

E-Government in Bangladesh: Recent Progress and Future Challenges

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Abstract: E-government is a recent policy innovation in Bangladesh that emerges as a response to the demands from various groups for receiving online services. Bangladesh Government also takes it as a political agenda with popular slogan, 'the Digital Bangladesh' to reach the doorsteps of people with better and efficient service delivery as well as to establish transparency, accountability and participation in the governance mode. But in regard to implementation of the dreams of 'Digital Bangladesh', the country's efforts are only at the beginning stages. Its current status falls short of standard in every constituent of e-government i.e. web initiatives, online services, infrastructure and citizens' preparedness. This article identifies some of the key challenges in these arenas and suggests some policy recommendations to overcoming them. It finds out that websites are not comprehensive enough to provide citizens quicker service and scope for online transactions; the infrastructure in terms of PCs, telephone lines and internet connection is very inadequate. The human capital is so scarce that nearly half of the population are incapable of receiving the online services. There are also management anomalies, resource constraints, lack of necessary socio-political support, among others. However, efforts are underway to overcome the barriers and provide services to the citizens and, accordingly, some successes are reported in online services, infrastructural and human resource development. But these efforts are minimal and very slow to address the issue in a comprehensive manner and, therefore, further actions need to be undertaken with web initiatives being multiplied establishing kiosks to overcome PC inadequacies, setting internet connection through using the existing electric power line and developing public-private partnership to overcome resource constraints, among others. For all these to implement, it is needless to say that establishing a central coordination body is essential to harmonise the scattered functions of different entities.

1.0 Introduction

[Among the public policy innovations around the globe e-government is the latest addition that seeks for providing the services to the doorsteps of people with least time and better efficiency. This new mode of governance, as defined to using the modern Information Communication Technology (ICT), is designed to ensure citizen's quicker and hassle-free access to the service delivery and establish

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better efficiency, transparency, accountability and participation in the governance process., By bringing forth more and more services online everyday the government is reinventing itself to fulfil people's aspirations of convenient service delivery and value for money. It reduces the time by providing 'one-stop services' and 'service in instant options', and curtails the cost through 'customisation', simplification and empowerment (Silcock 2001, pp. 88-89). In developing countries, e-government bears additional significance especially in fighting poverty, boosting national economic growth, reducing corruption and bureaucratic complexity and establishing good governance (Haque, 2006).

However, implementation of e-government in developing countries is neither an easy nor a discounted task as it requires transformation of organizational structure and business processes, mobilisation of human capital and utilisation of information, technological and financial resources, among others (PCOIP, 2002). In these countries resource constraints, lack of political support, lack of technology and inadequacy of infrastructure, illiteracy and paucity of skilled human resources pose a formidable challenge. Furthermore, the digital divide between rural people and urbanities, the poor and rich, the literate and illiterate bars wider accessibility contributing to disengagement of a significant portion of the population. Yet, attempts are ongoing to find innovative solutions to such problems/challenges. Such efforts have produced innovative ideas and alternative options consistent with local context aimed at overcoming the barriers of infrastructure, addressing the paucity of human capital and improving the general access of service delivery. The Bangladesh e-government experience does not represent a dissimilar picture of a typical developing country. In fact, there are several factors that have made e-government an important issue to explore and provide suggestions for improvement.

First, as online services by governments around the world are increasing, there is an impetus for the government of Bangladesh to respond in the same way as is manifested in its 'Digital Bangladesh' slogan. ,

Second, the government is under pressure to provide electronic delivery of public services from the demands of citizen groups, especially the business community, often driven by the concomitant development in the private sector i.e. the development of e-commerce and online banking,

Third, there are demands from NGOs, civil society organisations, donors and UN organisations to make the government more transparent, accountable, and efficient through electronic presence.,

Despite such demands, felt importance and significance of the issue, there is a scanty of study to explore the current status-and-challenges of e-government in Bangladesh. This paper is an attempt to contribute to focus on issues such as the potentials of e-government and the problems of webs, infrastructural development and human-capital formation, policy issues, innovations in service delivery and the key challenges in these arenas in a detailed scope, Exploring these issues in a great length is expected assist in arriving at some insights and policy options that can help the government to-choose the most efficient pathways to overcome the challenges.

The study is primarily based on secondary literature and surveys of some websites, The Web based survey did not administer any questionnaire but consisted of going through the content to locate different kinds of information required. It used the e-readiness measurement indices developed by the UN e-government survey-2008, to assess the progress in Bangladesh.

The study has been structured in the following way. The first section presents the introduction describing the rationale, objectives and methodology of the study. This is followed by a discussion on the theoretical framework of e-government, the development in this regard i.e. the transition from e-government to e-governance, the measurement of e-readiness, etc. The next section provides an overview of the current status of e-government in Bangladesh in terms of the policy issues, management structure, etc. The following section elaborates on the current status and sheds further light on e-readiness

in Bangladesh in terms of web initiatives, telecommunication infrastructure, and human capital. The final section analyses the problems and key challenges Bangladesh is facing with e-governmental online service delivery that is followed by the conclusion that incorporates summary of the findings and some policy recommendations. The concluding remark asserts that, despite having serious shortcomings in terms of infrastructure, human capital and web initiatives, the situation can be improved by the government through adopting some alternative strategies and policy options.

2.0 E-government- the Theoretical Framework

Conceptualising e-government delineates the definition of it, the evolution of it, and the measurement of progress through e-readiness.

2.1 Defining E-Government

Electronic government, popularly known as e-government, connotes to the usage of technology in the mode of the design and delivery of public services that aim at enhancing efficiency, transparency and accountability in governance. As to the technical term, e-government uses the most recent forms of ICT which are digital and wireless such as cellular telephones, satellites, electronic mail and, above all, the most widely proliferated one, the internet; it also includes the traditional forms such as print media, motion pictures, radio, telephones and records (Gudaitis, 2001, cited in Haque, 2002, p.231). Thus, the technology friendly governments around the world are also known as 'government online', 'networked government', 'digital government', 'cyber-management', 'smart governance', 'digital democracy', etc (Haque, 2002, p. 232).

But many scholars see e-government as more than merely the application of ICT to imply that the technology may help the internal operations while the external interface of government covers a range of relationships with citizens, businesses and other governments (Leitner 2003, cited in Siddiquee, 2006, p. 367). These relationships are manifested in the following dimensions:

- ✓● Government to Citizens (G2C) and vice versa (C2G) referring to citizens' interaction with the government.
- ✓● Government to Business (G2B) and vice versa (B2G) with the objective of speeding up business transactions between government and private bodies.
- ✓● Government to Government (G2G) for intra or interagency interactions and sharing of data (UN 2008; Backus 2001).

These multifarious relationships enable the citizens to enjoy unlimited access to bricks and mortar agencies for availing 'non-hierarchical', 'non-linear' and interactive services (West, 2008, p. 1). As to this broadened perspective of relationships, e-government is not merely a tool for attaining efficiency in cost reduction, as is the case in e-commerce. Rather, e-government strategy is largely shaped by public interest (UN, 2008, p.70). Beside financial savings it thus includes, as defined by Mexican Government's definition, features such as:

(1) "innovations in public service- better quality, easier access and new services; and (2) democracy -participation and interactive dialogue (3) accountability, transparency and responsiveness connoting to the transformation of relationships"(UN, 2008, p. 69).

Although e-government sounds like a buzzword connoting a reform developed overnight, it entails a long and evolutionary process to transform the government into an e-government. Organisational structures, business processes, tools and strategies of the government are to undergo transformation. Even today, further evolution has occurred at this end shifting from service delivery by individual agencies under e-government to the integration and coordination of service provisions through **cross-organisational** coherence offering one-stop shops to citizens and businesses known as e-governance or connected governance (UN 2008, p.2). E-governance essentially entails the whole of government concept which consists of two ends: the 'front end' and the 'back end'. The front end is the discernible part that focuses on the provision of services and interaction, supported by

integration, consolidation and innovation in the back-end processes and systems that are not accessible or visible to the public (UN, 2008, pp. 2-4). The ICT enabled connected governance ensures both internal efficiency as well as the external efficacy in service delivery. Many OECD countries are moving towards connected governance through creating back office coherence and coordination. Many developing countries are also in the same process, albeit with small-scale projects (UN, 2008, pp. 8-10). The differences across different countries in terms of online advancement, connectedness, infrastructure development and human capital for e-government are measured through e-readiness indexes.

2.2 Measuring E-government Readiness

The e-readiness index is developed by the United Nations that comprises the following indices:

(1) *Web Measure Index*

The web measure index consists of five stages of evolutionary development built on the previous levels of advancement of a country's online presence and the scale of electronic services compared to a pyramid-like upliftment. The first stage is levelled as the 'emerging presence stage' which is characterised by the existence of government web sites with static and limited but basic information providing citizens having few options to operate and interact. The second stage termed as the 'enhanced presence stage' facilitates a greater amount of downloadable databases and information on policy and governance issues i.e. policies, laws, regulations, reports, forms, newsletters, etc. yet with limited interactive options. The third stage, the 'interactive stage', in contrast, offers considerable options for interactions as citizens are able to reciprocate there with the government through the internet to collect a whole range of online services like the tax payments, license renewals, etc. The fourth stage called the 'transactional stage' provides the complete, secure, and two-way transactions between the citizens and the government. The transaction assists citizens obtaining a variety of online services like visas, passports, licenses, and permit renewals, tax payments, e-

procurements etc. The final stage, the 'connected or integration stage', represents the most sophisticated level characterised by an integration of services and the institutions offering them with the objectives of removing physical barriers and providing most public services-spotlessly. It further allows the citizens to e-participation by involving them in a two-way open dialogue to express their views on public policy and being responded (UN 2008, p.16; Siddiquee, 2006, p. 369).

(2) Telecommunication Infrastructure Index

The telecommunication Infrastructure index is a composite index of five primary indices referring to a country's infrastructure capacity as they relate to (1) the internet users, (2) personal computers, (3) main telephone lines, (4) cellular telephone and (5) broad banding per 100 persons each (UN ,2008 p. 16).

(3) Human Capital Index

"The Human Capital Index is a composite of the adult literacy rate and the combined primary, secondary and tertiary gross enrolment ratio, with two thirds weight given to the adult literacy rate and one third to the gross enrolment ratio" (UN 2008, p. 17).

The web measure index essentially entails the development of webs in the evolutionary, model, which builds upon the previous levels of sophistication. The telecommunication index signifies a country's infrastructural preparedness while the human capital denotes the citizens' awareness in receiving the benefits of e-government. These theoretical components of e-government are contextualised in the next sections with experiences from Bangladesh.

3.0 E-government in Bangladesh - the transition from traditional government

E-government in Bangladesh involves gradual policy initiatives adopted and management approaches developed in order to shift from traditional government to ICT enabled government. The policies emphasise on the government's strategy in providing technical and human resource logistics for the development of technology-friendly

government. The management structure signifies the actors in policy implementation that include both government and non-government sectors.

3.1 Policy Transition

The commencement of e-government owes, largely, to the growth of ICT in the country over a considerable period. The plan for modernising public administration with the help of science and technology dates back to 1972. Afterwards it scrawled with measures like creating a permanent body for simplification, computer-aided application in management information system, reporting, payroll, accounting and budgeting within a few agencies in the 1980s. In the 1990s, the modernisation attempts consisted of the improvement of file management system, office operations by computers and the training of the workforce in the new technology. However, specifically the urge for electronic government ushered to the governance debate in 2000, when the Report of the Public Administration Report Commission emphasised on the use of ICT in 'electronic government' (Haque 2006, p. 347). The broader framework of strategies and actions for launching e-government has later been outlined in different policies followed.

3.2 ICT Policy

In 2002, the government adopted the National ICT policy for concerting the ICT with the national development goal by making its widespread use in terms of information generation, utilization and application. The policy outlines the visions of e-government in Bangladesh by setting a goal to build a knowledge-based society by 2010. Urging to the infrastructural development for e-government it outlined different targets including establishing telecommunication infrastructure nationwide, connecting to submarine fibre optic cable network, extending internet facility to rural areas, establishing cyber kiosks in post offices, union and upazila (sub-district) complexes, setting up an internet exchange and increasing the bandwidth capacity and availability (GoB, 2002).

Section 3.6 of the policy specifically deals with the management of e-government issues. It underscores the spread of ICT in governmental bodies across the country that include ministries, divisions, departments, autonomous bodies and all district and upazila headquarters and union parishad offices. It says that all of these bodies will be connected to the 'National Data Resource Centre' for comprehensive information on economic, cultural and social affairs of the country. Each Ministry or Division must have an ICT unit comprised of ICT professionals and set up web sites with policy documents and information updated. The establishment of a common web platform connecting all web addresses related to 'e-forms', 'e-procurement', 'e-recruitment', 'e-results', etc. is also underscored in the policy (GoB, 2002).

Although the policy shows insufficient strength in identifying the specific strategies or action plans for implementing these visions, it does outline the broader framework of e-governmental strategies. Consequently, the changes and modifications have been adopted in the ICT policy 2009 that, in addition, identifies the action plans, the actors, the expected deliverables and benefits and goals for short, medium and long-term development. The ICT policy 2009 introduces **a singular national vision of enhancing social equity through the use of ICT** and outlines 10 broad objectives, 56 strategic themes and 306 action plans for a comprehensive coverage of all aspects of national life (GoB, 2009).

3.3 Related other Acts and Policies

To help with the implementation of ICT policies-a number of ICT friendly legal provisions are also operational. The Copyright Act 2000, amended in 2005, subject to proper enforcement, helps to reduce piracy in the domains of computer software, motion pictures, pharmaceutical products, CDs/DVDs, etc. (IIPA, 2007 p. 205). Enforcement of the 2006 ICT Act, similarly, aims to prevent crimes related to computer fraud, hacking, damaging programmes and data and launching computer viruses. Likewise, the ICT (Electronic Transactions) Act 2006 purports to facilitate e-commerce by

safeguarding the online transactions. Specifically, for e-government it facilitates electronic filing in government agencies and ensures efficient delivery of electronic records from government offices (BCC, 2009). Beside these acts, the Official Internet Connection and Usage Policy 2004 provides the framework for the use of internet facilities in government offices and determines its management and financial aspects, such as 'entitlement', 'approval procedures', and 'cost limits' (Haque, 2006, p. 350). These policy packages and acts set the normative structure of e-government while the operational aspects are dealt by the management structure.

3.4 Management Structure

The management structure involves a host of organisations as well as their operational responsibilities related to varying aspects of e-government. The Government Organization entrusted for the development and promotion of the ICT sector is the Ministry of Science, Information & Communication Technology. Accordingly, its programmes cover expanding the IT education, bringing changes in law, involving the private sector and NGOs, standardising the public websites and so on. The Bangladesh Computer Council (BCC), an autonomous body established by Act No IX of 1990 for the promotion of all kinds of ICT activities in the country, works under this ministry. For e-government programmes, the BCC discharges the responsibility of computerisation, providing advisory services to different online initiatives, conducting ICT training courses for government officials and running some development projects related to the expansion of ICT (BCC, 2009).

However, the Prime Minister's office plays a central role in broad policy matters related to e-government. Under it, a National ICT Task Force (NTF) headed by the Prime Minister and represented by public, private and civil society organisations performs on advising and overseeing the policy matters. Immediately below it is the Executive Committee, headed by the Principal Secretary to the Prime Minister, with the mandate to execute the e-government directives of NTF. To support the NTF, different ministries also constituted a host of focal

points and committees. In 2003, the Ministry of Planning launched a Support to ICT Task Force (SICT) programme, with the aim of providing administrative and secretarial support to the NTF in realizing various ICT projects, particularly e-government related ones. As of May 2005, the total number of projects under SICT programme was 30 (Haque, 2006, p. 351). The Prime Minister's office has recently launched a project called Access to Information (A2I) program supported by UNDP. This program under the leadership of Cabinet Division introduced web portals in all 64 districts in January 2010 for offering information on socio-economic development, history and culture of each district. This project aims to offer further assistance to the government in steps like formation of 'Information Commission', introduction of 'Online Banking Policy' and opening of 'Text Book Website' for school students (UNDP, 2010).

The telecommunication infrastructure and regulatory managements run through the Ministry of Post and Telecommunication. Bangladesh Telecommunication Regulatory Commission (BTRC), an autonomous body of the ministry regulates the telecom providers, both fixed and mobile. For infrastructural development, necessary for e-government, BTRC aims to increase the teledensity, establish a phone in every village, promote ICT applications in socio-economic development, etc. It oversees, among others, the licensing for the VSAT operators and Internet Service Providers (ISPs), the development of digitization schemes, regulation of tariffs, the setting of standards, etc. (BTRC, 2009).

Outlining the development strategies for e-government and allocating resources for that purpose is done by the Ministry of Finance in annual budgets. The vision of 'Digital Bangladesh', for instance, is outlined in the 2009-2010 budget attaching priority to the building of an ICT infrastructure, mainly the internet-connectivity and telephone coverage for those who are least advantaged and living in rural areas. The budget plans to provide all upazilas with internet coverage in the next five years and set fibre optical lines countrywide by the year 2010. For attaining secured connectivity with the information super

highway there is already an initiative underway to connect Bangladesh with the Second Submarine Cable Network. Similarly, the establishment of digital exchanges at upazilla and growth centres is also reported to be completed. Moreover, an access network will be built covering 23 districts including 6 divisional headquarters.⁴ For attaining human resource target increasing ICT literacy, the Government expresses its commitment to introducing compulsory computer and technical education at secondary level by 2013 and primary level by 2021. Detailed work plans on the ICT policy of the Government are underscored in the budget to launch e-government in all offices by 2014 and to initiate e-commerce by 2012 furthering the commitment towards building 'Digital Bangladesh' (MoF, 2009).

Local government Division under the ministry of LGRD is launching a project to bring all 4498 Union Parishads (UPs) under online networking system through setting up Union Information Service (UIS). It has a target to establish 100 UIS by 2009 and increase the number in 2000 by 2010, 3000 by 2011 and rest of within 2012. The UIS will, among others, offer information on farming and prices of essentials to the farmers and rural entrepreneurs (BDEN, 2009).

Along with these governmental efforts, there are a number of organisations whose efforts are also crucial for successful e-government in the country. These organisations include the Bangladesh Computer Samity (BCS), the Bangladesh Internet Service Providers (ISP) Association, and the Bangladesh Association for Software and Information Services (BASIS). Although they are distinct organisations, as their names suggest, they all advocate for e-government through their various efforts such as to negotiating with the government to diversify the effective use of ICT, rendering expert business on ICT, bargaining for ICT policy decision and enforcement of existing ICT laws, training the human resources, etc. For instance, their latest effort is the negotiation with the government to make ICT education compulsory in secondary and higher secondary educational institutions (BCS; ISPAB; BASIS, 2009)

✓ The management structure, thus far discussed, does not follow a unique pattern. Instead, different ministries bear the responsibility of different aspects of e-government. Although a lack of coordination is evident, the result of their collective efforts is reflected in the practical setting of e-government to which we shall proceed for our next discussion in the following section.

4.0 Practicing E-Government: Current Initiatives in Bangladesh

Since e-government's progress is measured through the components such as web initiatives, the infrastructure, and the development of human capital, the initiatives of the government in Bangladesh also relate to these aspects.

✓ 4.1 The Development of Web schemes

The development of a comprehensive web scheme is the most vigorous frontline presence of e-government. The UN survey 2008 reports that Bangladesh's web measure index is 0.3512, a better position than that of 2003 when it was measured at .092 (UN, 2003). With increase in number of webs progress has been made in interactive and enhanced stages. A large number of important offices including head of the state and of government offices, key ministries, divisions, departments, higher courts, audit and accounts office, board of revenues, central bank and others have set up websites (NWPB, 2009). Various projects under different ministries and divisions have begun to provide online services. Hajj management, electricity and water management, birth registration, railway ticketing and so forth are now presented through web initiatives. A study by Haque (2006, p. 353) has found that, currently, 38.9% of 50 ministries and divisions have at least one project on e-government; 16.7% are at an initiation stage while 44.4% have not any such initiatives.

Some of those who have e- government projects are reported to be making some progress in facilitating user friendly and customised services. ✓ The Finance Division, for instance, has developed a customized software for budget planning, sensitivity and impact analysis, financial projections, and preparation of various reports. It

has also created a software to facilitate an interface between the development and revenue budgets. The Bangladesh Bureau of Educational Information and Statistics (BANBEIS) has launched a GIS map-based software that provides information on the density of academic institutions in particular regions and relevant information relating to education (Sobhan et. al., 2004). The Planning Commission has a website for useful searchable databases of all Annual Development Programme (ADP) projects undertaken in the last three years (Planning Commission, 2009).

Under the Support to ICT Task Force (SICT) programme, several e-government projects are underway in many ministries and departments. The Ministry of Education, the Ministry of Labour and Employment, the Ministry of Expatriate Welfare and Overseas Employment, the Dhaka Passport Office, the General Manager (postal) North's Office, the Department of Agricultural Marketing, the Land Record Office in Manikganj are just a few. Many other government offices including the Bangladesh Bank, the Ministry of Law, Justice and Parliamentary Affairs, and the Dhaka City Corporation are also in the process of implementing important e-government initiatives (Sobhan et. al., 2004).

The major public websites can be accessed from one portal called 'Bangladesh. Gov.bd- the national web portal of Bangladesh'. This site contains the web addresses of the President's Office, the Prime Minister's Office, the Council of ministers, Parliament, the Judiciary, Statutory bodies, 41 ministries and divisions, citizen services, business services, important circulars and gazettes. In the home page the important events related to education, disaster management, passport, income tax and market prices are displayed. It also contains information on how to start a business, foreign direct investment, weather and climate, spotlight events, tourism and national statistics, government forms, postal services, stock exchanges, and currency rate (NWPB, 2009).

These initiatives by various government agencies have brought a host of services online as discussed below:

Services through Online Initiatives:

In most cases, instead of providing the online services directly, the forms of different services have been made available. A website contains many digitized forms of various ministries and divisions called 'Bangladesh Government Digitised Forms -e-citizen services application'. There are sixty five different kinds of Government forms including forms for birth registration, driving licence, citizenship, family pension, passport, immigration, No Objection Certificate (NOC), Visa Application Form, utility bills form, telephone connection forms, TIN application, etc. are available in the website (PMO, 2009).

Many e-governments around the world have widely launched online taxation popularly known as e-taxation. Bangladesh's progress at this end, however, is only at the beginning stage. Forms of Tax Identification Number (TIN) and Tax Returns are available online to download and fill in with limited scope for online submission. However, in Large Tax Payers Unit (LTU) e-taxation for submitting the declaration and online payment has been implemented since July 2009-10. The plans are underway for introducing the e-taxation in large scale covering VAT and individual income taxes (NBR, 2009).

Utility bills payment is another widely used domain of e-government service provision on interactive stages. In Bangladesh some improvements can be mentioned that have enabled citizens to carry out electronic payment of utility bills. The utility service providers such as PDB, DESA, WASA, Titas Gas, BTTB, etc. have all made several contracts with different banks and mobile phone companies for their bills to be paid electronically using internet banking, ATMs, Ready Cash card, Q-Cash card, POS and other channels. However, these efforts are only limited to cities that provide services to the urban population (UNDP, 2006, p. 4).

Apart from these utility services, some websites of different ministries have services on enhanced and interactive stages. Some of the successful websites to this end are the Online Hajj Information

Management website of the Ministry of Religious Affairs, the Electronic Birth Registration Information System of Rajshahi City Corporation, the integrated website and MIS in the Department of Roads and Highway, the Bangladesh Bank website and so on. For instance, in the financial arena Bangladesh Bank (BB) has engineered digitizations through the use of advanced ICT in all spheres of its operations including monetary policy, banking supervision and internal management. It has introduced automated clearing house that will enable cheque processing for payment within hours. Furthermore, a national payment gateway for e-banking connecting all banks for inter-bank transactions is planned to commence for facilitating electronic fund transfer (Rahman, 2010).

As an example of connected governance I present here the case of Electronic Birth Registration System in Rajshahi City Corporation (RCC).

Electronic Birth Registration Information System of RCC

The Electronic Birth Registration Information System (EBRIS) developed by the Rajshahi City Corporation (RCC) provides citizens with a unique identity card required for various social services, including education and health care. Introduced by joint efforts of RCC and the Ministry of Local Government, the implementation of this system has been spearheaded by the technical and financial support of UNICEF. It assists the citizens to register births from a ward office in a few minutes while the certificate is issued by the Public Health Department of RCC. In addition, it offers an immunization schedule for a registered child (Sobhan *et. al.*, 2004). Though many e-government projects in Bangladesh are at rudimentary stage, this one has been cited by the United Nations e-report 2008 as one of the connected stages of e-governance because of its successful back office integration in births and immunisation schedules and linkage with different offices.

Back office integration has helped in the retrieval and enquiry of data in seconds, avoiding duplication of entries, by multiple agencies. The

records of registered births helps the RCC to monitor the needs of a community, ranging from immunisation requirements to school enrolment status, and take necessary remedies (Akther *et. al.*, 2007, pp. 43-45). Along with the efficiency, the transparency too has increased as the users can easily access the information regarding the status of all registered children with respect to immunization, schooling, and other social services (Sobhan *et. al.*, 2004).

Thus, it appears from the above discussion of web schemes that web initiatives are underway; though most of them are in the mere presence level some of them are in the enhanced or interactive or connected stage too. The possibility of web initiative to be accessible to all, however, is largely dependent on a vibrant telecommunication infrastructure.

4.2 Telecommunication Infrastructure Development

The telecommunication Infrastructure index consist of five primary indices related to PCs, main telephone lines, cellular telephone and broad banding and internet users (UN, 2008 p. 16): The UN Report 2008 shows that Bangladesh's position in this index is lower than those of India, Maldives, Pakistan and Sri Lanka. In fact, it has got the lowest index in Internet usage than that of any other country in the region, available to only 0.31% people. However, its overall infrastructure index is relatively better than those of countries like Bhutan and Nepal due to its considerable increase in cellular phones. It is estimated that there are 13.25 telephone subscribers (both mobile and fixed) per 100 persons in Bangladesh (UN 2008). Such ranking and relative position of the country, of course, has been evolved from improvement in the management of the sector.

In the past broad banding and land phone were not widely available. Main phone line users consisted only 0.72 percent of people and broadband users were too small even to be articulated in the UN report 2008. It is alleged that such infrastructural frailty has been caused by long time inefficacy in the telecommunication and internet management sectors. Previously, the government single ownership and monopoly in main line phone brought an adverse impact in the

industry. Concentration of telephone lines in urban areas and lofty charges for internet services through dial-up connection put barriers to the development. For broad banding Bangladesh was not directly connected to the Global Information Superhighway compelling ISPs to connect to it through the satellite or Very Small Aperture Terminals (VSATs). However, recently some positive developments have taken place after the establishment of BTRC in 2002 that promote liberalisation and competition in the telecommunication industry. Consequently, in the last few years, some private operators have begun to operate in both fixed and mobile telephone sectors (DANIDA, 2006).

Consequently, an increase in the phone index fuelled by the extraordinary growth of mobile phone subscribers can be noticed. Alongside the government, two other private operators in the fixed phone market now are the Bangladesh Rural telecom Authority (BRTA) and the Sheba Telecom Limited (DANIDA 2006; MoF, 2009). BTTB has also appeared in the market through its mobile service named teletalk. The other mobile providers are Grameen Phone, Aktel, Warid, Bangla Link, etc. As a result of their collective operation, mobile tele-coverage reaches most of the remote areas of Bangladesh with an estimated number of subscribers being about 47.97 million as of July 2009 (DANIDA 2006, p 12; BTRC 2009). This growth of mobile telephone bears special significance for online services as the government can provide them through using SMS and internet facilities of these providers.

For scaling up the internet bandwidth, fibre optic cables have also been installed through many parts of the country. Bangladesh joined the Global Information Superhighway (submarine cable connectivity) in 2006 through the SEA-MEA-WE 4 consortium. Subsequently, BTTB has begun to reduce the charges for both the fibre optic and existing VSAT connections. Internet service providers (ISPs) have also emerged in scores with their present number being around 200. Many of them are also directly operating or patronising approximately 600 Cyber Cafes around the country, 250 of them being in the Dhaka

City (DANIDA 2006). As the broadband connections are mainly concentrated in cities the establishment of a national bandwidth backbone to carry domestic internet traffic is being given focus at the highest policy-making levels (Haque, 2006).

Though Personal Computer Index in Bangladesh is relatively better than that of its neighbouring countries with 2.42 PCs per 100 persons, it is still very inadequate to address the need for e-government. From 1990s, computer accessories are either tax free or with very limited tax and, therefore, the PC/Server market in Bangladesh is growing fast. The growth is further fuelled by the PC demands of large enterprises, MNCs and, importantly, many government agencies that collectively account for almost half of total imported PC/servers (DANIDA, 2006, p. 30). Along with the low rate of computer penetration, the concentration of consumer of PCs in cities and urban areas poses a challenge to the development of e-government across the country. A study done by the Bangladesh Bureau of Statistics (BBS) and BCS showed that IT concentration was highest in Dhaka, the capital city (72.76%), followed by Chittagong, Rajshahi, Khulna, Sylhet and Barisal with small percentages for each (Haque, 2006, p. 358).

The potential of e-Government is heavily dependent on the establishment of an affordable and broadly accessible ICT infrastructure to deliver online services. With the recent steps outlined above, Bangladesh's position appears to be at a very initial stage in providing proliferated infrastructural support throughout the country. But even if support to all of these elements of infrastructure has been provided, technology itself is useless unless it can be operated and used by a group of competent people.

4.3 Developing Human Resources

Capable human resources along with enriched human capital are very important for e-government as they suggest both the citizen's preparedness to engage in transactions electronically as well as the capacity of policy makers and implementers. In the Human Capital Index measured by UN, Bangladesh's position is better than in the two

other indices (i.e. the web measure index and the infrastructure index) with a 47.5 adult literacy rate and a 56.011 gross enrolment rate and thus making the overall rate 0.5033. This value is lower than that of India (0.6195), Sri-Lanka (0.8137), Maldives (0.8617) and Nepal (0.5176) but slightly better than that of Pakistan (0.4659) and Bhutan (0.4867) (UN 2008, pp. 279-281). The Net enrolment rate for secondary level is 44% while only 20% of tertiary students receive science and engineering education (HDR 2007, p. 271).

Like increasing the adult literacy and gross enrolment rates, specific development of skilled human resources in the ICT sector to deliver the e-government services is also crucial. The importance of such efforts is laid out in both the ICT policies of 2002 and 2009. The ICT Policy, 2009, more categorically, sets action plans for redesigning ICT and e-governance curriculum of the various government training academies with focuses on (1) e-governance leadership focusing on change management and process reengineering and (2) basic computer and internet literacy. Furthermore, it emphasises the development of ICT cells for all public sector organisations to be run by ICT professionals (GoB 2009).

Efforts are made to train the policy implementers and government officials for developing leadership in change management and process reengineering of e-government. BCC, with its head office and six divisional offices, runs various programmes to indoctrinate government officials on IT (BCC, 2009). Since September 2005, it has started to provide the e-government training to government officials in order to enable them to lever the e-government activities of varying complexities. Up to the recent past 800 government officials have received such training (Barkatullah, 2008). Besides, other governmental ministries and agencies also provide e-government trainings to government officials (Haque, 2006).

To ensure basic computer and internet literacy the government's initiatives range from introducing 'Computer Science' subjects at school level, facilitating graduate courses at tertiary level to arranging computer-aided education for the general masses. To cater for the IT

learning demands of younger generation, the government has designed the course curricula for both secondary and higher secondary levels with 'Computer Science' as an optional subject. It has also introduced computer equipments in many schools and colleges. The government is now planning to make Computer Science a compulsory subject. Like the government, the private sectors and non-governmental organisations are launching projects to introduce computers and train the students in schools and other institutions? But such efforts, especially in rural areas, result only in minimum IT orientation due to the options for not to choose the subject, the lack of electricity, poor location, unavailability of trained personnel, and low motivation and awareness (Haque, 2006, p. 360). As the IT orientation is not quite widespread at the secondary level, the industry relies more on the tertiary level IT professionals.

Among 73 universities in the country, including 21 public universities, many offer some form of IT courses and relevant degrees at the tertiary level. Moreover, 20 government and 87 private polytechnic institutes provide diploma or vocational certificate in IT in the country (DANIDA, 2006). Beside academic level, there are 1500 private ICT **training institutions that provide IT training to many incumbents from the general public.** The public sector's efforts in this regard are also worth mentioning as some agencies such as the Department of Youth, Department of Women Affairs and BCC also have their own ICT training programmes for citizens with their field agencies at the divisional and district levels, albeit, not in adequate numbers (DANIDA, 2006, p. 23).

These multiple efforts have helped increase IT personnel in the country in recent times. As indicated in the BCS reports, the total number of IT professionals in 2006 was more than 25,000 reflecting an increase of 12.50% percent from the previous year (DANIDA, 2006, p.16). It can be assumed that these trends of increase in IT literacy will facilitate back office support for e-government, while the overall improvement in the human capital index, in terms of enrolment and adult literacy, is essential for making the ordinary citizenry aware of the e-government frontline services.

So far, we have discussed the major initiatives of e-government and understood that there are a number of inadequacies, shortcomings and challenges related to the three dimensions of e-government. The next section will focus on those challenges.

5.0 Major Challenges of E-government in Bangladesh

Based on the foregoing discussion, a host of problems and key challenges of e-government can be identified that are related to the web measures, the **infrastructural** development, and significantly, to the human capital - the ultimate operators as well as recipients of e-government services./, These factors collectively influence Bangladesh's e-readiness ranking. The 2008 ranking for e-readiness of Bangladesh, as measured by UN, is 142 among all the countries in the world. This places it in the 7th position in the Southern Asian Region which remains far below the world average and is the lowest ranking region in Asia. Countries above Bangladesh are Maldives (77), Sri Lanka (101), Iran (108), India (113), Pakistan (131) and Bhutan (134). Only two countries behind Bangladesh are Nepal (150) and Afghanistan (168) (UN, 2008). But compared to previous years Bangladesh's position has improved considerably from 162 in 2005 to 142 in 2008. This improvement in the ranking can be attributed to Bangladesh's progress in web measurement in the enhanced and interactive stages as well as to the growth of mobile telephones. Yet, **compared** to other nations of the world and many other countries in South Asia this ranking is very low and far from the level adequate for providing online services to the citizen. The challenges and problems relevant to the issue are:

(1) Web related Constraints

A number of problems related to web initiatives can be identified:

First, web initiatives in most government agencies can only be considered to be at the 'emerging presence level' with very slow advancement towards other progressive levels such as interactive or connected level., The United Nations Survey 2008 (p. 54) indicates the utilisation of web initiatives in different stages in Bangladesh.

"Utilization is defined as services provided as a percentage of the maximum services in a category". It shows that 88% of webs are utilised for emerging presence, 42% for enhanced and interactive stages respectively, only 6% for transactional purposes and 7% for connected stages. The overall utilisation is 31% across all five stages. The low percentages for transactional and connected stages indicate that most web attempts are not for online transactions; rather they are present with some static information.

Second, the content of the webs has improved very little over time in providing services to the citizens. The study by Haque (2006, p. 360) found that out of 50 ministries and divisions only 28 have web initiatives. Most of them contain very rudimentary forms of information such as 'About Us', 'Contact Us', 'Email Address', etc. Features such as 'Forms', 'Notices', 'publications', 'Search', 'privacy policy', etc. are very rare. Some websites display outdated contents and some sites even sometimes pop up with blank pages. Websites rarely have the options for interactive features that contain complaints, comments, suggestions, and compliments, statistical queries with a pull-down menu. Instead, the sites mostly provide detailed information on traditional bureaucracy such as 'organizational structure', 'hierarchy', 'activities', 'achievements', 'top personnel', etc. Most ministries do not have the customised software; the purpose of the website is to serve only the internal operation of the ministry or division, the user groups being only the staff (Sobhan et al, 2006). Thus, they cannot attract a wide range of users since very little attention is given to citizens' demands and choices. Besides, many websites that provide services to citizens and businesses are not widely known to the public as efforts to make their presence known to the general public are not impressive (Haque, 2006, pp. 360-361).

Third, online initiatives are absent in providing important services such as public procurement, e-taxation, registration and so forth. Though the Public Procurement Act (PPA) 2006 and Public Procurement Rules (PPR) 2008 require the government to implement e-procurement, it is only at the beginning stage since the Central

Procurement Technical Unit (CPTU) of the Ministry of Planning will only launch e-tendering system on a pilot basis in projects by the Bangladesh Water Development Board (BWDB), Rural Electrification Board (REB), the Roads and Highways Department (RHD) and the Local Government Engineering Department (LGED) in 2010 (MoP, 2009). Similarly, e-taxation is only made accessible for large tax payer's unit leaving the vast majority of individual income tax payers out of such service (NBR, 2009). Other services such as vehicle registration, licensing, permit, passport, etc. do not offer scope for online transactions.

Fourth, integrated portals connecting and sharing various departments of the government and then delivering one-stop service to the citizens are hardly present. The sharing and connection between the public health department and the immunisation department in the Rajshahi City Corporation is a positive step in this regard. But this is a very small scale project. There are very little exchanges between different ministries and departments in the centre of administration, the secretariat. In fact, the current e-government drives in the Bangladesh Secretariat are confined mainly to 'planning and strategy formulation, connectivity and infrastructure, procurement of technology and website creation' (Haque, 2006, p. 360).

Finally, the limited number of information and services made available are not accessible to the vast majority of citizens due to digital divide. As has been noted by the World Bank, most citizens are not aware of the traditional services provided by the government and are, consequently, severely handicapped in their dealings with the bureaucracy (Haque, 2006). Thus, making more services available online will only add to their ignorance.

However, with web initiatives increasing their number as well as improving the content, diversifying in multiple arenas and making transactions available will not improve much without adequate infrastructure that can facilitate citizen's wide access.

(2) Infrastructural barriers

One of the most important hurdles to providing e-services in Bangladesh is developing the infrastructure i.e. providing an adequate number of PCs, telephone lines (both fixed and mobile) and internet especially broad band facilities. The country's possibility of building infrastructure in all of these fronts is severely handicapped by a host of challenges.

First, although telephone connection, both fixed and mobile: has increased considerably than previous time, it is still not sufficient to serve the whole country because of the vast population. This is especially true for rural population and the vast majority of poor people who cannot afford the phone cost.

Second, the number of PCs has not increased much as only 2.42% of the population have PCs in Bangladesh (UN, 2008). This low rate is further exacerbated by the concentration of PC users in cities and urban areas. Whereas the per capita income is around US \$ 500 (Gunter, 2008), it is very unlikely that the vast majority of people will afford PCs and it is surprising that Bangladesh will see any dramatic improvement in this index in the near future. Also, the low level of literacy poses a big challenge to the development of PCs in Bangladesh. Without adequate number of PC users across the country, setting other infrastructure such as broadband network or telephone connection is not viable.

Third, the available infrastructure technology is mainly used for purposes other than providing online services. Although the Government of Bangladesh is a big consumer of PCs, the use is limited to typing purposes and clerical needs, rather than providing on-line services to the citizens. Many offices are complacent to just being equipped with computers and other accessories without any effective use of those wares. Regulation, organisational change and process reengineering, provision of public services and awareness building for e-government hardly get priority (Haque, 2006). In fact, it has been observed that in government offices computers are mainly used for word processing, personal e-mail correspondence, accounting

and internet browsing (Hasan, 2003). Similarly, although the number of mobile phones has increased significantly, it is not being widely used for providing or accessing online services.

Fourth, internet diffusion is very low, largely concentrated in urban areas with the existing VSAT line being very slow and technically defective. The installed broadband lines are only concentrated in large cities and elsewhere in the country it only reaches up to the district and upazila (sub-district) headquarters. The spread of broadband network through installing fibre optics countrywide still remains a goal to be implemented.

Nevertheless, even after having established all of these infrastructural arrangements, it would be pointless if the ultimate users are not aware of the provision of such services or are incapable of handling the e-government options. Here Bangladesh faces the challenges of developing adequate human capital.

(3) Problems of Human Capital Development

Far from realising the ICT's wider application and developing a competent user group, in Bangladesh it is still seen as a hardware and software industry operable only by technical experts. Lack of literacy among the general masses and lack of efficiency among the government servants who are responsible for implementing e-government initiatives are posing a big threat to the development of human resources necessary for e- initiatives. This section addresses these inadequacies of human capital.

First, the lack of an adequate level of literacy posits a formidable challenge for the development of a competent user group in the country. The current literacy rate is .5033 out of 47.5 adult literacy rate and 56.011 of gross enrolment rate (UN, 2008). This low level of literacy makes it difficult for nearly half of the population to understand any meaning of e-government.

Second, at the secondary level of education since 'Computer Science' has been made optional, many students do not choose the subject. In addition, though many projects are underway to provide IT to schools

and colleges and other institutions for facilitating IT literacy among the incumbents, the optimum use of those equipments, especially at rural areas, is frustrated by setbacks such as interrupted power supply, poor location, unavailability of trained personnel, low motivation and awareness. Moreover, most of the training programmes provided by various institutes lack benchmarking in their syllabus and a technical capacity (Haque, 2006).

"Third, although the gross enrolment for IT education at the tertiary level is increasing, and a huge number of ICT graduates from different universities and institutes are coming out every year, they cannot be absorbed into the employment market and this leads to mismatch between market demands and IT education (Haque, 2006).

Fourth, lack of capacity among the policy makers and managers of e-government poses a significant challenge for launching e-initiatives in an effective way. A study by Emran et al (2008) found that the most significant barrier to the adoption of e-government in Bangladesh is the lack of knowledge among the government decision makers (26%), followed by attitudinal problem (15%), lack of political will (13%), planning and strategy (12%) and infrastructure (11%) and others. This can be further supported by the fact that only a few ministries and government agencies are capable enough to handle the ICT in their work processes (Sobhan *et. al.*, 2004).

For addressing these complex problems of online services, the infrastructure and the inadequacy of human capital, there is no denying the fact that an efficient management structure is required. But, like these above mentioned problems, management also suffers from numerous challenges.

(4) Management Challenges

A host of challenges can be identified that are related to management structure for which the goals and visions of e-government outlined in the policy directives could not be implemented. Based on the national ICT Policy of 2002, the ICT Policy Review Committee 2008 has identified 103 policy directives of 16 areas. It found that among these,

only 8 were fully or largely accomplished; 61 were partially accomplished and 34 remained unaddressed. A lack of coordination and ownership, a lack of specification of actors or implementing agencies in the policy document, and inadequate budgetary allocation have been attributed to be the major causes of this non-implementation (GoB, 2009).

A lack of coordination has resulted since the host of organizations carrying out the functions and managing the institutional frameworks for e-government often do so with scattered programmes and inadequate harmonization in providing integrated services to the citizen. There is no institutional framework that can ascertain the blurring boundaries between the functions and jurisdictions of different entities. For instance, training for human resource development is shared by a host of organizations like the BCC, the Prime Minister's office and the Establishment Ministry, and the lack of coordination among them results in choosing the same candidate for the same training more than once (Haque, 2006).

Lack of ownership is evident as most e-government projects in the country have been financed and managed by donor agencies that could not continue later due to inadequate resources and necessary human resource support. Though some projects are successful in this regard for developing ownership and receiving budgetary allocation, many projects have failed to be so, on both counts (Sobhan et. al., 2004).

Another important challenge comes from the lack of clarity and scope of confusion or conflicts between the roles and responsibilities of different ministries. Specifying the actors and identifying the policy directives in the 2009 ICT policy is certainly a positive initiative for ascertaining the specific responsibility. But, allocating the same job among different ministries and not making clear cut boundaries for each of them will not help much in achieving the goals.

Surpassing all these problems, resource constraints perhaps present the biggest challenge to the management for taking and implementing any e-government projects. In order to address the resource constraint necessary resource allocation through budgetary means is underscored for every ministry, department, and autonomous bodies for routine ICT activities. As a result, an ICT Development Fund has been created

through block grants in the annual budget to be accessed by public sector entities through a process of competition (GoB, 2009). But compared to the need, these efforts are very limited since resources are inadequate to address the issue across a broader perspective and government financing with limited revenue earning is simply inadequate to address the problem.

6.0 Findings and Policy Recommendations

6.1 Summary of Findings

E-government initiatives are only at the beginning stages in its attempt to address the digital demands in Bangladesh. The advancement in e-government around the world, as the theoretical part suggests, has not been materialised in Bangladesh with equal pace and scope. In all constituents of e-readiness i.e. the web initiatives, the infrastructure and the human capital, Bangladesh's position is far from the world average and one of the lowest in South Asia. In the web measure Index, though the number of webs has increased in recent times, most of them serve the purpose of merely being present without giving substantial scope for interaction and engagement in transactions. Though there are some websites with an enhanced presence and interactive features as we mentioned one in our case study, such as that of Electronic Birth Registration Information System (EBRIS) in the Rajshahi City Corporation, they still need further improvement and consolidation. For the EBRIS project, for instance, it is important to develop ownership since it is an externally funded project.

Bangladesh does not have adequate resources to build a robust infrastructure necessary for e-government. It is very difficult for poor citizens to afford the costs of personal computers, telephones and internet connections. With limited revenue earning, the government also does not have the ability to develop any vigorous infrastructure within a reasonable timeframe. In the telephone sector, though the number of mobile subscribers has increased in recent times, it only covers approximately 30% of the population; mobile phones are not widely used to provide online services. Only 2.42% of the population can afford PCs with heavy concentration in urban areas. Internet

accessibility is even much lower and, alarmingly, it is mostly concentrated in urban areas and, in many cases, with the slow and technically defective VSAT connection, Moreover, the major usages of technology for clerical needs and typing purposes or for personal causes, which are irrelevant to e-government, have made available infrastructure initiatives worthless,,

✓ The competent user group for the operation and for appropriate use of technology is far from developed. With half of the population being illiterate in Bangladesh, developing a competent user group is a formidable challenge. Similarly, human resource development for managing the technology suffers from a serious lack of drive and effort on the part of the government managers. The efforts to increase IT literacy are handicapped by infrastructural limits, inadequacy of good quality and standards, lack of trained personnel and awareness among the citizens, especially in rural areas.✓

To address these complex problems, it is needless to mention that developing a competent management structure is imperative. But, it has been evident that the management does not follow any coherent pattern and neither the policies are articulated in a specific way to discern the responsibilities of different entities involved in the management of e-government. Therefore, in order to make improvement in all these aspects of e-government, this paper recommends a few measures.

6.2 Policy Recommendations

i) The number of government webs should be increased and their contents need to be improved to give citizens a substantial scope for transactions, Portals should be established in a way that will deliver information based on the customer's perspective rather than the agency's perspective; there should be a reduction in costs for individuals and 24x7 availability; there should be less delay in accessing them and there should be more timely updated materials. Diversifying online services incorporating, among others, social services, personal benefits, e-taxations, licensing, public procurement,

bidding and so forth will ensure better efficiency and management in the service delivery and, consequently, reduce the chances of corruption and wastage. Moreover, citizens must have access to engage in interaction with the service providers and be clear about their needs and queries.

ii) Integrating webs and then providing one-stop services to the citizen through a coherent back office support is essential; Some lessons can be drawn from regional examples including the Singaporean e-Citizen portal or the South Korean portal that provide about 400 public services each (Sobhan et al, 2004). The potential thriving sectors in Bangladesh for integration are many. For instance, one sector where the felt necessity for integration is emergent is the land administration in district and sub-district levels. To provide one-stop services to the citizens, it is urgent to integrate through online initiatives the services of three offices such as the AC (Land) office, the sub-registry and the survey and settlement department (MoL, 2009). Similarly, to start an industrial set up in Bangladesh it is necessary to have licenses from 17 different offices which takes an unusual long time of two or three years to obtain resulting an adverse impact on investment prospects. Integration of the services of these different offices through web initiative will ensure speedy, transparent and accountable service delivery necessary for an attractive investment climate.

✓iii) Making available the existing web initiatives to all citizens is also important for bridging the digital divide, For instance, the online payment system for utility services is only available in big cities and towns, letting the vast majority of the rural masses without any idea of such measures. Using mobile phone SMS service in this regard can offer a solution to the problem making the widespread use of online payments of utility services across the country more viable.

iv) Since PCs are not affordable to most citizens, the alternative would be establishing internet kiosks in rural areas for the provision of e-services, Establishing internet kiosks for community access has been an effective model in low internet penetration countries such as Cambodia, India, Pakistan, and Sri Lanka. The Gyandoot project in

Madyapradesh of India, for example, has a cluster approach in building kiosks, each of them covering 25 to 30 villages (Kaushik, 2003). The kiosks can provide online most traditional services of government currently being provided manually by the upazila administration such as agriculture, land records, social welfare benefits, public auctions, education, health, etc. NGOs that have a wider base in rural areas can help in the running and establishing of such kiosks.

Another alternative for PCs can be mobile phone where the SMS can be a viable method to render some services. Mobile network covers almost all parts of the country and it emerged as a potential solution to the rural fixed telephone deficit in remote areas. So, it can be used to make information available regarding, weather forecast, disaster warning, payment of utility bills, and taxes of different types. Recent steps for making available the SSC and HSC results and payment of utility bills through mobile phones have earned wide appreciation. Mobile phones can also be used as modem for internet transmission on a wider scale as many operators have that facility across rural areas.

v) To overcome the inadequacy of fibre optical line, the alternative would be using electricity power lines known as Broadband Power Line Communication (BPLC) to transmit internet, which is adopted as a method in many developed countries (Mottalib, et al 2005, p.4). Up to the union, the lowest local government tier, there is electricity connection in most cases and that level can be used for setting kiosks connecting broadband transmission through electric power lines. It then can be connected to the upazila where the broadband or dial up connections already exist. However, the uninterrupted electricity supply for that is a must, which is inadequate at the present time.

vi) Uninterrupted power supply is also necessary for the running of PCs. In many remote villages of Bangladesh where there is no electricity the alternative to the problem would be the battery solution as has been experienced in the context of rural India. IIT Kanpur initiated a project equipped with a battery-powered facility, the 'Infothela' (Information Box), which is equipped with an assortment of

Internet and telecom facilities to impart the benefit of IT to people in remote areas (Singh, 2007).

vii) To address the resource constraints it is important to forge public-private partnerships (PPPs) that can mobilise private resources for public infrastructure, as has been experienced in many developing countries including India. The national ICT policy 2009 also envisions developing PPPs for providing cost-effective services to the citizens. Such partnerships can be established through financial investment in the form of BOO (build-own-operate), BOT (build-operate-transfer), or BOOT (build-own-operate-transfer) models. PPPs can cover areas like studying needs and feasibility for e-government projects, preparing plans for systems integration of different government agencies, designing architecture for e-government to ensure interoperability, scalability, and robustness, creating software applications, maintaining and updating ICT system and collecting the revenue for e-services (Sobhan *et. al.*, 2004).

viii) Building a competent user group through developing human resources in this sector is urgent. There is no substitute for increasing the literacy rate and gross enrolment ratio at primary, secondary and tertiary levels. In addition, the training curricula of different institutions need to be standardised in terms of their content and focus areas. In order to carry out all these works efficiently, trained and efficient management is required.

ix) In many pioneering e-government countries the management is done through an organization that plays the central role in coordination and integration as are the cases of Switzerland and Australia; In a similar move, the review committee in Bangladesh recommends transforming the ICT Task Force into a National ICT Council for better integration and coordination under which Bangladesh Computer Council (BCC) may act as the implementation arm in a more productive manner (GoB, 2009). Also, the existing ICT policies need to be operationalized framing appropriate rules that would make clear the blurring boundaries of different entities regarding respective jurisdictions and functions.

Finally, incorporating all these aspects of policy recommendations in an independent policy on e-government will certainly assist the setting up of strategic visions and goals, and for the finding of an effective solution to the problems of e-government in Bangladesh.

6.3 Conclusion

Thus, our discussion leads to the conclusion that e-government in Bangladesh is still in its infancy in terms of management, infrastructure, web initiatives and human capital development. Experimenting with all these alternative approaches, as discussed above, using proper guidelines and management strategies, can lead it towards maturity. The country must learn from the experiences of other developing countries, which, notwithstanding their limitations, have successfully implemented many digital initiatives. For innovation and policy acceptance from abroad there is no alternative to a vibrant and capable leadership that understands the magnitude of the problems and can lead toward strategic goals. More specifically, able political leadership and bureaucratic efficiency are vital to bringing efficacy in the online service delivery. With an increasing number of NGO operating across the country, the government can reach out to the people and ensure their access to online services to those living even in the remote regions if appropriate collaboration is developed. Like the present approach to the PPP regarding infrastructure projects, major e-government projects can be initiated and implemented under the similar models. Progress in the telecommunications sector is clearly evident as in areas like PC consumption as well as broadband networking. Similar progress is also reported from other fronts like increase in computer literacy, gross enrolment and adult literacy for necessary human capital. Thus, despite several types of constraints and impediments Bangladesh is advancing towards digital government, albeit slowly. Further progress in this regard and the realisation of the objectives of digital government require major drives. But to our mind the most important pre-requisite is the strategic leadership supported by unfettered commitment of the political and administrative elites to the tasks that lie ahead.

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