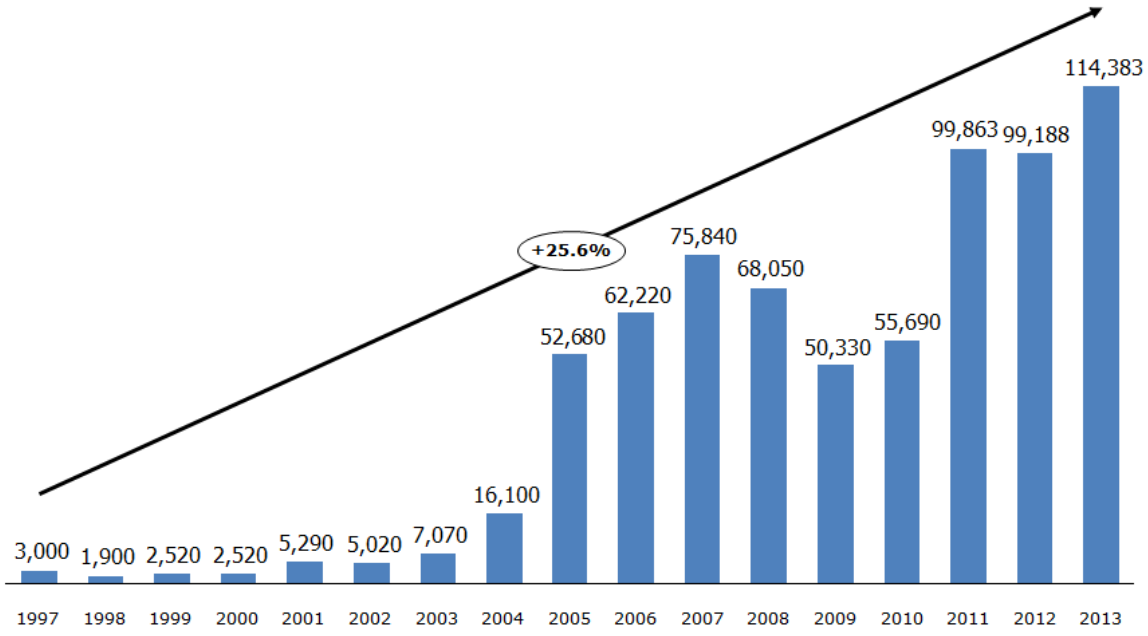
The vision for an inclusive society is that all citizens are able to participate in creation of wealth and its equitable distribution, where information and reliable and affordable communication technology channels are available for accessing information for making informed decisions and accessing services at their doorsteps. Such an inclusive society also creates digital opportunities for common citizens to participate in governance. Citizens of the country irrespective of economic condition, education, race, ethnicity, profession, gender are expected to be connected through network of mobile communications, broadband Internet, audio-visual media for exchanging information and accessing services.

Development Priorities

Keeping in line with MDGs, development priorities of the Government are distilled from the vision statement formulated to take Bangladesh to where it needs to be in the year 2021. They are (i) Promoting Gender Balance, (ii) Technical Framework for Achieving Middle Income Country Status, (iii) Ensuring broad-based growth and food security, Addressing globalization and regional cooperation, (iv) Providing energy security for development and welfare, (v) Establishing a knowledge based society, (vi) Building a sound infrastructure, (vii) Ensuring effective governance, (viii) Mitigating the impacts of climate change (ix) Creating a caring society, (x) Promoting innovation under a digital Bangladesh, etc.

4. Financial mechanisms in place for meeting challenges of ICT for development

The government has set the vision of Digital Bangladesh in 2009 following its election manifesto and due financial mechanism was placed to support the envisaged ICT development goals. In view of the concept paper of Digital Bangladesh and National ICT Policy 2009, ICT development goals were well designed and specified to be implemented through appropriate government agencies. The finance for such implementation was mostly outlined in the same policy.



More than BDT 71,870 core investment in mobile industry since inception

Figure2: Investment in Telecom Sector (AMTOB, 2014)

At present, there are four main financial mechanisms to facilitate for ICT development projects. These mechanisms are set with the understanding of financial capability and result oriented vision. 03 possible sources for project finance, i.e. government budget, donor support and private initiative have been incorporated in these systems. A brief outline of these mechanisms with examples is presented below:

(a) Allocation through Annual Development Budget

Under the provision of ICT Policy 2009, a number of ministries have been given responsibility of achieving particular goals in ICT. These goals are broke down into short, medium and long term indicative targets. So, directed by this clear guidance, when a ministry propose a project to achieve certain goal and it is approved by the Planning ministry and Finance ministry, there is guaranteed financial commitment from government for such project. If there is any financial commitment from the development partners, that is also synchronized with the allocation for these projects. In allocating development budget, the government has prioritized ICT with other key development sector like energy, transportation, education etc.

(b) **Public-Private Partnership (PPP**)

The conceptualization and implementation of PPP was a revolution in promoting pragmatic financial mechanism for development projects, especially for ICT in Bangladesh. This policy is being utilized in a variety of forms spanned from developing nationwide infrastructure to micro level initiatives. With a view to connect all the lowest administrative divisions, i.e., Unions, a total of 5000 Union Information Centers are established with the seed fund from government and PPP model is being used successfully in managing and operating these ICT facility centers for rural people. The operational responsibilities are given to local young entrepreneurs under the active supervision of government.

In another model of PPP, to ensure nationwide sustainable fiber optic connectivity, a countrywide network built by a government agency has been transferred to private agencies to operate and provide network services at minimum cost.

(c) Subsidies/ Tax benefit

Most of the ICT terminals, equipment and all capital machineries are exempted from import taxes to a great extent. All export oriented product and services of the ICT industry and businesses are exempted from tax. In addition to that, most of the ICT firms and all export oriented IT companies are exempted from income tax payment. These have been thoroughly favoring all ICT businesses and initiatives. Some of the local ICT business categories, if not export oriented, enjoy tax holiday for the initial years of their operation. Subsidies are also provided in the form of offering special treatment in public dealings and by allocating operational places in special business compounds. Keeping in view the importance of internet and data service, all such service providers are exempted from income tax including most favorable treatment in importing necessary

machineries. For expanding ICT services in the rural and remote areas, special financial incentives are included in the service and licensing provision of the service providers.

(d) Low interest loan/ Equity assistance

Small and medium size ICT enterprises are entitled to receive equity assistance from the Equity and Entrepreneurship Fund (EEF) of the government. It provides SMEs with up to 49% of equity support. Under the direction of the central bank, many public banks offers low interest loan for SMEs in ICT, especially for operating in the underdeveloped and rural areas.

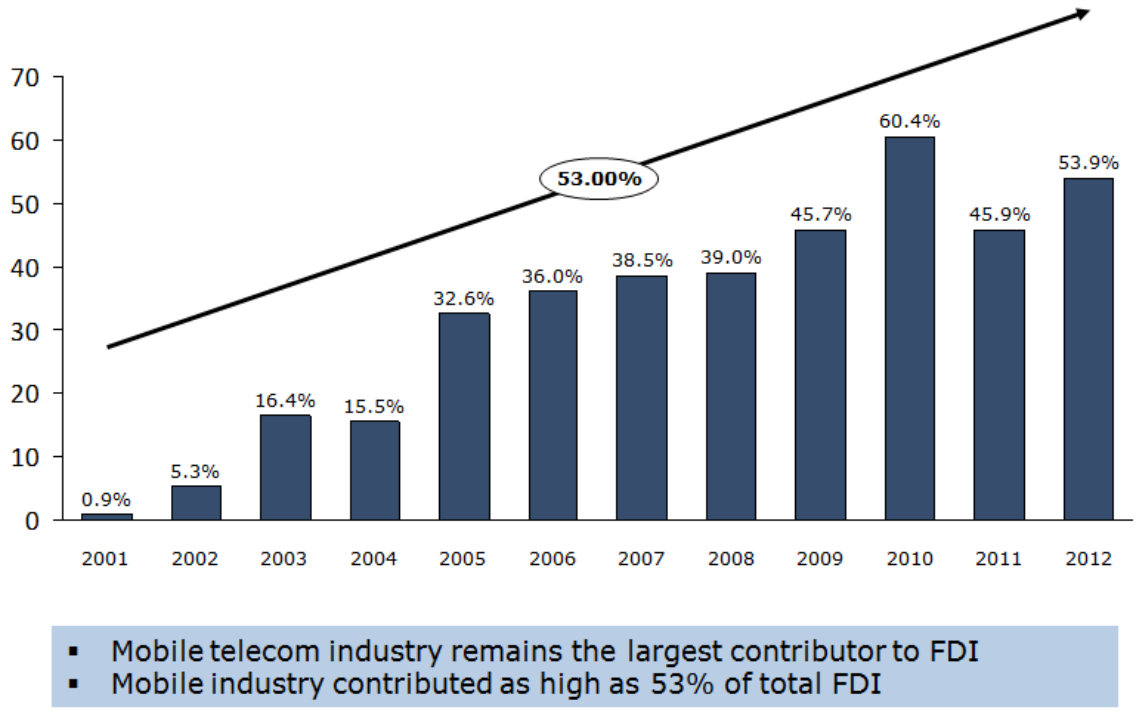


Figure 3: Foreign Direct Investment (FDI) in Telecom Sector (AMTOB, Bangladesh Bank, 2013)

Section II: Reporting on Each Action Line

C1. The role of public governance authorities and all stakeholders in the promotion of ICTs for development

WSIS 2013 Summit Recommendation –The urgent need to promote the use of ICT as a means to modernize parliamentary processes and increase transparency.

Initiatives by the National Parliament Secretariat

Bangladesh parliament secretariat is playing a vital role in promoting ICT as means to modernize parliamentary processes and increase transparency. At present following IT services are available in the Parliament:

(a) Dynamic Web portal hosted at Parliament own server.

(b) Web-mail service having mail accounts for all honorable MPs and Parliament secretariat officials.

(c) Broadband internet connectivity with BTCL (20Mbps).

(d) Deferent internet facilities using LAN having capacity almost 1000 connection more than 600.

(e) Wi-Fi facility at House and important location.

(f) Circulation of notices electronically through SMS & email to all MPs.

(g) Customized software are used to record debates of House, activates of all standing committee meeting to select question for House through electronic lottery to manage ID card etc.

(h) Optical fiber based DDN service between Parliament & Govt. Press to transfer important files including Parliament's debate soft copy.

(i) Digital time countdown system at House.

(j) PIMS database management system for all MPs & secretariat officials.

(k) Digital multimedia presentation at House during budget and other important programs.

(l) Digital Display management System (DDMS) at strategic location of parliament to display important programs.

(m) Satellite based live broadcasting of Sangsad (Parliament) TV program which is also enjoyable through internet.

(n) CCTV Digital surveillance Systems to ensure parliament

(o) Security.

WSIS 2013 Summit Recommendation – The increasing necessity to create a Global Community of parliamentary ICT professionals and members of parliament.

Initiatives by the National Parliament Secretariat

Bangladesh parliamentary secretariat is trying to develop a well-organized ICT team to provide vest IT Support to all stakeholders. There is a provision for 47 employees including 19 class-1 officers in IT branch. Recruitment against vacant posts is underway. Parliament secretariat is very much willing to adopt new technology to keep pace with modern ICT technology. Some initiatives have been taken to develop ICT professional through training, travel at home and aboard and practical experience. Some measures have been taken to disseminate ICT knowledge to members of parliament.

Besides, Parliament secretariat has following future planning to enrich ICT activities:

(a) Develop web site for each standing committee to enhance over sight activities.
(b) Develop electronic voting system at plenary Chambers ensure transparency in voting.
(c) Develop electronic document Management System (EDMS) for paperless office.
(d) Develop e-library system to facilitate research and knowledge sharing activities.
(e) Enrich MIS and modern database system to make an effective, proactive and responsive parliamentary secretariat.
(f) Set up standard IT core network to support upcoming e-parliament activities.
(g) Modernize exiting LAN & expand LAN to cover all potential users of parliament.
(h) Purchase some and user equipment to ensure access to information.
(i) Set up data center to ensure standard operating environment for sensitive ICT equipment.

Above all, followings are some of the progresses under this action line:

- There is a Bangla website which contains various agriculture related information.
- In rural areas 145 Agro-information & communication Centre (AICC) has been established, where farmers & others beneficiaries can have services. New 100 AICC are going to work soon enough.
- In Bargona district, Community Radio is established & each day it broadcasts different kind of agricultural & household related program, for 8 hours, to enhance their living standard.
- The field workers are given instruction of contemporary agro-solution through SMS.
- Call Centre is built to give solution regarding agriculture, fishery, and livestock. This was started as a pilot project and completed successfully. Soon,this is going to be started as a holistic approach with the toll free no. 16123 for the call center.
- 20 standardized multimedia e books have been prepared for this purpose.
- A bilingual dynamic web-portal is launched which has provision for sending email & SMS. Also a blog is there to share agro-experience among all of the officers of agriculture department. This portal is used for answering agricultural queries.

- A web-based self-managed PMIS is started for all the officers of DAE.
- Head, regional & District offices, Agriculture training institutes, Horticulture centers, quarantine centers & every Upazilla offices are been delivered with computers, printers& EDGE modems.
- 510 officers & 1190 workers are trained with necessary ICT knowledge.
- To ensure secure communication, 1800 email account is created for all the officer of Agriculture expansion Department.
- Web-based reporting system is started in the controlling room of DAE which is facilitating reception of online report from different districts.
- An advanced training room is built with internet connection to conduct ICT training on a regular basis.
- DEA headquarter is blessed with 100 computers with fast Ethernet(100 Mbps) connection.
- High speed Internet (3 Mbps, Fiber Optic) is introduced in the head quarter. It has also been under the coverage of a Hi Speed Wi-Fi network.
- A call center is used to give expert suggestion through telephone to the farmer regarding Nursery & grading.
- An initiative to introduce farmers'helpline with the help of Banglalink though short/ long code by which the farmers can easily have suggestion from Agricultural officers &workers.
- The organization included in NARS is connected to the Data center of BARC through VPN connectivity. So, the establishment of the integrated MIS of those organization would be easier.
- The establishment of centralized MIS is in progress &is going to be over soon. After that, it would be placed to the server to the respective organization& to BARC data center.
- BARC already has the (ARMIS) & (PDS) data input is in progress from the org. included in NARS.
- A bilingual Dynamic website is created to BARC which is going to be uploaded soon.
- New Agricultural technologies are made available in Bangla for Farmers through Bengali website.
- New Mobile apps are to be produced which would cover various agro- technical innovations & other related services.
- An online service named "Bangladesh Rice Knowledge Bank" is introduced to give away the information of Kinds & nature, standard seed supply, cultivation method & maintenance, removal of insect & disease, irrigation & manure management etc. of BIRI rice.
- Multi stakeholders are getting information of new invention & citizen charter of BINA, in both Bangla and English through website.
- 22 Banglalink corporate SIMs are being used to communicate important innovations of BINA to the field workers. Infact, to establish an easy two way common between the field workers & BINA officers.
- Different ways of cotton cultivation & related information, contemporary suggestion during cultivation & different publication, related information regarding production & Marketing are

placed in websites in both Bangla and English. Moreover, farmers can satiate their other related queries through the contact number given in the website. .

- A trail reporting system has been started by the introduction of "online reporting software" for the org. to send field report online.
- Information of newly introduced/ registered crops is to be stored & uploaded in the website.
- In the seed exam lab, acomplete software is presented to computerize the related seed examination reporting. This reporting is started on a trial basis. After the implementation of this online reporting system, respective labs would gain better working efficacy, less paper work &time and also with the instant publication of lab test result in the website. So, the seed producers can download necessary test results easily from the web site.

C2. Information and communication infrastructure

WSIS 2013 Summit Recommendation – As data centers change from hardware defined to software based solutions running on standardized hardware could be implemented to telecommunication networks to reduce expense and increase scalability.

BCC has already discussed the matter with CISCO. CISCO technical team will visit BCC shortly to carry out evaluation of BCC's network and data Centre.

C3. Access to information and knowledge

WISS 2013 Summit Recommendation – Linking the economic and long-term sustainability advantages of Open Systems Solutions in the allocation of public funds and procurement processes.

Also, securing and enhancing the creation of accessible Open Knowledge Commons that enable access to the growing range of Open Systems Solutions, including FOSS, Open Data, Open Hardware and their related processes, methodologies and experiences.

The central Procurement Technical Unit (CPTU), Computer Council and Ministry of ICT jointly are planning to accomplish the recommended works properly. These works are seemed to be not directly related with the assigned activities of the Bangladesh Bank (BB).

C4. Capacity building

WISS 2013 Summit Recommendation:

(a) A growing number of countries are implementing e-learning strategies and as a result, there is growing massification and multiplication of ICT users.

(b) There is a trend of increased partnerships between public and private sector in national e-skilling programme;

(c) There is a need to introduce 'Training the Trainer' programme;

(d) There is an urgent need for the development of ICT infrastructure and technologies in parallel with e-skilling and human capacity building;

(e) The growing importance of up-skilling and re-skilling of e-skilled students due to the fast-changing environment;

Leveraging ICT, Bangladesh project has taken and initiative to establish and training academy called Bangladesh Institute Global IT Training (BICIT). As the first step, meet the goal, a Training of trainer programme will be arranged short under Fast Track Future Leader (FIRL) program.

C5. Building confidence and security in the use of ICTs

WISS 2013 Summit Recommendation:

(a) The importance of accounting for the 'human element' as priority;

(b) The importance of evidence-based policy-making to support decision-makers in identifying best strategies;

In order to carry out relevant activities, Leveraging ICT in Bangladesh project, EOI has been called.

C6. Enabling environment

WSIS 2013 Summit Recommendation:

(a) The growing importance of enhancing greater collaboration and participation in multi-stakeholder processes of consumers, with a view to ensure that their needs are taken into consideration and that they benefit from broadband services;

(b) Consumer awareness are needed to be increased to encourage innovative ways to promote resource efficiency and to foster the cooperation between ICT and environmental sector in the field of greening the ICT sector;

(c) Governments should take steps to develop enabling environments for e-business and adopt e-commerce regulation consistent with the cross-border nature of e-commerce;

(d) There is a need to facilitate business-to-consumer e-commerce to bring the costs of shipping and delivery and address logistic bottlenecks;

To ensure greater collaboration & participation in multi-stakeholder process of consumers in terms of Broadband service ICT Division has taken the following steps:

(a) To reduce the user gap of internet between rural and urban areas ICT division has organization a workshop 'To Determine the strategy for reducing the internet uses gap between rural & urban areas'. So consumers can get greater benefit from broadband service.

(b) To increase the internet penetration over the country ICT Division organized internet fair in upazilla and district level with the collaboration of Telecom Operators.

(c) ICT Division has been implementing BanglaGovNet (Infosarker-I) and Infosarker-II project to established country-wide network connectivity so that consumers can get benefit from e-service and broadband service through the network.

(d) ICT Division has organized a Workshop on 'Prospect & Challenges: Green Technology' to promote resource efficiency and to foster the cooperation between ICT and environmental sector. ICT Division also going to implement the 'Innovation for smart green building' project to making the office smart & green technology enabled, so that increase the consumers awareness, use of resource efficiency and promote the cooperation between ICT sector. ICT division has been started e-filing system. Paperless office is one of greening environment sector using ICT's.

Government had also created enabling environment for e-business and e-commerce. About 69% of the population has already become active subscribers of mobile phones and Government has promoted mobile network as one of the main vehicles for e-service hence also for e-commerce and e-businesses. At Present, banks are promoting different types of cards (Master, Visa Card) which are being used for online payment. Bangladesh Bank has established national payment switch (NPS) to facilitate inter-bank online transactions. However, cross border e-transaction in foreign currency is yet to be opened. Till now travel related transactions are permitted with some restrictions. In order to resolve issues related to cross-border transactions in foreign currency Bangladesh Bank is working closely with National Board of revenue.

C7. ICT Applications

WISS 2013 Summit Recommendation – There is a need to ensure the sustainability of e- business solutions by engaging users as well as local and global ecosystem players, in innovation processes form the early stages of design and testing;

Also, Government should take steps to developing enabling environments for e-business and adopt e-commerce regulation consistent with of e-commerce;

Also, there is need to facilitate business-to-consumer e-commerce to bring down the costs of ship and delivery and address logistic bottlenecks;

As per Bangladesh Bank's "Strategic plan 2010-2014" in the area of e-business and e-commerce along with its local ecosystem players to develop the holistic e-payment systems BB is working to:

(a) Implement Bangladesh Automated Clearing House (BACH) comprised of automated cheque processing system and Electronic Fund Transfer(EFT);

(b) Establish required legal and regulatory framework for efficient payment system;

(c) Promote and encourage online banking-commerce-payments shared ATMs, POS, mobile payments etc.

The following initiatives have taken to obtain the above mentioned goals:

- Live operation of CITS (Cheque Imaging and Truncation System) based Bangladesh Automated Cheque System (BACPS) has started from October 07,2010
- Live operation of EFT Credit transaction has started from February 28, 2011 and EFT Debit transaction has started from September 15,2011.
- To comply with current best practices of payment systems regulations and supervision, Bangladesh Payment and Settlement Systems Regulations (BPSSR),2009 has been published in 27 April 2009.
- Bangladesh Automated Cheque Processing Systems(BACPS) Operating Rules and Procedure's has been published on 11 January,2010 and Bangladesh Electronics Funds Transfer Network (BEFTN) Operating Rules' has beenpublished on 11 August 2010 for Electronic Fund Transfer (EFT).
- In order to combat the fake cheque printing, forgery of signature, tempering/changing the amount/name/MICR line in cheque clearing through Bangladesh Automated Clearing House (BACH), a circular for taking "Positive Pay Instruction" has been issued on 26, November,2013.
- To extend the banking services to the remote areas of the country, "Guidelines for Mobile Financial Services" have been published on 22 September 2011.
- Accordingly for enforcing the appropriate use of Mobile Financial Services and combating the forgery, another circular letter has been issues on 01 September, 2013.
- For taking initiatives to provide the services of e-commerce, online utility bill payment, online fund transfer and credit card based internet payment a circular has been issued on 02 November, 2009.
- To combat any kind of misuse of online payment for money laundering banks have been ordered through the same circular to submit the Suspicious Transaction Report (STR) and Cash Transaction Report (CTR) to BB. Later, the maximum amount of internet/ online fund transfer has been fixed to 5.00 lacs through another circular issued on 28 March, 2011.
- National Payment Switch, Bangladesh (NPSB) has been started with limited transaction with 4 banks from December 27, 2012. 54 banks have been started online banking. Lastly, some initiatives are being taken to establish and implement the Real Time Gross Settlement (RTGS) system.
- To preserve customers interest and to encourage them more in electronic transactions by using electronic media/ channels and to enhance the security of online card based transactions and with a view to protecting the interest of all concerned, 2 circulars have been issued on 02 05 September, 2013.
- E-business has not been developed to the optimal level yet in our country. However, the desired infrastructure of the cross border e-commerce is also yet to be developed. Effective and valuable policy is required to be taken at the very level of higher and optimal authority.

On the other hand, ICT Division under MoPT &IT and Ministry of Commerce may take the sustainable initiatives regarding the bringing down the costs of shipping and delivery and addressing the bottlenecks. In this regard BB may have no action to be taken at their end. However, BangladeshBank (BB)will take initiatives

by discussing and reviewing with the diverse stakeholders' development of e-business within its capacity and authority.

C8. Cultural diversity and identity, linguistic diversity and local content

Bangladesh government is planning to take initiatives to increase public and consumer awareness of environmental implications of using ICTs and their potential to improve environmental performance and promote widespread development and adoption of clear standards and eco-labels based on life cycle approaches to production, use and disposal of ICT goods and ICT-enabled applications. This includes spreading awareness of the direct effects of ICTs, enabling effects of ICT applications in buildings, transport and energy, and the potential of ICTs to have systemic effects on social and cultural behavior.

Figure 4: Drivers of ICT Services

The government will take initiative to reduce price of bandwidth which will facilitate increasing number of net users, enhancing demand for local content and applications, and a stronger boost towards developing a connected Bangladesh.

The government alongside the private sector has also recognized that despite all the developments demand for local content is still very high. Text and multimedia livelihood contents (created by some private, not-for-profit entrepreneurs and Access to Information project of the PMO) cover key areas like agriculture, health and human rights. At the same time, initiatives taken by "Agricultural Information Services" and agencies under the Ministry of Health to create digital content are set to address the present gap. Initiatives are also in place to develop digital contents for people with disabilities. Audio books and software for the visually impaired people (in both Bengali and English) are also being used for the population without functional literacy. Young Power for Social Action (YPSA), a Chittagong based NGO is the leading institution in this domain.

Lower price and equal access for competing service providers can help to ease the gap of access to information faster. The open Cable landing Station (CLS) policy will be adopted. Efforts towards eliminating scope for monopoly and unfair business practices will be taken at each stage of the domestic and international connectivity. The MOPT and BTRC will take necessary steps to lower price of bandwidth for increasing number of net users, raising demand for local content and applications.

C9. Media

The government will focus on providing integrated multimedia broadcasting service to reach the marginal sections of the country. Synergistic opportunities are being explored between diverse communication media (e.g. FM Radio, Satellite TV, Cellular Phone services, etc.) to reach out to maximum number of people at a shortest possible time with valuable information.

C10. Ethical dimensions of the Information Society

Bangladesh is focused in building a people-centered, development-oriented Information Society, where everyone would be able to access, utilize and share information and knowledge easily and efficiently. The concept of Digital Bangladesh should be centered on the creation of what is popularly termed as a "knowledge-based society". Information and communication technologies (ICTs) are a critical component for building this knowledge-based society. Government's ability in creating and disseminating knowledge will eventually drive the nation's growth in the coming days. A digital society ensures an ICT-driven knowledge-based society where information will be readily available online and where all possible tasks of the government, semi-government and also private spheres will be processed using state of the art technology. The first and foremost challenge to materialize the Digital Bangladesh Vision 2021 would be to ensure overall connectivity at an affordable cost. With the intent to enhance connectivity emphasis should be provided on the establishment of infrastructures to "Connect the Unconnected" and importance must be given on laying more optical fiber to reach the marginal people of the country. Digital Bangladesh Vision 2021 should establish technology-driven e-governance which includes e-administration, e-education, e-health, e-commerce, e-production, e-agriculture, etc. in the five focus areas of the knowledge paradigm:

(a) Access to Knowledge:

Providing access to knowledge is the most fundamental way of increasing the opportunities and reach of individuals and groups. Therefore, means must exist for individuals who have the ability to receive and comprehend knowledge to readily obtain it. This also includes making accurate knowledge of the state and its activities available to the general public. Project, will be initiated immediately with an objective to facilitate the establishment of a firm presence of Bangladesh Government entities on the Web with two way communication capability or Web 2.0. The Program requires provision of an entire spectrum of web services to the Government sector as well as running specialized Portals for the benefit of citizens and other stakeholders.

(b) Knowledge Concepts:

Knowledge concepts are organized, distributed and transmitted through the education system and that's why we need an NREN in Bangladesh. It is through education that an individual can make better informed decisions, keep abreast of important issues and trends around him or her and most importantly, question the socio-economic arrangements in a manner that can lead to change and development. In fact, a successful "Digital Bangladesh" would need a more literate population. A mass computer-literacy program or even a government- sponsored computer course, offered perhaps as an incentive for every student who completes his or her secondary-school education, would benefit everyone. If there is will - backed by investment - there is a way.

(c) Creation of Knowledge:

A nation can develop in two ways – either it learns to use existing resources better, or it discovers new resources. Both activities involve creation of knowledge. This makes it important to consider all activities that lead to the creation of knowledge directly or help in protecting the knowledge that is created. To realize the aspirations of the 2021 vision, the country is taking steps to produce its own engineers, scientists and technological know-how.

(d) Knowledge Applications:

Knowledge can be productively applied to promote technological change and facilitate reliable and regular flow of information. This requires significant investment in goal-oriented research and development along with access models that can simplify market transactions and other processes within an industry. Initiatives in the areas of agriculture, small and medium enterprises (SMEs) and traditional knowledge can demonstrate that knowledge can be very effectively applied for the betterment of the rural poor.

(e) Delivery of Services:

Knowledge services have the potential to simplify many different points at which citizens interact with the State. Traditionally, these points of interaction have been vulnerable to unscrupulous activities and rent-seeking. We need to set the bureaucracy under an e- governance initiative, with a transparent file tracking

system that the public can access. This will, right away, reduce corruption, because everyone involved in the process can be trackeddown. Technology provides us with an opportunity to ensure accountability, transparency and efficiency in government services.

E-governance

E-governance is one of the ways in which citizens can be empowered to increase transparency of government functioning, leading to greater efficiency and productivity. E-Governance aims to place the government within the reach of all citizens increasing transparency and citizen's participation. Thus, the development of e-Governance should promote universal access to government's services, integrate administrative systems, networks, and databases, and make such information available to the citizen via Internet. In a nutshell such e-Governance should transform the government into a citizen centric technological driven one. There are various dimensions to building a Digital Bangladesh, all of which are equally important pillars.

A Digital Bangladesh constitutes the following goals, which the government is focusing to develop:

(i) Build excellence in the educational system to meet the knowledge challenges of the21st century by strengthening the education system, promote domestic research and innovation, and facilitate knowledge application in sectors like health, agriculture, and industry.

(ii) Leverage information and communication technologies to enhance governance and improve connectivity that allows ICT-based services to be deployed equitably throughout his nation.

(iii) Devise mechanisms for exchange and interaction between knowledge systems in the Global arena.

(iv) Promote creation of knowledge in S&T laboratories that utilizes information technologies and communication networks for dissemination and exchange of knowledge.

(v) Promote knowledge applications in agriculture and industry so that they can use ICTs for marketing and promotion of its products, for producing internal efficiencies, and for communication and transaction between entities.

(vi) Promote the use of knowledge capabilities in making government an effective, transparent and accountable service provider to the citizen and promote widespread sharing of knowledge to maximize public benefit.

C11. International and regional cooperation

In recent past, regional cooperation has gained momentum as countries in South Asia recognize the enormous potential of raising living standards and eradicating poverty by harnessing the region’s potential in areas of water, energy, transport, trade and investment. The range of possible areas of cooperation is large; but such cooperation to be sustainable must emerge from national interests and must be win-win for all countries. During the period of the Perspective Plan, Bangladesh intends to play a proactive role in seeking out opportunities for beneficial cooperation in the South Asia region and beyond. Other openings for such cooperation have come from its membership of the Asia Pacific Trade Agreement (APTA) and Bay of Bengal Initiatives for Multi-Sectoral Technical and Economic Cooperation.

Case for Sub-Regional Cooperation

In recent years, proposals for sub-regional cooperation between Bangladesh, India, Nepal and Bhutan have been gaining ground. Bangladesh, India, Nepal, Bhutan and Myanmar are endowed with rich complementary resources that offer significant opportunities for cooperation in several sectors. The framework for cooperation indicated below stipulates huge gains for Bangladesh in several areas.

Trade and trade facilitation

Presently, Bangladesh annually exports goods worth only $350 million approximately through official channels to Bhutan, India, Myanmar and Nepal. The potential is much larger. A major constraint is non-tariff barriers (NTBs) in terms of negative lists, quality controls, customs procedures, border facilities, transport and transit arrangements, and the like. Removal of these restrictions and upgrading of border facilities will likely facilitate trade substantially in the sub-region and help boost Bangladeshi exports.

Regional transport

A major constraint on trade and exports is transport costs due to primitive and restrictive transport arrangements within the sub-region as well as poor infrastructure. Bangladesh has limited natural resources, but one major asset is its access to sea. It has two sea ports (Chittagong and Mongla) that are not used to their true potential. Examples of countries that have successfully converted such assets to substantial development gains include Rotterdam port in the Netherlands, Singapore port, and the Hong Kong port. Bangladesh can also strive to convert this advantage into national economic gains by modernizing and upgrading these sea ports to serve as international ports with traffic open to all including the regional neighbors of Bhutan, Nepal and India. Even Western China stands to benefit from an opening to the Bay of Bengal. Additionally, investments will be needed to modernize and upgrade related rail, road and inland waterway linkages. The benefits for Bangladesh in terms of investment, trade, transit fees and port charges can be enormous.

Energy trade

With higher growth in South Asia, demand for energy has grown tremendously.In the North East sub-region, both India and Bangladesh are energy deficit. On the other hand,Bhutan and Nepal have tremendous hydro-power potential. Bhutan is already engaged in verysuccessful hydro-power exports to India. Nepal's hydro-power potential is estimated at around80,000 MW and of this some 40,000 MW is believed to be economically viable. As compared tothis, Nepal has developed less than a 1000 MW of power so far. Parts of India's North Eastalong the Brahmaputra and Meghna River Basins also have hydro-power potential. Given theoutlook for international oil prices and the adverse effects of fossil fuel use on climate change, asustainable long-term solution to power needs in the North East sub-region including Bangladeshwill require development of hydro-power in Nepal and Bhutan as well as parts of North EastIndia for exports to Bangladesh and India. Other sources of clean energy, such as gas, need also tobe developed for conversion to power with possibility for trade. Yet another possibility is regionalpower trade based on varying patterns of demand and capacities. This

requires compatible gridinterconnections between Bhutan, Bangladesh, India and Nepal along the bordering areas.Preliminary technical analysis suggests considerable potential here and a win-win for all.

Water management

The biggest potential gains are in water management, particularly for thepoor. This is also the area where vulnerability is most serious, especially for Bangladesh that liesfurthest downstream before the three mighty rivers Ganges, Brahmaputra and Meghna meet thesea. The range of issues include cooperative arrangements to address long-term vulnerabilityemerging from climate change (e.g. availability of water, coastal belt flooding from rising sealevel) to immediate solutions to reduce flooding, making more water available for irrigation, andproducing hydro-power for regional use. In the past water agreements have been difficult tocome by because of the tendency to think of this resource as a zero-sum game: more for myneighbor means less for me. This need not always is the case. A package deal that looks athydro-power, irrigation and flood control together based on an equitable sharing of financialcosts and benefits will likely show that a cooperative solution is indeed a win-win.

FDI and Joint Venture

Foreign Direct Investment in Bangladesh has been less than thepotential in relation to the South Asian region. There are some Indian investments in Bangladesh,but their volume is not substantial. The main constraints to FDI are inadequate and inefficientinfrastructure facilities, such as power, transport and communications, and port facilities. Even ifthese were to be addressed, substantial challenges would remain that need to be handled at thepolitical and diplomatic arena. Potentially promising areas of investment cooperation include gasexploration, petrochemicals, textile machinery, electrical, electronic and leather goods. Health,education and tourism also offer potential. Existing cooperation in jointly combating terrorism,militancy and illegal drugs/arms trafficking can be strengthened to every country's benefit.

Cooperation on Road and Highway Projects

The idea of greater transport connectivity amongthe Ganges- Brahmmaputra - Meghna basin countries – Bangladesh, Nepal, Bhutan and northeasternIndia was conceptualized as early as 1959 but gained traction under UN-ESCAPsponsored proposal of the Asian Highway System in the 1960s. In the late 1990s, the Bangladeshgovernment endorsed the following objectives of the Ganges-Brahmmaputra-Meghna triangle:joint development and management of waterand other resources, development of physical infrastructure such as roads, railways andports, and cooperation in other areas such asenvironment protection and tourism. It was clearly felt that Bangladesh should not be left out ofthe opportunity of developing links with other parts of the region and beyond. Hence, the supportfor the grand Asian Highway System (which is a roadmap for further regional, sub-regional andbilateral cooperation) gained momentum. The system is expected to open the gateway todomestic investments and FDI in Bangladesh. A very specific benefit relates to Bangladesh'sstrategic location for use as valuable route for trade and commerce of India, Nepal and Bhutan.

Strategic Actions

Long-term strategies for strengthening regional cooperation include:

- More vigorous efforts in multiple forums to make SAFTA, APTA and BIMSTEC moreeffective organizations.
- Forging effective cooperation in trade, cross-border investment and all the other areas ofmutually beneficial activities.
- Initiatives to resolve cross-border issues and undertake joint projects, such as production anddistribution of electricity, gas, coal, fertilizer and other products, all on a win-win basis.
- Participation in the grand Asian Highway and Asian Railway Systems that generate win-winoutcomes. This however calls for development common standards through establishment ofinstitutions backed by adequate financing from participating governments.

Section III: Profiles of Progress

A Case Study on E-purjee (Digital Cane Procurement and Development System)

1. What is Purjee?

Bangladesh Sugar and Food Industries Corporation have 15 Sugar Mills under operation. During crushing season each sugar mill purchase daily a huge quantity of sugar cane from thousands of cane growers through permit called Purjee. This issued paper "Purjee" is the legal permit for the sugar cane growers receive from Sugar Mill to supply their cane as per given schedule and receive payment against this document. Therefore this is the most important document for the sugar cane growers.

2. Background

Sugar Mills issue the Purjee for the sugar cane growers based on different factors like total area of cane cultivated land, variety of sugar cane, maturity of cane, consideration of transport issue etc. But from the time of Sugar Mills establishment, due to some mismanagement, corruption, lack of transparency, growers illiteracy and different others factors, sugar cane growers are being deprived in many ways from their rights. Gradually the sugar cane growers have been losing their eagerness of cultivating sugar cane due to multi-dimensional harassments.

Figure 5: Sugar Cane Farmer's Checking E-Purjee

By introducing the Digital Purjee Management System, the mismanagement, miscommunication, corruption etc. will be possible to minimize. Also the possibilities of alteration of Purjee schedule of the growers, providing and issuing fake Purjee for some others benefit etc. will be minimum as the Digital Purjee Management System of sending SMS will be operated from authorized center of the Sugar Mills to the grower's mobile phone directly. The growers will be able to cross check the Purjee. Apart from this, the growers will be able to submit their complain to the right authority directly by sending a SMS in a predefined format easily at anytime from anywhere without any intervention.

3. Advantages of E-Purjee

For Growers

- Transparency of cane procure system is ensured.
- Guarantee to receive Purjee instantly.
- It becomes easier to harvest sugar cane & send it to mill.
- Timely receive news of any interruption of crushing in factory.

For Sugar Mill:

- Possibility of getting fresh cane increases.
- "No Cane" situation at mill yard can be avoided.
- E-Purjee enables direct communication between sugar mill authority and growers.
- As all data related to E-Purjee system are managed centrally henceforth the Purjee system becomes more transparent.

Figure 6: A Sample 'E-Purjee" SMS

4. Increased Productivity

The digital e-purjee system introduced in the sugar mills a year back has ensured a faster delivery order to the sugarcane growers putting the production of sugar up by 38,760 tons in 2010-11 seasons. "Issuance of hand written purjee in the manual system takes at least 7-10 days causing a reduction of earning due to weight loss of sugarcane extraction from the field," said Mahmud-ul-Haque Bhuiya, chairman of Bangladesh Sugar and Food Industries Corporation (BSFIC). He said after successful introduction of digital e-purjee system through mobile SMS (Short Message Service) make available purjee in a minute that contribute significantly in the profit earning. Due to the easier process of e-purjee, farmers supplied 15,81,907tons of sugarcane in the season that was almost double compared to the previous crop season. The turn up of issued purjee has also been increased by 10.53 percent after the introduction of electronic system, he added.

Section IV: The Way Forward and the Vision Beyond 2015

1. Futuristic Vision: "Digital Bangladesh by 2021"

Information and Communication Technologies (ICTs) is being considered and recognized as a key development enabler by the Government of Bangladesh. In the Poverty Reduction Strategy of the country titled National Strategy for Accelerated Poverty Reduction 2009 (NSAPR-II), ICTs were similarly identified and given due importance. The government's 'Digital Bangladesh by 2021' vision aims to mainstreams ICTs as a tool to eradicate poverty, establish good governance, ensure social equity through quality education, healthcare and law enforcement for all, and prepare the country for climate change.

The Vision 2021 and ICT

In recognition of the long-term development challenges, the Government adopted the Vision 2021. The Vision 2021 and the associated Perspective Plan 2010-2021 have set solid development targets for Bangladesh by the end of 2021. Those targets if achieved will transform the socio-economic environment of Bangladesh from a low income economy to the first stages of a middle income economy. Along with higher per capita income, Vision 2021 lays down a development scenario where citizens will have a higher standard of living, will be better educated, will face better social justice, will have a more equitable socio-economic environment, and the sustainability of development will be ensured through better protection from climate change and natural disasters. Development priorities of the Perspective Plan are distilled from the vision statement formulated to take Bangladesh to where it ought to be in the year 2021, given its human potential and natural resource endowments. In the Vision 2021 and the associated Perspective Plan 2010-2021, ICTs were identified as key driver.

Digital Bangladesh

Vision 2021 focuses on the Digital Bangladesh strategy to highlight the tremendous capacity of information and communication technology to help steer the country's development during the Perspective Plan. The national ICT Policy 2009 has expressed its vision in terms of expansion of information and communication technology and its huge potential in establishing a transparent, committed and accountable government, the development of skilled manpower, improvement of social justice, and management of public services. Put together, this will generate the impetus to move Bangladesh towards a poverty-free middle income prosperous country by 2021.

ICT Policy: A Key Enabler for Development of The ICT Sector

The importance of science and technology in general, and of ICT in particular, has led the Government to formulate the National Science and Technology Policy and National ICT Policy 2009.In pursuance of this policy Bangladesh's ICT sector is growing at an estimated 20% per year. From the perspective of policy reform and

development, the Access to Information (A2I) Programme (based at the Prime Minister's Office) identified over 53 e-citizen services which were termed as quick-win activities. 21 of these quick-win activities have already been launched, while the rest are being pursued. The project has already provided technical assistance to ministries and divisions to develop their websites and imparted training to key officials. As part of the Digital Bangladesh strategy's formulation and planning, the project developed a concept note on Digital Bangladesh and assisted the Ministry of Posts, Telecommunication and Information Technology to develop a five-year budget to implement Digital Bangladesh projects.The ICT Policy cuts across numerous thematic groups, including Education, Science and Technology, Infrastructural Development, Employment Generation, Private Sector Development, Agriculture, Health including Nutrition, and Small and Medium Enterprises. The Science and Technology Policy, including ICT, will deal primarily with overall policy, leaving details to the appropriate thematic groups.

2. The Way Forward

Affordable Internet for All

Government will expedite the process of having second and even third submarine cable connection to ensure redundancy and reliability in nationwide Internet connectivity.Price of bandwidth has been reduced significantly which will ultimately facilitate increasing number of net users, enhancing demand for local content and applications, and a stronger boost towards developing a connected Bangladesh.

Rural Infrastructure Development

Implementation of the Rural Telecommunications Network Development and Utilization Guideline 2010 is underway to make sure that the existing network infrastructures have been optimally utilized for commercial communication and key social services (e.g. education, health care, e-governance, etc.).

Enabling Taxation Policy

The government is planning to revisit taxation policy for mobile telecommunications industry for creating opportunity for the reaching out poor population in rural Bangladesh. Such decision will attract more investment by the telecommunications operators.

Adapt New Technologies

The government will keep on accelerating the process of introducing new technologies (e.g.4G, LTE) in the mobile telecom segment through transparent licensing system.Nationwide a national information infrastructure plan will be developed.The governmentwill also initiate programme for resource mobilization so that every citizen will have effective access to information and service through various channels. Appropriate incentives for value added service providers will also be developed through mobile telecommunications and Internet through regulatory arrangement and other mechanisms so that innovative solutions can come and the providers can protect their investment.The government is determined to promote public private

partnership for launching various e-services, particularly those, which are targeting rural and marginalized population in the area of health, education, employment creation and human rights.

Public Private Partnership

The Government will invite private sector and not-for-profit sector for rolling out broadband connectivity in rural area. Basically it might be government-private-NGO partnership for reaching the very last mile, where there is already vibrant NGO presence. Here, local entrepreneurs will be encouraged to launch last mile Internet service to local community.

Multi-Media Integration and Synchronization

Synergistic opportunities will be explored between diverse communication media (e.g. FM Radio, Satellite TV, Cellular Phone services, etc.) to reach out to maximum number of people at a shortest possible time with valuable information.Community Radio (CR) can emerge as another channel of last mile connectivity for the Baseof thePyramid (BoP) population.

Specialized Actions: High-tech Park

The government in collaboration with development partners is building High-tech Park with complete facilities (facilities for employees, schools, medical support, recreation facilities etc.) for attracting foreign investment in the sector. Public-private partnership will also be considered as an option for such arrangements.

Finance for ICT Industry

Bangladesh Bank and Ministry of Finance is undertaking specialized programme for enabling banking and financial institutions provide access to finance to ICT industry by building capacity of mid-level and top level bank officials and show the potential of ICT sector for financing and providing know-how on how to finance with risk mitigation. The programme will also include support to banking and financial institutions to launch special working capital and long term project funding.Special provisions for IPO/Stock market listing (e.g. low level of mandatory paid up capital) will be explored for IT enterprises so that these companies can raise required capital from share market.

Promote Local Investors

All ministries and various government agencies will identify projects where ICTs can be mainstreamed as well as projects related to building ICT infrastructure for implementation where Bangladeshi companies will be given preference and in case of joint venture initiatives the stake of local companies will be at least 51%.

All ministries will prepare projects to be implemented under public private partnership (PPP) framework, where private sector will provide services to the citizens and business on behalf of the government with a sustainable business model linked with domestic and foreign direct investment. A series of programs through

Office of the PPP at the Prime Minister's Office will be organized which will include road show on PPP for attracting projects under the PPP modalities.

Long Term Roadmap

The Ministry of Commerce/ Ministry of Science and ICT in collaboration with all ICT-related business associations will develop a 10-year master plan for promoting country brand including specific actions related to inclusion of Bangladesh in globally reputed outsourcing/off-shoring index/ranking list.

Human Capital Development

For addressing the problem of human resource, a long term plan will be undertaken so that current supply of 5,000 yearly IT graduates can be increased to 10,000 in next 2/3 years. Students from non-metropolitan cities with relatively low overseas migration trends (colleges under national Universities must start IT education) will be encouraged to enroll. Also, special education loan policy and scholarship will be developed to encourage students for IT education enrollment. More industry involvement will be ensured during academic programme.

3. Vision Beyond 2015

The national vision is to develop a knowledge based society by the year 2021, which has been declared as Vision 2021 by the Government.

Vision 2021 calls for Bangladeshi socio-economic environment to be transformed from a low income economy to the first stages of a middle-income nation by the year 2021, when poverty would have all but disappeared, where society would be full of caring and educated people living healthy and happy lives. In line with constitutional obligations and international commitments to human rights, Bangladesh in 2021 shall be a country in which (i) every citizen has equal opportunities to achieve his/her fullest potential; (ii) all citizens enjoy a quality of life where basic health care and adequate nutrition are assured; (iii) all citizens have access to a modern, technical, and vocational education tailored to meet the human resource needs of a technologically advancing nation; (iv) sustainability of development is ensured through better protection from climate change and natural disasters; (v) there is respect for the principles of democracy, rule of law, and human rights; (vi) gender equality is assured; so are the rights of ethnic populations and of all other disadvantaged groups including persons with disability; and (vii) the diversity and creativity of all people are valued and nurtured.

Thus in 2021, Bangladesh will take its place amongst middle income nations of the world, where progress is not just reflected in higher living standards but also in a wide range of human development indicators. And all this will be achieved with the recognition that the state must play a key role in sustaining economic development.

Figure 7: Achieve "Digital Bangladesh": The Vision 2021 by GoB

But that role will not be one of control and ownership of enterprise but that of facilitator of private initiatives and innovation, through provision of infrastructure and effective regulation of markets, with the goal of creating an enabling environment for the private sector to invest and serve as an engine of growth. The government will be service-driven through cost-effective public sector delivery systems fully enabled by adoption of modern technology and it will be held accountable to the highest standards of governance in the operation of all public and private sector institutions.

The private sector will operate in a policy environment that encourages investments in innovation and enterprise, where ideas and talents have the scope to flourish. Financial intermediation and the legal system will have been made effective through reforms that give impetus to private entrepreneurship and actively encourage business start-ups. Special encouragement to women entrepreneurs will be the hallmark of micro, small, and medium enterprise development programs.

Finally, the public and private sectors will collaborate effectively and efficiently through public private partnership (PPP) projects and other innovative models to deliver infrastructure, utility and other services in an environment-friendly manner.

Conclusion

The "Vision 2021" constitutes a goal that is eloquently described by the Hon'ble Prime Minister as 'Digital Bangladesh' to rapidly address the lack of capacity to generate productivity improvements from technological progress, which has long been undermining Bangladesh's growth potential. On the whole, the 'Digital Bangladesh' agenda is likely to aid the creation of a knowledge-based society, which is necessary for Bangladesh to move up in the development ladder.

That Vision embodies a dream that Bangladesh, on the eve of its 50thanniversary of independence, will cross into the middle income country threshold, its citizens will enjoy a higher standard of living, will have better access to education, will benefit from improved social justice, and will live in a more equitable socio-economic environment. These milestones will be achieved in a political climate that is in line with core democratic principles of human rights, freedom of expression, the rule of law, equality of citizens irrespective of race, religion and creed, and equality in opportunities.

A number of key sectors will play a pivotal role in materializing the Vision 2021. It begins with a focus on explicit goals, challenges, and strategies for the agricultural and rural sectors which account for a significant proportion of the country's GDP and employment. The primary goal is to eliminate food deficiency by improving production that will enable citizens to meet their nutritional requirement. More specifically, for ensuring food security by 2021, strategic goals will be addressed in the crop sector, fisheries, livestock and poultry, and forestry. In order to enhance employment generation and rural development, adequate policy attention would be given to rural-non-farm activities. The government is determined to help farmers in marketing agricultural products and accessing rural credit by pursuing policies that establish powerful autonomous local government bodies for coordinating public and private development initiatives.

Industrialization process would play a central role in accelerating growth and achieving real GDP growth of 10% by 2021. This means that in an era of increasing globalization, the only mantra for survival and progress is to facilitate the competitive strength of our industrial sector. In terms of broader goal, the industrial sector will continue to account for a much larger share of GDP – reaching 37% in 2021. This dominant performance of the industrial sector is necessary for it to address the increasingly diminishing capacity of agriculture to absorb the incremental labor force. However, industrial expansion must simultaneously be matched with a highly productive farm and non-farm agricultural sector. Within industry, the manufacturing sector is to display superior double digit performance for the period 2011-21. This can be realized by increasing the competitiveness of Bangladesh's export, and ensuring a larger share for the country in global trade. With this objective, policy makers can target product and market diversification with an effective trade policy regime that is geared to ensure productivity and export competitiveness while aiding the emergence and expansion of new product markets.

For Bangladesh to emerge as a 'middle income country', we need a vibrant and effectivetransport and communication network. The strategy is to develop an efficient, sustainable, safe, and regionally balanced transportation system in which various modes – roads, railways, inland waterways, air transport, ports and shipping, urban and rural transport – complement each other, interface appropriately, and (when possible) provide effective competition to each other. The progress in the telecommunication network and digital media are also noted to be fundamental in advancing economic growth. This is because these sectors play a fundamental role in facilitating the diffusion of information, which in turn reduces associated transaction costs in the economy.