

An Information System Model for e-Government of Digital Bangladesh

Mohammad Abul Kashem , Nasim Akhtar and Anisur Rahman

Dhaka University of Engineering & Technology, Gazipur, Bangladesh

Summary

Digital Bangladesh is a proposal which involves the use of ICT for management, administration and governance to ensure transparency, accountability and answerability at all stages of people and state. Without the development of ICT sector, the dream of a Digital Bangladesh would be only a nightmare for the inhabitants. ICT is also a combination of physical structure and brain. Computers, Network equipments, Software, Wire and Wireless Connectivity Systems, Broadcast Hardware and many other Hardware and Accessories are the physical structure. The qualified persons behind the structure act as the brain. To materialize the idea of digital Bangladesh, development of countrywide structure and a large number of qualified human resources are the necessary. In this paper, we have proposed an effective Information System Model for implementing electronic governance (e-governance) and e-services in Bangladesh which is in a vision of developing into 'Digital Bangladesh'. We have also analyzed the vision of Digital Bangladesh and the need of e-governance for achieving that vision. Our Information system model guides the development of the new e-government architecture and handling the challenges of developing e-governance in Bangladesh emphasizing on the usage of available resources and facilitating e-services in various sectors of government. In addition, we offer precise recommendations for developing e-governance in the most feasible, cost-effective, and efficient manner.

Key words:

Digital Bangladesh, Database, e-Government, e-Service, Information System, Software.

1. Introduction

Information and Communication Technology (ICT) and the rapid development of Technological advances lead the age of Information and Digital revolution. This revolution has made a considerable impact on social, political, educational and cultural livelihood of mass people which took the whole world into a different era. Bangladesh, being one of the developing countries taking attempts strongly for building the nation by entering into global frontier through ICT. So a platform has been introduced for interaction among the Government, Businesses and citizens that assures trouble-free, accessibility and availability of information to all levels of the society. Implementation of 'Digital Bangladesh' was an election promise means appropriate use of technology to

materialize all the commitments of the government including the ones regarding education, health, employment and poverty mitigation. The key intention behind this idea is to improve the standards of livelihood of the citizens by empowering them, ensuring transparency and accountability in every sector of life, and setting up effective-governance and, above all, deliver public services to their thresholds through the most effective use of latest technologies. Mainly, upgrade of the attitudes by adopting new technologies, development of positive thinking and application of innovative powers are essential for establishing Digital Bangladesh. At the same time, the digital-divide in various regions and among poor and rich, educated and uneducated, men and women must be removed. Rapid development of information and communication technology (ICT) produces widespread opportunities for efficient and cost effective public service delivery. The implementation of 'Digital Bangladesh' will ensure the goal of transforming Bangladesh into a middle-income country by 2021. This vision, together with many inventive enterprises, will lead the country towards higher and sustainable growth path. For actualization of the Vision 2021, the Government aims to set up a Bangladesh where modern technology will be the driving force of the economy and take it to a higher trajectory of growth. It also aims to demonstrate its resilience against disasters caused by climate change and ultimately build a happy, prosperous and caring Bangladesh by promoting ICT and its effective use.

The fundamental building blocks of a Digital Bangladesh include four broad components:

- a) To develop of Human Resource: The key objective is to make the best use of new technologies to build world-class 21st century skills in all areas of study especially mathematics, science, and English language through use of newer and cost-effective delivery tools and digital learning contents. This component will also deal with providing vocational and 'lifelong education' opportunities to the youth and adults in order to retool them and build newer skills to improve their productivity commensurate with the needs of the 21st century globalized world.
- b) Linking peoples: The objective of this component is to find a sustainable connectivity channels to ensure the benefits of Digital Bangladesh reach the marginalized and

the disadvantaged. Innovative shared access outlets, awareness and capacity development of local communities to access public e-services, massive development of local language content and locally relevant content, and establishing two-way channels to promote participation of grassroots in policy Discourse are key focus areas.

c) e-Governance for Good Service Delivery: The key objective of the e-Governance component is to leverage ICTs in all spheres of Governance to ensure delivery of services to those who are the least served. Development of an Digitized-administration platform and creation of affordable, transparent electronic-services using ICTs that are already in the hands of millions such as mobile phones, radio, TV in addition to internet are key. Important areas to address are education, healthcare, agriculture, administration of land and water resources, social safety nets, law enforcement and judiciary and disaster management.

d) ICT in Business: This component will deal with three broad issues of Digital Bangladesh: using ICTs to promote access to markets by the disadvantaged producers and SMEs, promotion of ICT business through providing services and technology needed to sustain the three other components of Digital Bangladesh and boosting ICT as an export oriented sector to earn foreign currency and generate employment. M-banking and electronic payments as well as electronic business transactions are few key initiatives.

Digitization of Governance is undoubtedly essential for establishing a transparent and accountable Government and corruption-free administration. It is only with the best use of ICT that we can reach public services to people's doorsteps economically, efficiently and in a transparent manner.

Digitization of Governance is in actual fact the use of Information System (IS) to the activities of Government carrying out in order to bring 'Simple, Moral, Accountable, Responsive, Transparent' (SMART) governance. This would generally involve the use of Information System by government offices for any or all of the following causes:

Exchange of information with peoples, business organization or agents and non-government party or other government departments, Rapid and efficient delivery of public services, Upgrading domestic efficiency, cutting down overheads and increasing revenue, reformation of administrative processes, Improving quality and accurateness of services. Digital Government is a major change and planned tool that supports and simplifies governance for parties, government, citizens and businesses.

In the age of the information and communication technology (ICT) Digitization of Governance may use to make life easy by providing proper support using intelligence, speed and effective application of ICT. It is

necessary to make government more responsive, prompt and to make more sustainable future for the benefit of the whole society and world.

A proper Information system can realize the expected benefits of the digital Governance. An information system can be defined technically as a set of interrelated components that collect (or retrieve), process, store, and distribute information to support decision making coordination & control in an organization. In addition information systems help analyze problems, visualize complex subjects, and create new services. It produces the information that organizations need to make decisions, control operations, analyze problems, and create new products or services.

In this paper we have studied the importance of Computerized Information System based Governance for implementing the vision of digital Bangladesh as well as focuses on the issues, prospects and challenges of developing digital governance. Later we have proposed an Information system model for the digital governance. This study shows necessary environment of e-governance, existing tools and tools requirement of Digitization of Governance in Bangladesh. This report paper shows some guidelines of future research to further improvement of Digitization of Governance in Bangladesh.

2. Goal of e-government

E-governance is described as the application of hardware, software, internet and other information and communication technologies (ICT) to the functioning of government to bring about effective, efficient, transparent and accountable governance enabling the citizen to reap the maximum benefit from the government. It is a comprehensive tool for bringing a revolutionary change in the operation of the government through ensuring a system of speedy transaction and a system of check and balance. Electronic governance is defined as the application of information technology to the processes of government functioning in order to bring about simple, moral, accountable, responsive and transparent (SMART) governance. World Bank defined e-government as the use of information technologies (such as wide area networks, the internet, and mobile computing) by government agency that is able to transform relations with citizens, businesses, and other arms of government. Thus using technologies can have a variety of different ends: improved deliverance of public services to people, good communications with trade and industry, citizen empowerment through access to information, or more efficient government management. The resulting benefits can be less corruption, increased transparency, greater convenience, revenue growth, and/or cost reductions."

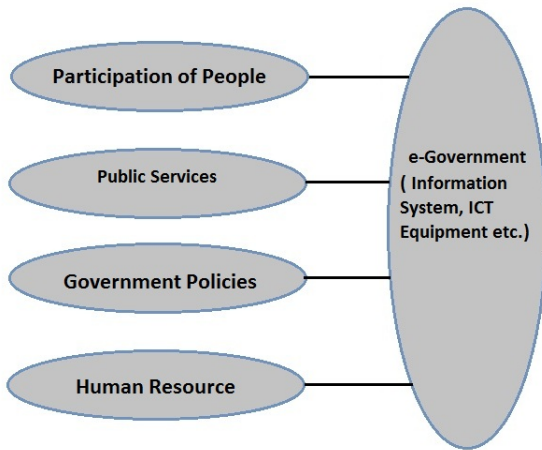


Fig 1. An e-Government Framework

The main goal of digitalizing the governance is to ensure good governance and realizing the democracy through easy access of the Information, public participation in governance and making the internal process and public service efficient. The concrete gains that an ICT based government can bring to broader governance transformation and economic advance initiatives in Bangladesh include: increasing transparency and accountability, reduce corruption, efficient and prompt service delivery, wider participation and deeper involvement of citizens, institutions, civil society groups and the private sector in the decision making process of governance greater transparency in government actions, efficient, cost-effective and responsive governance, people's participation in governance, promotion of a democratic society enhance foreign direct and domestic investment, reduces scope for corruption, more efficient, saving time and resources in the internal processes, provides simplicity, efficiency and accountability of management, greater citizen access to public information, more efficient services to citizens, make better the private sector performance and efficiency by reducing the time and expenses required for businesses to interact with the government, accountability in delivery of services to citizens, allows for decentralization of governance, allows greater scope for incorporation, allows learning from the past, information services, swift and secure communication, stimulating the local ICT industry, makes ICT relevant to the masses, convenient services to citizens and businesses etc.

The major objective of this paper is to derive an Information System model for e-government in Digital Bangladesh based on the context of socio-economic conditions of the Bangladesh as well as analysis of the implementation of this model

3. Related Works

A lot of researchers have examined the role of e-governance in terms of transparency and development of economy in a number of countries. Most of the researches focus on the acceptance of electronic means in management and communication aspects of governance and administration process.

Pathak, Singh, Belwal, and Smith (2007) mentioned the summary of a survey in Ethiopia on the factors that are source of corruption and the potential of e-Government to diminish corruption as well as suggested that e-governance can help in establishing more accountable governments.

Concerning Fiji and Ethiopia, Pathak et al. (2008) reported that e-governance can largely improve the government-citizen relationship and the reduction of corruption.

Pathak et al. (2009) analyzed sensing of public service deliverance in Fiji so as to discover the prospective of e-governance to reduce corruption and efficient governance. Monga (2008) exemplifies that e-governance, which is a prototype shift over the conventional approaches in public administration, and specified it as the representation of government services and information to the public using electronic means.

In contrast, Haque's study (2002) on India reports that, beyond the issue of public access and contribution, e-governance has not shown any promising results even in terms of service delivery.

Hamner and Al-Qahtani's study (2009) centers on the satisfactoriness of e-Government by citizens. They argue that it is a people-centric approach that determines the overall acceptability of e-Government to people in Saudi Arabia. Similarly, in the African context, Schuppan (2009) got that different institutional and cultural dimensions must be considered when to develop e-Government in sub-Saharan Africa. This study also recognized that, especially for African countries, a context-oriented approach seems to be a more hopeful way to the unbeaten implementation of e-Government.

Holliday (2002) evaluated the key ICT policy initiatives adopted by the Association of Southeast Asian Nations (ASEAN) and its partner states. The major finding is that e-governance activity in East and Southeast Asia is highly diverse, reflecting national strengths and weaknesses rather than regional capacity for policy change. This article argues that ASEAN must pay renewed attention to strategy to build e-Government through ICT progress, and thereby achieve the perceived regional development.

Siddiquee and Mohamed (2007) investigated the impact of service delivery innovations and reforms on governance in Malaysia's public sector and get that some of the successes incorporate collaboration between the public and private sectors; streamlining work procedures and methods with an emphasis on service quality and customer satisfaction;

client focus and accountability; and the use of ICT to improve quality of governance. However, major areas that need improvement include high incidence of corruption, bureaucratic inefficiency, the lack of competence and professionalism among public officials, and the lack of competitiveness.

Duncombe (2006) contributes to hypothesize about ICT and its association to progress by applying a "livelihood approach" as a structure of study. It takes rural micro-enterprise as an significant prospective area of ICT application in the context of Botswana. A vital ending of the study is that it provides some clue that new digital ICTs are playing a major role in the lives of the countryside poor. There is, however, proof that as the poor become less poor, the extent of separation from poverty is reduced proportionately to their ability to access and use ICTs.

Nagi and Hamdan (2009) in their research on Jordan got that, in compliance with the Royal vision, some policy and initiatives have been developed to establish Jordan as a regional organizer in the areas of information and economic development in the region. One of these initiatives is the implementation of e-Government, which offers various benefits: creating new jobs in public and private sectors, reducing illiteracy, improving transparency of government, effecting the growth of knowledge-based economy, and improving the delivery of services to both citizens and businesses for both government and society.

Heeks (2001) found that the use of ICT can make a significant contribution to the achievement of good governance. E-Governance can make governance more effective and efficient, and bring benefits to developing countries.

Analyzing case studies from countries such as the Philippines, Honduras, Chile, and South Korea, Heeks (2001) study outlines three key contributions of e-governance: improving government process (e-administration), connecting citizens (e-citizens and e-services), and building external interactions (e-society). Atiqur Rahman, Journalist, discusses e-government of Bangladesh. In order to do the work, both public and private sector should be made as an infusion of resources, leadership and ICT centered development. 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 and additionally, argues that the scope e-government under the digital Bangladesh is not yet clear and wide. It covers not only e-governance or e-commerce or e-banking, or operating a country-wide mobile phone network through which one can access the daily newspapers or other internet devices. To make it, every office has to be automated or computer based.

It is argued by Shahjahan H. Bhuiyan and examines the role that e-governance can play in the modernization of public administration for efficient and effective service delivery to the citizens of Bangladesh, as well as its potential to control corruption and reduce poverty.

Focusing on the above statements, Sadik Hasan discusses various technologies have been applied to support the unique characteristics of e-government, including electronic data interchange, interactive voice response, voice mail, email, web service delivery, virtual reality, and key public infrastructure. A coordinated effort of political leadership, bureaucrats, and private entrepreneurs could facilitate the desired development in the ICT sector and accelerate the presence of e-government in Bangladesh. It defined e-government as "utilizing the internet and the world-wide-web for delivering government information and services to citizens."

Tuomas Poysti discusses the information law as one of the important tools of the e-government in varieties of ways and means internationally. The author emphasizes the information Act, legal information, ICT legal issues, informational justice systems etc.

The potential of e-Government practices to promote transparency has been discussed by N. Rashid. It explains how the application of Internet-based technologies/e-government can under certain circumstances, encourage transparency, openness and better governance.

In the recent literature regarding implementation of electronic governance, G. Islam et al. propose network architecture, database and software aspects for implementation of electronic governance in Bangladesh. Their proposed model is based on a separate layout for rural and urban areas. This paper limits on the illustration of hierarchy model of infrastructure arrangement and doesn't propose any complete architecture or timeline based implementation policy for e-governance in Bangladesh.

Sobhan et al. presents the tangible benefits of e-governance in Bangladesh with illustration of e-government readiness through a survey in. A couple of case studies have also been focused with an aim to pointing the challenges and implications of e-governance in Bangladesh.

As-Saber et al. has provided a comprehensive study on the Information technology law and e-governance from Bangladesh perspective. They focus on the major concerns for policy documentations of electronic governance.

V. Ndou presents a detailed overview of e-governance and related terminologies with comparative analysis of e-governance status in comparison with developed countries. The opportunities of electronic governance has also been investigated in some papers which includes, Cost reduction and efficiency gains, Quality of service delivery to businesses, transparency, anticorruption, accountability

attainment, increase in the capacity of government reach, network and community creation to Improve the quality of decision making and promote use of ICT in other sectors of the society. Analyzing a number of case studies (which doesn't include any from Bangladesh), V. Ndou also figures out a couple of challenges in implementing e-governance.

In a research, several issues regarding the status, potential and barriers for grounding electronic governance adoption has been discussed for Vietnam. Conducting an interview based analysis; the authors have represented e-Government

from demand side and have depicted the aspects of getting information for the non-users.

4. Proposed Information System model architecture

In Bangladesh, there are a lot of challenges in developing e-government e.g. Lack of ICT Support (Internet facility, communication backbone etc), lack skilled human resources, Power shortage, lack of legal support, Natural disasters etc. So an effective, sustainable and flexible Information System (IS) is required to implement the e-government.

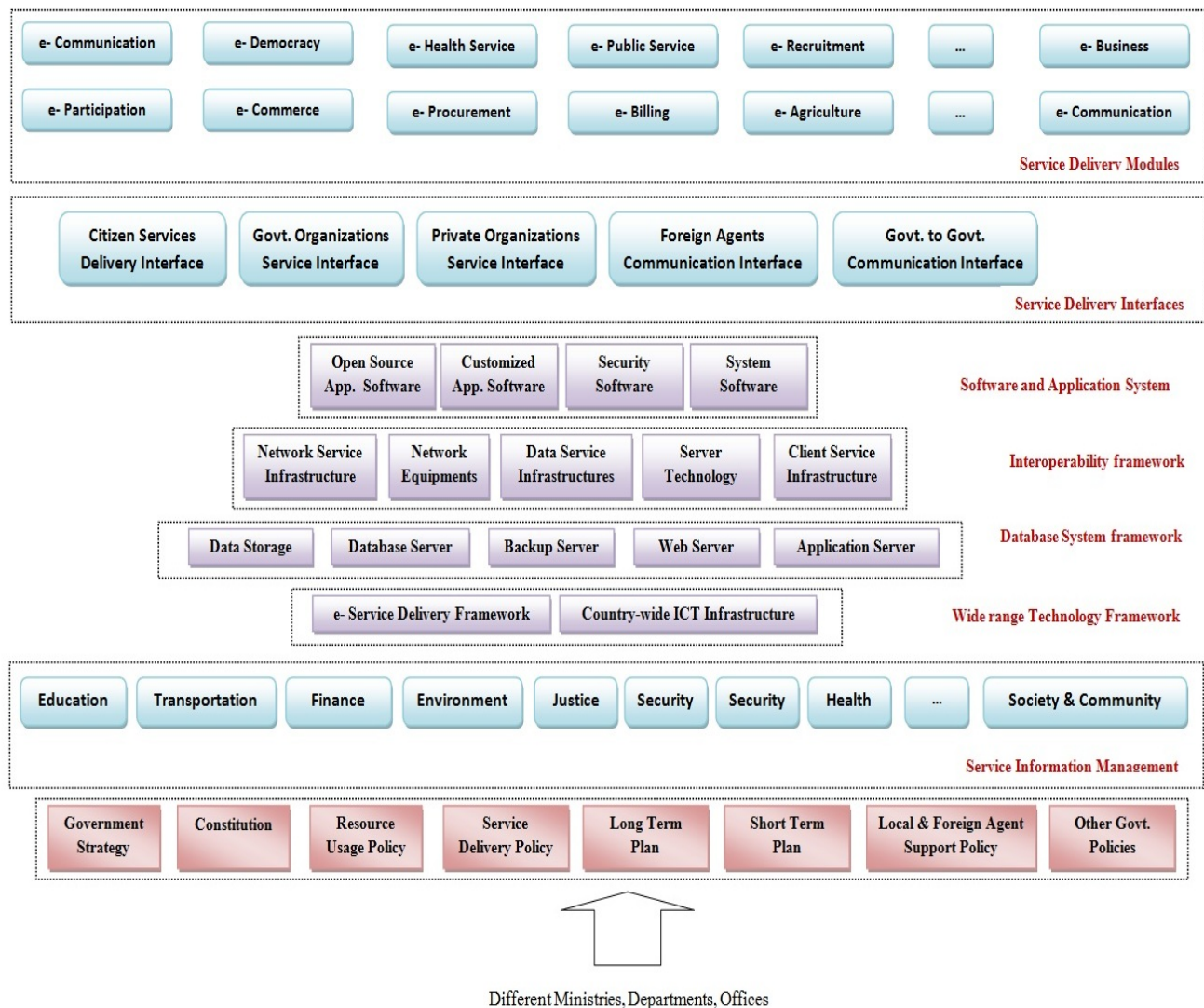


Fig 2. Proposed Information System Model for e-Government of Digital Bangladesh

In this paper we have proposed an Information System model for the e- government of Digital Bangladesh which is the core of the e-government.

The proposed System model is developed by considering the development hierarchy of e-governance with utmost use of existing infrastructure and available technologies. In the development of our model, we have considered several promising issues e.g. Government Policy, Strategic Plan, implementation overhead etc. An outline of the System model has been presented in figure 2. In this part we go over the main points of the phases of Information System model, with detailed components and. The proposed model is centered on the financial and technological views of the country that comprise of economic conditions of the citizens as well as the government, available engineering and technological supports, existing skilled and non-skilled human resources, nature, culture and traditions of the country, literacy rate and the overall environment. Success (or failure) of e-governance system is dependent on the implementation time of the system, the quality of the services provided as well as the acceptance of the citizen and employees of the related organizations. As e-governance system is the summation of heterogeneous multidimensional services, participation of the huge amount of Information, use of a lot of new technologies with a new way that aims to provide better access to information and equal participation of citizens in management process;

4. Analysis of the Proposed Information System model for implementing e-government

Implementation of e-Government is a combination of several technologies, different systems, various peoples, multidimensional aspects as well as a number of development phases. In order to facilitate e-governance, some development phases must be observed. In phase 1, considering the current government strategy and policy, some planning and design should be done which will include the Hardware and software specification as well as sequence of execution based on the structure of proposed Information system.

At the primary stage, we must implement the country-wide communication infrastructure. This infrastructure support must be reasonably priced and efficient for the citizens as well as organizations. Establish and maintain the Local Area Network (LAN) and WAN where necessary. Units of government organizations got connected to sharing of information and flow of data between different government entities. Communication network should include both the wired and wireless to reach at the remote area of the

countryside. Bangladesh has already joined in the information super highway. Fiber-optic based ICT-infrastructure would be available soon. Bangladesh has been advanced in Mobile communication and technology including introduction of 3G technology and Smart Phones. So while developing the country-wide large communication infrastructure, mobile network technology should be preferred.

Being a developing country, Bangladesh is not ready to set up e-governance in all the departments at a time. So, It is important to Bangladesh that e-governance have to be implemented hierarchically. Govt. Sectors should be prioritizing in terms of usefulness, effectiveness, functionality and liability of providing services. The wrong identification of the sectors may put at risk the total plan of implementation of e-governance. This prioritization procedure should consider the interdependence and intercommunication among various service-providing sectors for ensuring a consistent, functional and effective analysis to implement e-governance. In the next stage, Information, methodology and functionality of each sector should be recognized, check for the feasibility and should be organized in a structured manner so that appropriate information can be served at the time of request. It should involve citizens as well as system analysts and government officials of all levels. In all departments there should be availability of personal computers, other essential IT-equipment and system software to all the functionaries. The use of computers began with word, Excel, power point and quickly followed by data processing. The technology universities and other ICT organizations can support Information management process primarily by providing their skilled IT-experts and concerned human resource. The demand of e-Government is huge sized data warehouses to be implemented and manage since it is a large-scale system including growing information size. For faster, reliable and consistent database development for Information system, centrally managed distributed database system may be the most helpful. It is also required to consider web and WAP-support for all levels of design and development of services relating e-governance.

The commitment of e-Government is to involve the participation of the citizens in decision-making, policy making, goal selection, quickest service delivery, development of good governance, corruption-free and success-oriented environment. To achieve this goal, peoples should be informed easily about all the sectors and services of e-governance. This communication can be made using traditional communication media. SMS, MMS etc. are efficient tools in communicating for the adaptation of e-governance in various sectors. Providing citizen-incentive lucrative facilities and services electronically

through e-governance may bring rapid attention of the citizens.

The adaptability and effectiveness of the e-governance depends primarily on the citizens, as they are the stakeholders of e-government. It should be taken into consideration that, the first language of Bangladesh is Bengali. So, it would be most effective to ensure the use of Bengali in implementation of e- government for conveying information. The use of Unicode in representation of Bengali text is also expected to facilitate uniform and massively accessible platform. So, the Next stage is to purchase and develop system and application software. Robust, secured and reliable software based on open source and customized should be developed. Manage and support is a key issue for the system and applications which should be carefully handled. The integration of the facility to provide comments and other information through internet may guarantee the participation of citizens in decision-making and various multidimensional service-oriented processes.

The Next stage is IT Training. As a human being we don't like to go through a technological changing or new environment especially where we are not habituated. To be user friendly and habituated we need training and go step by step. Provide relevant training courses to the officers/ staff that enable them to work on computers by using various applications. To make the services easy for the citizens' proper tutorials and instructions should be given as necessary. Basic working principles and types of services offered by government should advertise over the press media, television, radio etc. It will cause the awareness of the citizen about the benefits of the e-government.

5. Conclusion

By Conducting a general derivation and analysis on the usefulness and effectiveness of the Information system implementation we generate the idea behind developing various e-services e.g. e-Administration, e-Democracy provided here. A detailed Information system model required to develop the e-government fit for the Digital Bangladesh has been derived and analyzed in this paper. We also present definite recommendations for designing, developing and managing the e- government system in Bangladesh. The development of e- government is the only means left to boost the country into a corruption-free developed nation.

References

[1] Alam, M. and Islam, M. S., "E-Governance: Infrastructure and Implementation Challenges in Bangladesh",

- Proceedings of 10th International Conference on Computer and Information Technology, 2007, Dhaka, Bangladesh.
- [2] Brendan, "Electronic Government for New Zealand: Managing the Transition", Thesis of MBA, Alfred P. Sloan School of Management, 2000.
- [3] Backus, M., "E-Governance in Developing Countries", IICD Research Brief No-1, 2001.
- [4] Das, S., Sharma, L. N., and Gogol, A. K., "ICT Infrastructures in Indian Villages", Proceedings of 7th International Conference on Computer and Information Technology, December 2004, Dhaka, Bangladesh.
- [5] Sambamurthy, V. and Zmud, R., "Arrangements for information technology governance: a theory of multiple contingencies". *Management Information Systems Quarterly*, 1999, Vol. 23, pp. 261-290.
- [6] Spafford, G., "The Benefits of Standard IT Governance Frameworks", *IT Management*, 2000.
- [7] D. Net (Development through Access to Network Resources), "Handbook On Implementing E-Government With Basic Introduction To E-Commerce", Academy for Planning and Development (APD), 2004, pp 25-26.
- [8] Itekhhar Ali Chowdhury, Md. Shahidul Islam, and Zahid Hasan Mahmood, "Journey towards E-Governance: A Bangladesh Perspective", Proceedings of 7th International Conference on Computer and Information Technology, December 2004, Dhaka, Bangladesh.
- [9] E. Turban, j. Lee, D. King, and H. M. Chung, "Electronic Commerce: A Managerial Perspective", 2000, p 451.
- [10] Md. Abdul Mottalib, Sheikh Faridul Hasan, Syed Khairuzzaman Tanbeer, "BPLC: Proposed Approach to Implement E-governance in Remote Areas of Developing Countries", *International Academy of CIO (IAC)*, Japan, 2006.
- [11] "E-Governance Horizon Scan Report: An assessment study of e-Governance in Bangladesh", Access To Information (A2I) Program, Chief Adviser's office , Government of the People's Republic of Bangladesh, December 2007.
- [12] Proceedings of 7th International Conference on Computer and Information Technology, 26-28 December 2004, Dhaka, Bangladesh.
- [13] World Summit on the Information Society, Plan of Action, 12 December 2003.
- [14] Shah Murtaza Rashid Al-Masud, "Does the Digital Divide Still Exist", Proceedings of 7th International Conference on Computer and Information Technology, 26-28 December 2004, Dhaka, Bangladesh.
- [15] Farooq Sobhan, M. Shafiullah, Zahid Hossain, Mridul Chowdhury, "Study of e-Government in Bangladesh", Research Report, Bangladesh Enterprise Institute, Bangladesh. April 2004.
- [16] S. A. Ahsan Rajon, "Broadband Over Power Line Communication: Prospects and Problems in the Context of Bangladesh ", Proceedings of International Conference on Electronics, Computer and Communication, Rajshahi, Bangladesh, June 2008.
- [17] Michiel Backus, "E-Governance and Developing Countries: Introduction and Examples", Research Report, International Institute for Communication and Development (IICD), No. 3, April 2001.

- [18] Stephen A. Ronaghan, "Benchmarking E-government: A Global Perspective - Assessing the UN Member States", Final Report, United Nations Division for Public Economics and Public Administration and American Society for Public Administration, New York, May, 2002.
- [19] Melissa Teasdale, "Government in the Palm of Your Hand", Proceedings of EURO m-GOV 2005, Brighton, UK, July 10-12 2005.
- [20] A Y M Ekramul Hoque, Abdur Rashid Sikder, Md. Shamsul Alam, "Statistics for Monitoring Attainment of MDGs in Bangladesh", Bangladesh Bureau Statistics, Bangladesh.
- [21] Valentina Dardha Ndou, "E – Government for Developing Countries: Opportunities and Challenges", the Electronic Journal on Information Systems in Developing Countries, EJISDC (2004) 18, 1, 1-24.
- [22] Bhasker Mukerji, Vinod Kumar and Uma Kumar, "The Challenges of Adopting Open Source Software in Promoting E-government", Technology in Government, GIFT Publishing, Global Institute of Flexible Systems Management, New Delhi, 2006, pg. 22-31.
- [23] Ala M. Abu-Samaha and Yara Abdel Samad, "Challenges to the Jordanian Electronic Government Initiative", Journal of Business Systems, Governance and Ethics, Vol 2, No 3, 2007, pg. 101-104.
- [24] Md. Anisur Rahman, "Access to Global Information—A case of Digital Divide in Bangladesh", 2007,
- [25] Sanjib Das L. N. Sharma A. K. Gogoi, "Enabling E-Governance for Low Bit Rate Network through Rural ICT Infrastructures in Indian Villages", Proceedings of 7th International Conference on Computer And Information Technology 26-28 December 2004, Dhaka, Bangladesh.
- [26] Md. Anisur Rahman, Md. Sahadat Hossain, "A Comprehensive Concurrency Control Technique for Real-Time Database System ", GJCST Volume 13 Issue 2 Version 1.0 Year 2013 pp.1-4 .
- [27] Gazi Zahirul Islam, Md. Ibrahim Khan, Md. Anas Boksh Mazady, "Developing a Model of E-governance for Urban and Rural Areas of Bangladesh", Proceedings of 11th International Conference on Computer and Information Technology (ICCIT' 2008) 25-27 December, 2008, Khulna, Bangladesh, pp. 587-592.
- [28] S. A. Ahsan Rajon and Sk. Ali Zaman, "Implementation of E-Governance: Only Way to Build a Corruption-Free Bangladesh", Proceedings of 11th International Conference on Computer and Information Technology (ICCIT' 2008), 25-27 December, 2008, Khulna, Bangladesh, pp. 430-435.
- [29] Nguyen Tuyen Thanh, and Nguyen Hai Thi Thanh, "Grounding e-Government in Vietnam: Bringing more government services to citizens", Proceedings of Vietnam E-Government Symposium, 2007.
- [30] Clay G. WESCOTT, "E-Government in the Asia-Pacific Region: Progress and Challenges", Systemics, Cybernetics and Informatics Volume 3 -Number 6, 2006, Pp. 37-42
- [31] Sharif N As-Saber, Aashish Srivastava, Khalid Hossain, "Information Technology Law and E-government: A Developing Country Perspective", JOAAG, Vol. 1. No. 1, 2006, pp. 84-101
- [32] Nahid Rashid, "E-Government as a Tool to Promote Transparency and Openness: the Case of Bangladesh", Proceedings of 5th International Conference on e-Government, Suffolk University, Boston, USA 19-20 October 2009.
- [33] Iwasokun Gabriel Babatunde, Olabode Olatunbosun and Oluwadare Samuel Adebayo, "Analytic Study of the Level of Incursion of ICT in the Nigerian Local Governments", IJAR-CSIT 1(2): p. 1 – 24.
- [34] Md. Abdul Karim, "Digital Bangladesh for Good governance", Bangladesh Development Forum, Bangabandhu International Conference Centre, 15 -16 February, 2010.
- [35] Thompson s.h. Teo, shirish c. Srivastava, and li jiang, "Trust and Electronic Government Success: An Empirical Study.", Journal of Management
- [36] Information Systems, 2008–9, Vol. 25, No. 3, pp. 99–131.
- [37] Md. Anisur Rahman, "An Efficient Concurrency Control Technique for Mobile Database Environment", GJCST Volume 13 Issue 2 Version 1.0 Year 2013 pp.17-21.
- [38] Bhuiyan, M.S.H. "E-Government Applications in Bangladesh: Status and Challenges." The Proceedings of the 4th International Conference on Theory and Practice of Electronic Governance (ICEGOV), 25-28 October 2010, Beijing, China. www.icegov.org
- [39] Axelsson, K., Melin, U. & Lindgren, I. "Developing public eServices for several stakeholders – A multifaceted view of the needs for an eService", 17th European Conference on Information Systems, 2009, Viena, Austria.
- [40] BBS. "Statistical Pocket Book of Bangladesh", 2008, Bangladesh Bureau of Statistics (BBS), January 2009. Ministry of Planning, Government of Bangladesh. [Online], Available: www.bbs.gov.bd [10 February 2010]
- [41] M. Mozammel Hoque Chowdhury, "The Role of E-Governance towards Citizen Welfare in the Developing Countries: Perspective Bangladesh", International Conference of e-CASE 2009, Singapore, January 8-10, 2009.
- [42] Babu, H. M. H, "IT work plan for implementing digital Bangladesh (in Bengali).", 2009, Computer Jagat, 18(12), 37–39.