A COMPARATIVE ANALYSIS OF ICT DEVELOPMENTS IN DEVELOPING AND DEVELOPED COUNTRIES

A.K.M. Muzahidul ISLAM
(Corresponding Author), Malaysia-Japan Int'l Institute of Technology (MJIIT), e-mail:
akmmislam@ic.utm.my OR *islam_muzahidul@yahoo.com*

Lalitha Bhavani JIVANADHAM
Advanced Informatics School (AIS), Universiti Teknologi Malaysia, 54100 Kuala Lumpur, Malaysia

Nafees MANSOOR
Malaysia-Japan Int'l Institute of Technology (MJIIT)

Sabariah BAHARUN
Malaysia-Japan Int'l Institute of Technology (MJIIT)

Shamsunnahar KHANAM
Graduate School of Environmental and Life Sciences
Toyohashi University of Technology, 441-8580 Aichi, Japan

Abstract

The most exposed advancement in this era of globalization has been the Information and Communication Technology (ICT) influx. It has turned the world into a global village with boundless connectively, interactive organizations, information sharing and infinite accesses across the globe. It is a cross-cutting issue as well as an indispensable instrument for social and economic development. For decades ICT has been playing an important role in creating employment, hovering work skills and production. The adoption of ICT can dramatically reduce corruption from a society, thus can bring forward-looking governance in the country. The life and livelihood of a large number of populations, especially those living in rural areas, cannot be developed without utilizing the ICT scope for them. However, Bangladesh, a developing country, with huge potential, despite many problems still far away from using ICT, when the whole world is getting developed with the blessings of ICT. Malaysia, another developing country, was once seen as potential high-tech hub that is downplaying its role now and has focused on developing its own infrastructure. On the other hand, Japan as a developed country and one of the top industrialized countries in the world, has been able to exploit the all-out paybacks from ICT till date.

In this paper, we provide a comprehensive empirical analysis on Information and Communication in developing and developed countries where Bangladesh, Malaysia and Japan are the study regions. We also provide a comparative analysis, raise some future challenges and describe the steps taken forward for the ICT development in these regions before providing a set of recommendations for these nations which also can be adopted by other developing countries.

Keywords: Information and Communication Technology (ICT), Internet, Fixed Line, Cellular Phone, E-Governance.

JEL, **classification** R10, R40, R30

1. Introduction

In recent years, Information and Communication Technology (ICT) is playing one of the key roles in advancement of a nation. It covers the vast area of information, communication and the telecommunication technologies. ICT categorically processes information and ensures connectivity. In this modern era, without the development of ICT sector the dream of a digitization of a country would be a distant dream. However, ICT is only a technology, a technology or a machine could not be functional without human where humans are the driving force in establishing an idea in to society and state. Indeed, Information and Communication Technology is a combination of physical backbone and

the skilled human capital behind the backbone. Physical backbone could be the hardware and accessories e.g., computers, network devices and connectivity and software.

In the era of globalization, ICT is a cross-cutting issue as well as an essential tool for economic development. It can play an important role in creating employment, raising work skills and production. The adoption of ICT can lead to corruption-free, citizen-centric and forward-looking governance in the country. The life and livelihood of a large number of populations, especially people living in the rural areas, can be developed by facilitating ICT equipment. As a whole it can ensure transparency, accountability and answerability at all levels of society and state.

In this paper, we provide an empirical analysis of ICT sectors in developing and developed countries where we choose Bangladesh, Malaysia and Japan as study regions. The two main reasons of choosing these countries are: i) Research area of interest and ii) Accessibility of Information. It is to be noted that Bangladesh and Malaysia fall under developing countries, whereas Japan is a developed country. The main objective of this paper is to study the ICT sector development of these countries. Make a comparative analysis of these countries and to point out the ICT gaps between developing and developed countries. Finally, to make some recommendation to tire downs the gaps to lead the developing countries towards the developed world through ICT. We believe that the study will benefit the developing countries to understand their limitations that will ultimately help the decision makers to plan well towards digitize their vision 2020.

With a population of more than 150 million and a total land of 147,570 km^2, Bangladesh, located in the south Asia (see Figure 1), is considered as one of the most densely populated countries in the world. As a developing country, Bangladesh needs the blessing of ICT for the development of the country. To materialize the idea of digital Bangladesh, development of countrywide backbone and expected number of human recourses are the basic needs. However, availability, accessibility and affordability must be ensured.

Moving down to south east of Bangladesh as shown in Figure 1, Malaysia was once seen as potential high-tech hub that is downplaying its role now and has focused on developing its own infrastructure. However, Malaysia had successfully developed "one of the most advanced telecom environments in the developing world". Indeed with a population of little more than 28 million and a total area of 329,847 Km^2, Malaysia is one of the top developing countries that have done a huge improvement in the ICT sector in the past few years. Malaysia's telecom industry is consolidating but still expanding as mobile growth soars to 90% of its 28 million populations using mobile services. Wired telecommunication though is a more matured market, the usage is seen declining [1].

Besides Bangladesh and Malaysia the other country that is studied is Japan. Japan is one of the developed nations in Asia, which fully utilizes ICT almost in every sphere of its economy. Japan, an island nation located in the Pacific Ocean which lies at the east of the Sea of Japan, China, North Korea, South Korea and Russia, stretching from the Sea of Okhotsk in the north to the East China Sea and Taiwan in the south as shown in Figure 1. It has the world's tenth-largest population, with 127.3 million people and area of 377,944 km^2, Japan is considered as one of the super powers of current time as it has the world's third-largest economy by nominal GDP and fourth-largest economy by purchasing power parity. Japan is also world's fourth-largest exporter and importer.

In reality, the home fibre connectivity gives Japan a huge boost in the country's ICT sector. High Definition (HD) Image Technology, Home Network, and Mobile Equipment Technology are the main areas where Japan has made a big improvement. In the areas like Optical Transmission Technologies such as WDM (Wavelength Division Multiplexing) and PON (Passive Optical Network), Japan has achieved a big improvement. Audio technologies, AV terminal/imaging terminal technologies, Integrated/Process technologies are some other sectors where Japan gets a lot of world's attention.
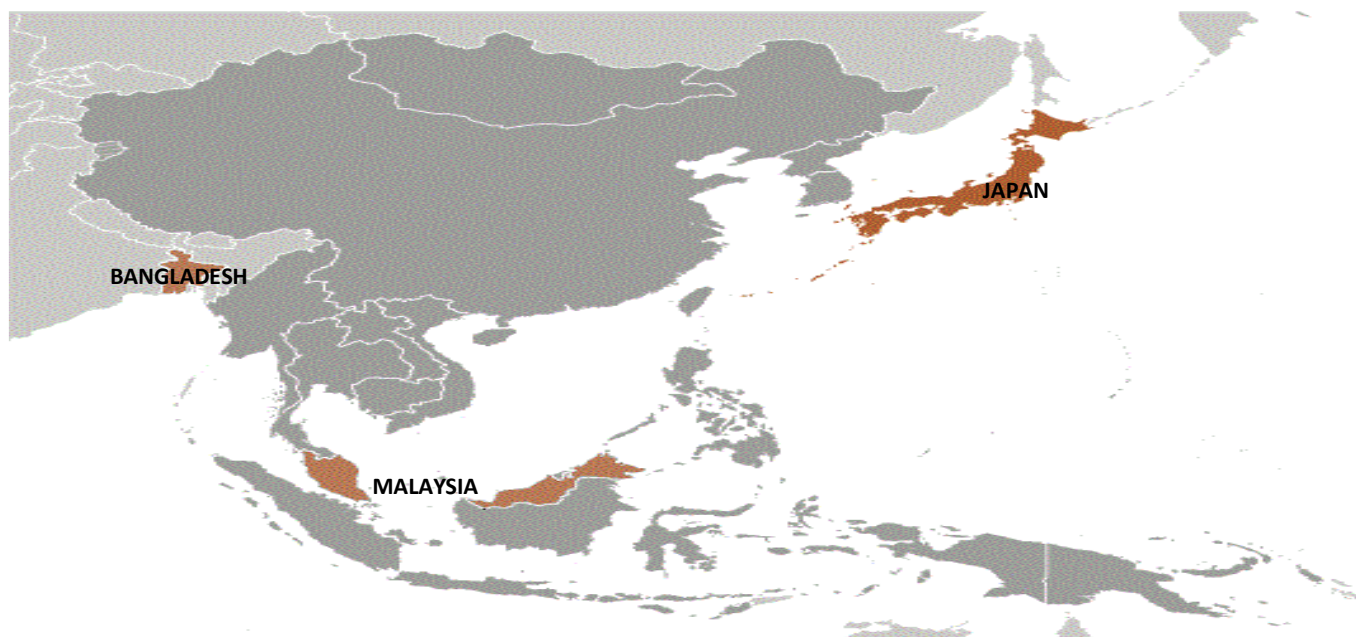
Figure 43: Geographical Location of Bangladesh, Malaysia and Japan

Figure 1 illustrates the geographical location of Bangladesh, Malaysia and Japan. These three countries are in the Asia continent. Bangladesh and Malaysia are two economically developing countries in this continent where as Japan in the most economically developed country in the region.

In this paper, we study the ICT sector of these countries in depth. We analysis their strength and weekness that facilitate to boost up the countries economy. Based on the study we make some recommendation to faciliate their ICT sectors.

The rest of the paper is organized as follows. In Sections 2, 3 and 4, ICT sector of Bangladesh, Malaysia and Japan is demonstrated, respectively. In Section 5, the steps that have been taken forward for their ICT developments are presented. Later in Section 6, a comparative analysis of ICT sector between Bangladesh, Malaysia and Japan is delivered whereas in Section 7, we raise some issues and future challenge. Subsequently in Section 8, a set of recommendations is suggested that could be adopted by the developing countries for the development of their nations by maximising the usage of ICT and finally in Section 9 we present the concluding remarks.

2. ICT in Bangladesh

The ICT sector in Bangladesh has started its journey when the Atomic Energy Centre, Dhaka and some universities have taken place in using computers back in 1964 [2].   However, the formal education in computers was first introduced in 1984 with the foundation of Computer Science and Engineering Department in the Bangladesh University of Engineering and Technology (BUET). Nowadays, a thousand number of ICT related graduate every year Bangladesh is producing from around 35 Public and 51 Private Universities.

In the year 1998, the government has decided to withdraw all import duties and VAT from all computer hardware and software which has brought computers close to the middle income households. Later, in October 2002, the Government of Bangladesh issued its National Information and Communication Technology (ICT) Policy stating the importance of this sector and referring to the designation granted by the Prime Minister as a thrust sector. As a result, now the total number of computer user is about 20 Million. Over 3000 Bangladeshi NRB (Non Resident Bangladeshi) IT professionals employed only in North America.

The Internet came in 1993 to Bangladesh. The government has decided to allow private companies to act as Internet Services Providers (ISPs) using VSATs in mid-1996. More than 180 ISPs are now operating in Bangladesh. As of 2011, the total number of internet user in Bangladesh is over 1 Million which is only about 1% of the total population. Though broadband internet access is available it charges high for high speed connection than other south Asian countries, though this is rapidly changing.

The telecommunications and information technology sectors in Bangladesh are still very poor. In Bangladesh, the total number of PSTN Phone Subscribers has reached 1.03 million at the end of May 2010, whereas the total number of Mobile Phone Active Subscribers has reached 82.442 million at the end of October 2011 [4]. The mobile sector in Bangladesh contributed a total of BDT 260 billion to the economy in 2007. The number of Internet subscribers in Bangladesh is expected to reach 18.3 million by the year 2020– translating to a 32 percent household Internet penetration at around the same time. This increased internet penetration would resulted in 2.6 per cent contribution to the country's GDP by 2020 while creating 129 thousand more jobs by the same year.

In Bangladesh, Broadband internet and e-commerce is slowly progressing. WiMAX service is now available from some internet service providers. However, Broadband is legally defined as 128/128 kbit/s, which is not in line with (International Telecommunication Union) ITU. Therefore, most of the Broadband internet services and also subscribers are using bandwidth that may not be considered a broadband in other countries and may not be broadband in international standards [3].

3. ICT Sector in Malaysia

In Malaysia the first computer system is implemented in 1966. The first Smart School was launched in July 1997. Subsequently, the government has introduced various initiatives to facilitate the greater adoption and diffusion of ICT to improve capacities in every field of business, industry, education, and life in general. Malaysia has a long-term vision usually referred to as "Vision 2020" which calls for sustained, productivity-driven growth, which it believes could be achieved only with a technology literature, critically thinking workforce prepared to participate fully in the global economy of the 21st century [5].

Technological advancement is a key success factor in this industry. Currently, the industry is saturated with wired and wireless telecommunication technology. Malaysia presently has an adequate copper analogue system that is being replaced and expanded upon by a new digital fibre optic cable network as demand for capacity increases. This allows the introduction of advanced telecommunications services in the country. Currently only fibre-trunks constitute the backbone of the major telecommunications exchanges [6]. The optical fibre trunk implemented by Telekom Malaysia Berhad is the largest integrated solutions provider in Malaysia, and one of Asia's leading communications companies. Wireless technology is another option to provide wider broadband access solutions. Initially, wireless networks were considered as a solution for providing telecommunication facilities to rural areas and lightly populated areas where it was difficult to provide conventional wire-line networks as the cost of wireless networks were competitively higher.

Technological developments in the wireless facility during the last one decade have completely changed the telecommunication scenario in Malaysia. On account of reduction in the cost of the equipment, ease of installation, operation and maintenance, flexibility for service providers and convenience to end users mobile services have taken over the fixed line network. Wherever the penetration of copper loops is not widely spread, the laying of new copper cables and optical fibre cables is an expensive option due to high operational cost. Therefore, wireless based access is an ideal solution for widespread coverage through a combination of different technologies like WIMAX and Wi-Fi. These technologies have the added advantage of interoperability and economy of scale due to international standardization. However, the deployment of any wireless technology requires suitable and sufficient spectrum availability and efficient utilization.

Wireless data communication technology that has deployed in Malaysia includes 3G (International Mobile Telecommunications-2000) services, WIMAX (Worldwide Interoperability for Microwave Access) and Wi-Fi [7].

The year 1995 was considered the beginning of the Internet age in Malaysia. The growth in the number of Internet hosts in Malaysia began around 1996. According to the first Malaysian Internet survey conducted from October to November 1995 by MIMOS and Beta Interactive Services, one out of every thousand Malaysians had access to the Internet (20,000 Internet users out of a population of 20 million) (Beta Interactive Services, 1996). In 1998, this number grew to 2.6% of the population [8].

Broadband penetration in Malaysia is gaining more attention as the citizens are shifting towards knowledge-based nation. The surge of bloggers in Malaysia, fuelled by the local bloggers community helps to boost the broadband adoption among Malaysians. As the society advances towards the era of High Definition digital distribution of contents, consumers demand greater bandwidth capacity for their internet connectivity. It is apparent that there is a booming demand for higher bandwidth broadband packages. Malaysians in general are pessimistic towards the services provided by the telecommunication providers in Malaysia. There has been a plague of poor services provided by the major telecommunication providers on their internet connections, causing consumers to complaint about slow internet connections and not getting the amount of bandwidth as advertised. Most of these are because of poorly-maintained last-mile copper connections and network congestions.

4. ICT Sector in Japan

The rapid development of information communication technology (ICT) has underpinned Japan's economic growth for the last few decades. Japan, one of the top industrialized countries, has been able to exploit the all-out paybacks from ICT till date. Japanese companies, the main actors in encouraging ICT investment, have been benefitted most from ICT. With the introduction of 'IT New Reform Strategy' and 'U-Japan' [9], Japanese government has been able to put the country to sit in the group of the front-runners in IT these days.

Japan has made sequential national ICT policies since around 2000, with the aim of fostering an advanced ICT network society. The Information Technology Basic Law was enacted in November of 2000. In 1999, Japanese Internet penetration rate was just 13.4 percent, lagging behind that of Northern Europe and North American countries. Also, in April 2001 the number of broadband subscribers in Japan was 737,000, behind the United States and Korea. At the time, introducing ICT into corporate management in Japan meant simply installing information technology devices and systems. The law was established because of a sense of urgency on the part of the government about Japan's slow start in the ICT revolution [10].

The 'IT Strategy Headquarters' was established in 2001 under the leadership of former Japanese Prime Minister Junichiro Koizumi to implement a new national strategy called 'E-Japan' for IT-driven growth. E-Japan attached high priority to developing infrastructure and making the most effective use of available IT resources. In 2006, the IT Strategy Headquarters created 'IT New Reform Strategy' for the next step after 'E-Japan'. Its ultimate goal was to realize a self-sustaining 'ubiquitous network society' by 2010.

The speedy improvement of information communication technology (ICT) has highlighted the economic growth of a developed country for past few years. This economic growth can be attained through productivity gains and companies' efforts in the wide application of ICT. Out of the total GDP growth in Japan, ICT has contributed near about 40% [11].

In the mid of 1980s, Internet was introduced in Japan. Similar to the others, it was initially developed as an experimental network project, named JUNET, among computer scientists to share their computer resources as well as information, knowledge and ideas.

In 1992, AT&T JENS, a small subsidiary of US giant telecommunications company in Japan started to provide leased line Internet connection service in Japan. And through this AT&T's service, a small start-up company called IIKK became the first ISP in Japan that provided Internet connectivity service to individual and corporate users on commercial basis including TWICS [12].

In 2000, the number of Internet user was 47 million that was 37.1% of the total population. But in 2010, this number had gone up to 78.2 % [13]. This number is a growing day by day as in 2012; the total number of internet users in japan is near about 101 million, which is 80 % of the total population and 4.4% of the world internet user [14].

In the field of wireless technologies, Japan is sitting on a very high position. Advanced Wireless technology such as mobile communication technologies and applications, Japan has made an enormous development. Japan is also a front-runner in NGN technologies. Parts in mobile phones, contents of animation and games, good service and support for users are the some other parts of ICT where Japan has made a big improvement.

Japanese ICT sector has strengths in FTTH (Fibre to the Home), high definition image technology, home network, and mobile equipment technology. Japanese competitive advantage is derived from its forte in optics and imaging, components for mobile telephones and TV, and advanced visual content. Japan has obtained a large share of the world's ICT market in other areas.

Now days, Japan is mainly focusing on MPU technologies, OS technologies, software development technologies. Comparing with other developed countries; Japan is a bit slow gaining the full blessings of ICT because of strategic channels for sales, grasping overseas trends and lack of engineers with high skills of communication in foreign languages. Japan is also putting a lot of attention on Green ICT and expending a lot of money on the Research and Development (R&D) of green ICT.

5. Recent Steps Forward

5.1. eGovernance in Bangladesh

In Bangladesh, eGovernance is a vibrant topic and it is needed not only for establishing a democratic and transparent government but also for fighting against poverty of the country. Through the bidirectional information flow of eGovernance, the voice of the poor and disadvantaged groups can be heard by the government and which can contribute to policy building and implementation. Unlike most developed countries, government is the key provider of citizen services and public information in Bangladesh. It is therefore the government's prime responsibility to guarantee the flawless delivery of these services effectively and efficiently to every part of the society. Leverage of ICT enables government to provide these services to the grass root level of the society. Following are a few of the recent examples of public services, which are being delivered using ICTs in the country.

At the early stage of the present government, a joint coordination, of the Prime Minister' Office, the centre of bureaucracy and the Ministry of Establishment, ensures each of the 53 Secretaries of the Government of Bangladesh should provide at least one service electronically. These initiatives, collectively called the eGovernance 'Quick Wins' [3], were meant to quickly showcase the impact of the newly engineered service delivery mechanism to the citizens, receive their feedback and allow government the necessary preparation time for nationwide implementation. 17 of these quick wins have already been launched while the rest are in progress. Below are a few examples of those Quick-Wins [3].

Modernise TAX and Land Record Management - Recently, the ministry of Law has taken an initiative to digitize its land record system in the sub-register level of the country. Initially, it has taken place only in Dhaka. However, eventually the record system is expected to be implemented in the whole country. Moreover, the government has already signed an agreement with ADB that aims to introduce the online filing of tax returns and digitised management of land records in order to improve transparency and government service delivery.

Union Information and Service Centres - Supported by a fund of UNDP, a pilot "Community Electronic Centre (CeC)" project [4], Union Parishads, the lowest unit of Local Government, provide Union Information and basic IT Service to the rural citizens.

Utility Bill Payment - Now a days, citizens can pay gas, electricity and land phone bills through mobile phones. Customers can go to thousands of private sector outlets or bill-pay centres to pay their utility bills and receive SMS acknowledgement instantly. This reduces the cost, time and hassle for citizens and increases revenue for the public sector by ensuring timely bill payment.

Dhaka City Corporation Call Centre - The DCC Call Centre [5] is not only able to answer citizens' critical questions but also take down their complaints. The call centre can be accessed by citizens

through mobile phones, SMS, email and web sites.

Personal Data Sheet - Government officers now use the software personal data sheet (PDS) to access personnel information from anywhere in the country over the web established by the Ministry of Establishment. This allows 90% of the officers who are not located in the capital city to access vital professional information. In future, this system will have performance-based information to which they currently have access only through physical visits to concerned government departments. This system should signify a marked change in the way confidential information is handled within the government.

National Web Portal - The National Web Portal (www.bangladesh.gov.bd) is a citizen-centric gateway for all government information and services that can be accessed electronically. The website is positioned as the online one-stop shop for all government eServices and is providing information on the most popular citizen services, the basic information of the structure of Bangladesh Government, current news, upcoming events and other important information and links to all government ministries, divisions and departments.

Single Website with Downloadable Forms - This website (www.forms.gov.bd) reduces time and cost to access forms from many different organs of the government. Various government and non-government organizations are already using this site from around the country.

Web-enabled Personal Management System - This system, initially developed for the Ministry of Establishment, is gaining momentum for adoption in several other ministries and directorates including the Cabinet Division, Ministry of Education, Planning Commission, among other.

5.2 Agro-Informatics in Bangladesh

'e-Krishi', globally known as 'e-Agriculture' is an emerging field where Information and Communication technologies or ICTs (Radio, TV, Cell Phone, PDAs, PCs) are playing a vital and catalytic role in addressing key hindrances to the growth of Agriculture such as mismanagement of inputs, inaccessibility to rural finance, ineffective and inadequate extension service, lack of awareness about agro-processing, and insufficient preparedness for natural calamities, among others. In many developing countries, ICTs in Agriculture have proven to have helped farmers boost productivity by giving them access to vital information, such as weather forecasts, crop advice and market pricing, empower them by establishing linkages with policy makers and so on [15]. Some of the eKrishi initiatives taken in Bangladesh are below.

Agricultural Radio and TV Shows - The government-owned Bangladesh Television has been telecasting an agricultural TV show called "Mati-o-Manush" for over 30 years now. This is the oldest form of information dissemination through an electronic means. This is one of the most watched shows by the rural farmers and has recently been replicated by private TV channels. Currently, there is a Radio show called "Krishi Dibanishi" in which the farmers call in to have their agriculture related questions answered. This shows has also gained a lot of popularity.

Department of Agriculture Marketing Website - The Department of Agriculture Marketing (DAM) website provides commodity price information with the aim to involve all agriculture stakeholders, especially farmers in the decision making process. The database provides wholesale and retail prices of around 200 commodities from 30 of the 64 districts. The price information is collected daily and sent to the DAM headquarters in Dhaka through email.

Soil and Land Resource Information System - SOLARIS [16] under Sugarcane Research and Development Institute is a 2 GB data repository that stores soil data using primary information from Upazila Nirdeshika from 460 districts. A customized GIS software SOLARIS-GIS maps soil data based on classification (Soil Texture, Landtype, Landform, Drainage, Slope, Surface Water Recession) and condition (Crop Suitability, Land Zoning, Nutrient Status and Fertilizer Recommendation).

Department of Agricultural Extension Website - In order to develop and strengthen the ICT department of DAE, the government has initiated a project called "The ICT Development of DAE". The DAE website is one of the key components of the project. This website stores and disseminates field level information from and through extension workers.

Agriculture Information and Communication Centre - Ten of the Agriculture Information and Communication Centres (AICCs) are being set up leveraging the existing infrastructure of farmers' field schools, farmers clubs and other community centres. These centres are functioning as one-stop

shops for farmers for all agriculture related information and services including market information, soil testing, crop diagnostic services, etc.

Fisheries Information and Communication Centre - These centres will be very similar to the AICCs, but more focused on fulfilling the farmers' fisheries related information needs. The Department of Fisheries holds a wealth of information related to fish culture, their diseases and remedies, etc. The existing field workers are hardly enough for disseminating the information efficiently.

Krishi Alaponi - Krishi alaponi is a call-in TV show for farmers in which they are able to call directly to have their agriculture related questions answered and/or participate in agricultural policy debates, budget discussions etc. This is done in collaboration with Ministry of Agriculture and a private mobile operator in Bangladesh.

5.3 ICT in Health Sector in Bangladesh

The use of ICTs in health sector helps in maximum utilization of communication channels and enhancing the existing services within the present resource allocation. This flow of information will help to remove the misconceptions of health consumers, those who are now mostly in the dark due to the unavailability of adequate information and communication with the service providers. Some of the notable eHealth initiatives are below.

ORT - Oral Rehydration Therapy (ORT) started a "Labon gur Sharbat"(a home remedy for diarrhea) campaign through mass media, which was carried out extensively by BRAC, the largest NGO in Bangladesh. Mass media campaign also plays a crucial role in popularizing this cheap and effective home remedy. Special initiatives like School ORT program are also carried out.

Tele Counselling - Social Marketing Company (SMC) initiated a tele-counselling program named "Tele-Jiggasha" on reproductive health, family planning and STI/HIV/AIDS in the year 2001. It started with a mission of increasing access to information and personal counselling through telephone hotline with assurance of confidentiality.

Health Line and Telemedicine - Health Line, the medical advice and consultation service of GrameenPhone [17] was launched in October 2007. Apart from the core medical consultation services, the caller of '789' [17]through GrameenPhone are also able to get additional medical information services; they can avail doctor and medical facility information, drug information, interpretation of laboratory test reports and data, and emergency support information as supplementary services. Currently, there are other mobile operators who have also started offering telemedicine services.

Internet Connectivity at Upazilla Health Complex - All upazilla health complexes of Bangladesh have recently been connected to the Internet. This enables them to communicate with the central offices at ease and provide services to the patients more efficiently. The physicians of these upazilla health complexes are also equipped with cell phones for remote consultations. Some of these centres also have tele-conferencing facility with which, they are able to communicate with the highest authorities.

Health Alert through ICT - The government of Bangladesh has effectively used ICT during the outbreak of Bird flu in the recent times. People were informed about the situation and advised what to do. Steps taken by the Government to prevent the spread were shown on the electronic media. This is an excellent example of handling emergency efficiently through the use of ICT. Other seasonal health alerts and messages on preventive measures are also sent to customers of mobile phones through SMS. Some of these messages are sent in Bangla for the non-English speaking customers.

5.4 ICT in Education Sector in Bangladesh

To address the challenges of the 22nd century, a country's education system must re-invent itself to produce the skills and confidence. The curriculum must incorporate material to develop the requisite skills; the teaching methods must embrace collaboration and creative problem solving for the locality; the system of assessment must measure whether the children are growing up to be good citizens and how much they can really contribute to nation building; and, most importantly, the educational governance must make sure the curriculum, teaching, and assessment deliver results that move the nation forward. Not only the developed countries, but also the developing nations including

Bangladesh are making increasing use of ICT to offer better services to the people and to ensure accountability and transparency. The use of ICT in all of its conceivable and readily available forms can enable the country to achieve successes in the area of education.

Electronic Publication of Exam Results - The two major state certification exam results (SSC and HSC) are now published electronically. Previously, the procedure of viewing a student's result was rather cumbersome which involved standing in long lines and flocking at the schools. With the new system, the students can receive their exam results through email or can view it via web or mobile.

GIS-Based Education Planning - This Geographic Information System (GIS) map-based software by BANBEIS is a powerful planning tool for the policy makers. It quickly helps identify areas for intervention based on priority criteria such as underserved status, poor teacher training, lacking or disaster-affected infrastructure, and other critical educational issues.

Digital Content for Education - In now days, Bangladesh has started producing audio-visual content for teacher training and students. Although in its infancy at the moment, the digital content for education is being planned as a significant thrust area of the country at the moment with many public-private partnership efforts developing. Thousands of schools are being equipped with modest computers laboratories, internet connection is spreading quickly to secondary educational institutions and digital content is increasingly being used to improve the quality of science, mathematics and English education in secondary schools.

eLearning - With the increasing number of students, most to the higher educational institutes of Bangladesh, have started the eLearning program. These programs include virtual classroom, online library management system, online registration and so on.

Introduction of Bangla keypad - The government has decided that all mobile phone sets bought in the country must have Bangla keypad from February 2012. The Mobile-phone operators will not be able to import handsets directly, however, they'll will be able to bring in handsets through local importers, following a similar approach in Malaysia to protect the local entrepreneurs. The operators may be allowed to import high-end sets with superior technology. It is to be mentioned that currently there are six mobile-phone operators in Bangladesh: Grameenphone, Robi, Citycell, Airtel, Banglalink and state-owned Teletalk.

5.5 eCommerce in Bangladesh

eBanking - eBanking satisfied customer demand in banking activities electronically throughout the world. At present, several private commercial banks (PCBs) and foreign commercial banks (FCBs) in Bangladesh offered limited services of tele banking, internet banking, and online banking facilities working within the branches of individual bank in a closed network environment.

Online Shopping Facilities - Early this year, BRAC Bank Ltd. has launched Bangladesh's first e-commerce platform in alliance with Visa. This has opened the opportunity for Bangladeshi citizens to use Visa cards for online shopping e.g., online ticket booking, purchasing gifts, etc. BRAC Bank online shopping is open for 24 hours making it possible for retail products, companies and stores to keep earning long after shopping hour is over.

5.6 Infrastructural Growth in Bangladesh

3G Mobile Service Facilities - Bangladesh Telecommunications Regulatory Commission (BTRC) has decided to commence third-generation mobile telecommunications technology (3G Mobile) in Bangladesh. BTRC had earlier announced that Teletalk, a Government Owned operator would get to do a six-month trial run of 3G. Post-test run, the 3G spectrum is expected to be auctioned in June 2012. It is announced that 700 base transceiver stations, or cell sites, are especially designed for 3G, and 500 transmission receiver equipment are being already placed.

Once 3G mobile technologies is launched it would make mobile telephony much more efficient, with high-speed data transfer affording users to watch mobile TV, make video calls, use navigation equipment and access many other services.

Terrestrial cable licences - Recently, the government of Bangladesh has decided to issue licenses to private   entrepreneurs for setting up, maintenance and running two submarine cables and three terrestrial fibre links in the country in a bid to make telecommunication and internet facilities easier. Under the licence, the companies will be able to connect with the neighbouring countries through terrestrial fibre-optic cables.

The cables are expected to provide better and more efficient internet access by building redundancy to the submarine cable. The decision has been made apprehending the necessity of alternative submarine cable since the total telecommunication and internet system collapses when the country's lone submarine cable is cut off. The two submarine cables are expected to be set up under the sea, having landing stations at Kuakata, Patuakhali, Barisal and Chittagong. Terrestrial fibre link has to be established between Dhaka and the landing stations. The new submarine cables are also expected to bring an end to illegal Voice over Internet Protocol (VoIP) operations in the country.

5.7 Advanced Services in Malaysia

Due to the paradigm change from infrastructure and access to applications and content, Malaysia is strengthening its advanced services particularly on creative content creation, payments and electronic commerce and connectivity applications [18].

In the effort of improving its advanced services, the domestic creative content creation, services and distribution and broadcasting sectors are developed extensively, with the optimism of transforming Malaysia into a regional hub for digital content. The deployment of a unified mobile and online payments system to a large user base at reduced cost is also encouraged. In addition, the deployed system ensures complete interoperability between existing platforms and by utilising mobile phones. Furthermore, the Malaysian government plays a pertinent role in driving the development and adoption of value-added communication services and applications for business, household and the government bodies as well.

5.8 Shifting to Knowledge-based Economy in Malaysia

Attentions to shift to knowledge-based economy, particularly in E-Learning, E-Healthcare and E-Government are taken by coordinating efforts to provide access, devices, applications and content [18].

E-learning for students and professional trainings on a common knowledge platform has been introduced. Several E-Healthcare launches are done nationwide to increase the awareness and to transform the perception of the public in order to achieve the goal of knowledge-based economy in Malaysia. The e-healthcare is made attractive to the public by enabling remote scheduling, remote monitoring, and facilitating personal record keeping and streamlining payments and reducing wait times. This initiative is extended to the government sector as well, to improve the convenience, efficiency and transparency of Government services to the public and for trade facilitation.

5.9 E-Governance in Malaysia

The E-Government is one of the leading applications launched in Malaysia under Multimedia Super Corridor (MSC) to improve social conditions and provide economic benefits. The objective of this flagship application is to initiate and accelerate the growth of MSC and to enhance the national competitiveness. These flagship applications plays a vital role even in the creation of high value jobs and export growth, thus reducing the digital divide and making MSC a regional hub and test bed.

E-Government is acronym for electronic government. *E-Government* is a digital interaction between the Malaysian government and citizens (G2C), the government and businesses/Commerce (G2B), government and employees (G2E), and also between the Malaysian government and other governments or agencies (G2G). The main focus of this application is G2C where it is aimed to improve transparency and responsiveness of the government to the public (19).

In e-government application, seven main projects are identified to be the core e-government application.

- Generic Office Environment (GOE)
- Electronic Procurement (eP)
- Human Resource Management Information System (HRMIS)
- Project Monitoring System (PMS)
- Electronic Services Delivery (eServices)
- Electronic Labour Exchange (ELX)
- E-Syariah

Besides these main projects, there are supporting projects such as EG*Net (Government Virtual Private Network (VPN)), EG IT Standards, Integration projects among flagships and legacy, PKI and digital signature and shared services outfit (SSO).

Several policies and laws have been also introduced to support these flagships such as Communication and Multimedia Act 1998, Digital Signature Act 1997, Telemedicine Act 1997, Personal Data Protection 2004, Electronic Transactions Act and E-Government Activities Act.

Since the use of information technology enables improvement in mass processing tasks and public administration operations, e-government improves the efficiency of the operations of the government. Similarly, e-government also provides efficient data sharing between government agencies. Thus e-government is able to generate savings on data collection and transmission.

The e-government applications are developed based on best understanding of citizens' requirements as the main element in reforming government operations is to adopt a customer-focused approach. These applications will provide seamless online services thus improving the traditional government services. Another benefit is that e-government is able to achieve specific outcomes. The internet can help stakeholders share information and ideas and contribute to specific policy outcomes. For instance, online information can boost training programmes; sharing health information can improve resource use and patient care.

E-government contributes in reducing government expenditure through more effective and efficient programmes, improving business productivity through administrative simplification and promoting the information society and ICT industry. E-government acts as a factor for reform in government. Most governments nowadays are facing the issue of public management modernization and reform such as globalization, changing society and increasing customer expectation increases the compulsion towards e-government application.

Malaysia is yet to reach full potential due to limited number of transactions available online as well as issues in infrastructure, change management and integration of legacy systems. The government agencies such as MEWC, MAMPU can ensure that implementation of e-Government applications are successful. The success of e-government in Malaysia is the key to determine Malaysia's progress towards achieving vision 2020.

J. MYKAD

The next flagship is the introduction of MyKad to the public. The objective of this project is to provide a secure ID platform for private and Government transactions and processes. This project has attracted many private applications to-date but acceptance of public applications, e.g. driver's license, has been minimal.

This project faces problems in terms of accessing to infrastructure, e.g. card readers, lack of buy-in from other agencies and poor public perception of security. These issues have limited the public usage of other applications on MyKad.

MyKad can bring some social impact through reduction of fraud and paperwork if it is fully utilies. The full potential of MyKad application can be achieved with the cooperation of multiple agencies such as NRD, MAMPU, Pos Malaysia and NITC.

K. SMART SCHOOL

Smart school is a flagship designed to promote ICT literacy and encourage creativity and self-learning in the younger generation. This flagship has been enhanced based on knowledge from pilot projects

that has been introduced since 1998. Smart school is able to provide productivity and social gains from improved administration of schools and reduction of paperwork.

The key challenges of this application are the exam-oriented curriculum, lack of technical support and change management of teachers. The government initiatives through this application include PPSMI, computer lab at school and SchoolNet that is the e-learning website. However, engagement and communication between different stakeholders within MOE could be improved to speed up full roll-out of smart school.

L. TELE-HEALTH

Tele-health is a project launched by the government to improve the overall standard of healthcare and provide more information to enable the public to better manage their health. Through this project several projects have been launched such as Tele-consultation, My-Health portal and Continuous Professional Development to provide services to the users. However, poor access to infrastructure and under-developed critical enablers limiting the use of Tele-health projects. The success of the implementation of Tele-health can be achieved with the cooperation between different stakeholders with MOH and MICC.

5.10 Next Generation Infrastructure in Malaysia

The next generation infrastructure prospects and the maturity of the existing infrastructure are able to support the future growth of Malaysia, focusing on coverage, affordability and quality of access [18].

In order to resolve access gaps mostly in rural areas, initiative to mandate broadband for all is proposed. This initiative ensures the increase ICT usage and proficiency. Importance of having access to broadband is considered similarly as to water and electricity utilities. All new residences will have ready access to content and communication services; which not only address the access gap issues but it will also enable an infrastructure transformation in sub-urban and rural areas through shared infrastructure in order to reduce costs and accelerate roll-out.

Initiatives to offer smart network to reveal quality and affordability of services is provided, through differentiated broadband packages based on priority of service, usage gaps and application-specific enhancements. Additional international submarine cable capacity will be laid and data centres will be built to host content locally in Malaysia [19].

5.11 E-Governance in Japan

The Waseda University Institute of e-Government has released the 2012 Waseda University World e-Government Ranking, where Japan lies at the eighth position of the world countries in terms of eGovernment [20].

The e-Japan Strategy specifies three priority policy areas such as "establishment of an ultra-high-speed network infrastructure and competition policies," "facilitation of electronic commerce," and "realization of an electronic government." [21].

The establishment of an electronic government system has been continuing for nine years in Japan. As a result, now almost all types of applications to the government can be made electronically. There are two factors in the electronic government in Japan where one is making administrative transactions among government offices online and the other is making transactions between governments and citizens online.

5.12 E-Learning in Japan

The emergence of the Internet and electronic broadcasting has significantly increased the flow of information available and information has gone from hardcopies to digital media. A revolution is currently happening and Japan's education system needs to evolve as well and harness the power of ICT in education. Thus, new initiatives shown below have been launched:

• Setting up training schemes for people to better understand and process information and

- facilitate/promote lifelong learning
- Enhancing environments for easier accessibility to the Internet and reducing/eliminating any possible learning curve in using the Internet
- Enforcing a database of learning opportunities and useful educational information
- Making this database widely available (to ordinary people) in the same way the Massachusetts Institute of Technology (M.I.T.) opened a free online course website

5.13 Internet and Technology in Japan

The ISPs in Japan offer very attractive packages termed "triple play" (Internet, Television, Telephone) or more recently "quadruple play" (Internet, Television, Telephone, and Mobile Access). The result of these marketing tactics is that many Japanese will have Internet access. Even someone not interested in using the Internet will have to sign up for it because of the bundled services. In Japan, Internet access is considered affordable with respect to the high transfer rate offered.

Regarding to a study published by the Yano institute in March 2013 the number of fibre subscribers will reach 30 million while the number of ADSL subscribers will decrease to 7 million. The attractiveness of fibre comes from that fact that it offers very high transfer rates. For example the classic download rate offers by the fibre is about 100MB/s. However KDDI has just launched a new offer with fibre that allows a theoretical transfer rate of 1GB/s of download and upload. This offer is only available for some prefectures. But note that download rate of 1GB/s means that it is possible to download a DivX movie in 1 second and a Blue Ray DVD in 5 minutes.

6. Comparative Analysis between Bangladesh, Malaysia and Japan

Upon analysing the history and the progress of ICT sectors in Bangladesh, Malaysia and Japan based on a wide variety of sources stemming from previous researches which is illustrated in Table 1 below, a comparative analysis of the difference between the ICT trend in developed country and developing countries is derived. The goal of providing this analysis is with a believe that is allows a better understanding of what have been achieved so far in both developed and developing countries. Then this comparison is used as a basis to provide proper recommendations for the developing countries to head towards becoming a developed country in the near future.

Table 5: Summary of ICT in Bangladesh, Malaysia and Japan

Description	Bangladesh	Malaysia	Japan
Population (July 2011 est.)	158,570,535	28,728,607	126,475,664
Urban Population (2010)	28% of total population	72% of total population	67% of total population
Literacy (2001 est.)	48%	89%	99%
GDP Composition (2010 est.)	• Agriculture: 18.6% • Industry: 28.5% • Services: 53%	• Agriculture: 10.5% • Industry: 41.4% • Services: 48.2%	• Agriculture: 1.4% • Industry: 24.9% • Services: 73.8%
ICT Initialization	1964	1966	1956
Beginning of formal Education	1994	1997	1994
Total Internet Users (2009 est)	617,300	15,355,000	99,182,000
Government Type	Parliamentary Democracy	Constitutional monarchy	Parliamentary government with a constitutional monarchy
Government role to enhance ICT Sector	• Withdraw all import duties and VAT from all computer hardware and software • Issuing of National Information and Communication Technology (ICT) Policy • e-Governance • E- Government • E-Health • Agro-Informatics • E-Commerce	• E-Government • Smart School • MyKad • Tele Health • E-Commerce • E-Learning	• E-Japan • IT New Reform Strategy • U-Japan • E-Government • E-Learning

Based on table 1 we can see that the ICT sector in Bangladesh, Malaysia and Japan is almost having a similar pattern. The initiatives taken to enhance this sector, is practically similar where all three countries have moved forward to transform most traditional practices by introducing E-Government, E-Health, E-Education and E-Commerce. Though Bangladesh, Malaysia and Japan have similar practices, the contribution of ICT sector on the development of these countries varies. We can say that by exploiting ICT to the fullest Japan has brought itself on par with other developed countries in the world as illustrated in Figure 2 below. In figure 2, Japan is one of the Asian countries that has been indicated as very high development rate, in other words Japan is also categorized as one of the advanced economy country. As for Bangladesh, it is indicated as medium developed and as for Malaysia it is indicated as highly developed. So what is the real factor behind this variation in development?
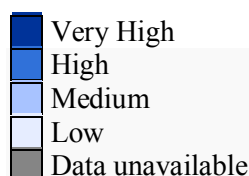
◼ Very High
◼ High
◻ Medium
☐ Low
◼ Data unavailable
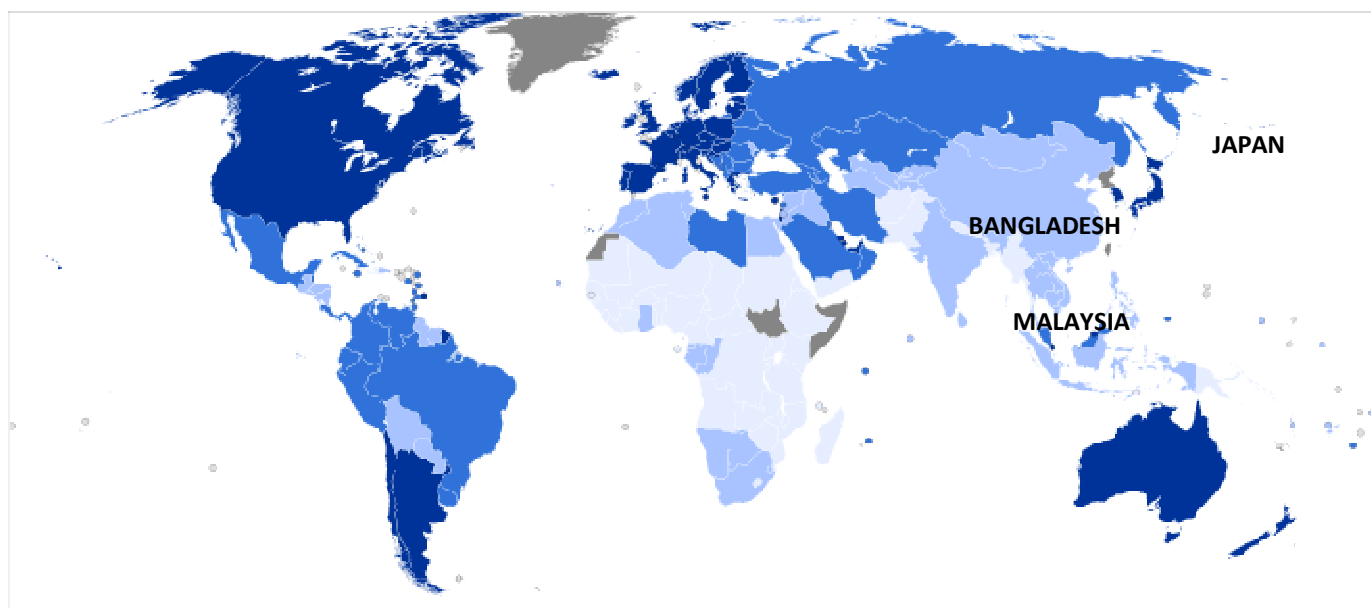
Figure 44: World Map [22]

As mentioned earlier, the delivery of the conventional development goals (in health, education and business), has clear potential of being enhanced by the ICT applications, regardless of the effect of the ICT sector on national economic performance. In the economic growth perspective, the achievement of these development goals is likely to be easier because the relationship between the two is dualistic. Economic growth is also more likely to be achieved in societies that are healthier and better-educated, where individuals and communities have the skills and capacity to fulfil their potential and to develop new business opportunities. ICTs can thus play a part in improving both national economic performance and mainstream social development, a dual potential which should be better understood by policy-makers in both ICT and economic development.

ICT production sectors are mainly done by either middle-income countries that comprises transition economies in central and Eastern Europe or countries in Asia and Latin America with established industrial and manufacturing sectors. The ICT production is also practised by very large countries, such as India and China whose size gives them substantial domestic markets and skilled workforces requiring wages at levels well below of other countries. Much of the investment in ICT manufacturing in developing countries derives from foreign sources rather than from local capital markets, for example, while most of the resulting production leads to improved efficiency in the countries to which products is exported rather than enriching local manufacturing and services. Much the same is probably true of the export-oriented service sectors undertaking software development, data entry or back-office functions which have become established in some smaller developing countries with appropriately skilled workforces.

Least Developed Country (LDCs) such as Bangladesh has limited ICT production or export-oriented ICT service sectors. ICT manufacturing sectors in developing countries also seem likely to have fewer backward and forward linkages into the national economy than ICT production sectors in the OECD area [23]. Much of the investment in ICT manufacturing in developing countries derives from foreign sources rather than from local capital markets, for example, while most of the resulting production leads to improved efficiency in the countries to which products is exported rather than enriching local manufacturing and services. Much the same is probably true of the export-oriented service sectors undertaking software development, data entry or back-office functions which have become established in India and some smaller developing countries with appropriately skilled workforces. Second, many developing-country economies, particularly LDCs, are still dominated by commodity production and (often subsistence) agriculture, in which ICT investment obviously has much more limited value. The scale of ICT investment will therefore be much lower as a proportion of national output than in industrialised countries and the benefits for national growth will be slower to materialise.
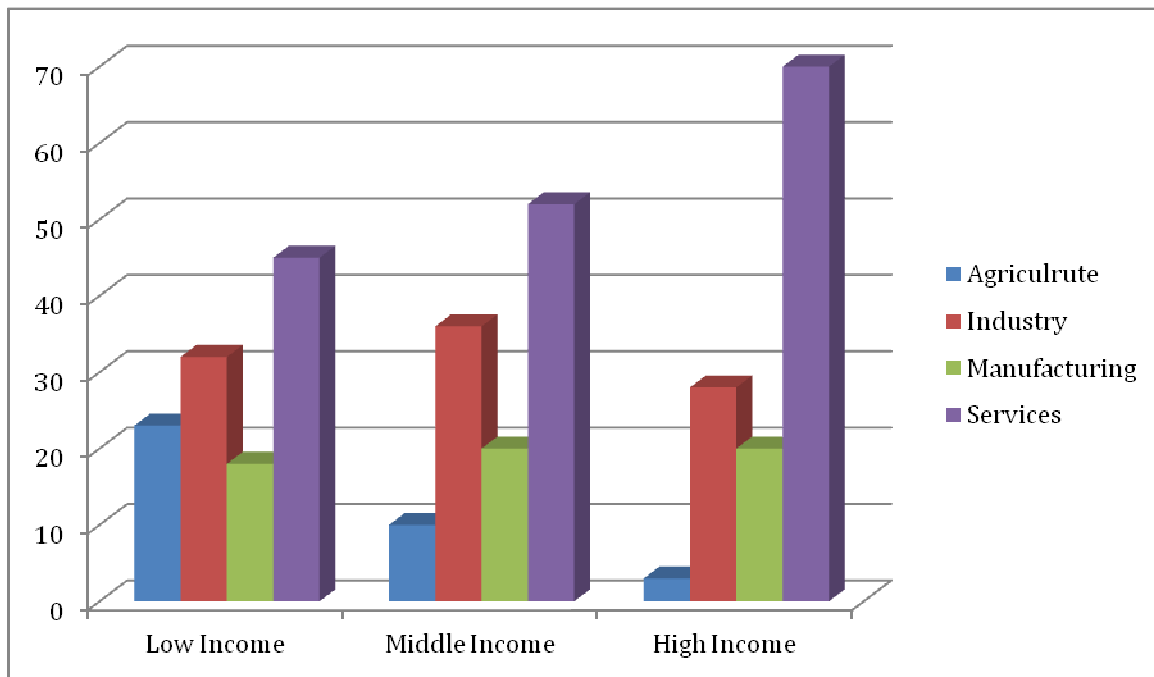
Figure 45: World Development Indicator
Source: World Development Indicators 2003, The World Bank, p.192

The interest of development agencies in ICTs is not so much the impact which ICTs may have on business or national economic performance because the overall focus is on poverty reduction. ICT applications clearly have potential to enhance the delivery of mainstream development goals (in health, education and so on), regardless of the effect of the ICT sector on national economic performance. Although the achievement of these development goals is likely to be easier in a context of economic growth, the relationship between the two is dualistic: economic growth is also more likely to be achieved in societies that are healthier and better-educated, where individuals and communities have the skills and capacity to fulfil their potential and to develop new business opportunities. ICTs can thus play a part in improving both national economic performance and mainstream social development, a dual potential which should be better understood by policy-makers in both ICT and development for a developed country.

Since the introduction of the Internet in 90's, ICT has been considered as a formidable tool to close the gap between the developing world and the developed world by skipping certain stages of industrial development and leapfrogging into the Information Economy. Used in the right way and for the right purposes, ICT can have a dramatic impact on achieving specific social and economic development goals.
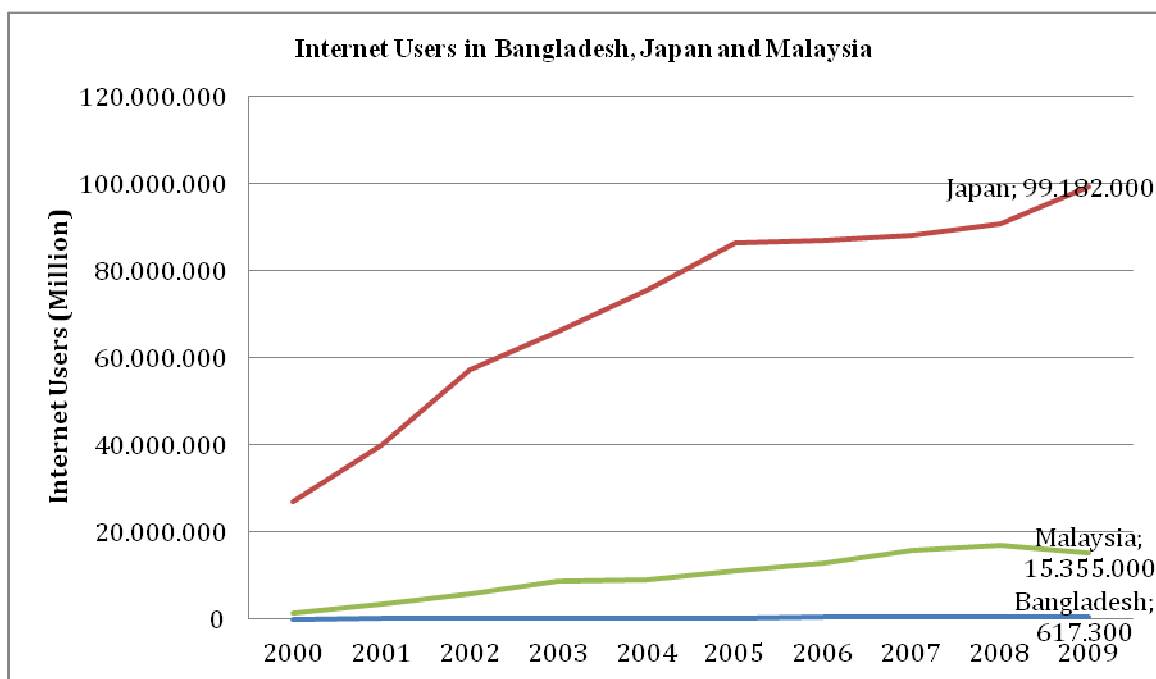
Figure 46: Internet Users
Data Source: World Bank, World Development Indicators – Last updated March 2, 2011

Table 6: Internet Users in Bangladesh, Japan and Malaysia

Country Year	Bangladesh	Japan	Malaysia
2000	30,000	27,060,000	1,500,000
2001	140,000	40,000,000	3,400,000
2002	150,000	57,200,000	5,700,000
2003	240,000	66,000,000	8,692,100
2004	280,000	75,430,000	9,000,000
2005	300,000	86,300,000	11,016,000
2006	400,000	87,000,000	12,860,000
2007	500,000	88,110,000	15,868,000
2008	560,000	90,910,000	16,903,000
2009	620,000	99,182,000	15,355,000

Source: CIA World Factbook accurate as of January 1, 2011

Figure 4 and Table 2 shows the number internet users in Bangladesh, Japan and Malaysia between 2000 to 2009. The numbers of internet users in all three countries are increasing. Japan records a rapid growth rate in these years but as for Bangladesh and Malaysia the number of internet users' growth rate is slower than Japan. Though Bangladesh has the highest population compared to Japan and Malaysia, the number of internet users in Japan and Malaysia has outnumbered the users in Bangladesh. Apart from having very high literacy rate i.e. Japan (99%) and Malaysia (72%) compared to Bangladesh literacy record (48%) [24], the other factor that may also contribute in allowing Japan and Malaysia to have more internet users is also the number of internet host or the Internet Service Providers (ISPs) available in these countries. As the number of hosts is one indicator of the extent of internet connectivity. Table 3 below shows the number of ISPs in Bangladesh, Japan and Malaysia.

Table 7: Internet Host in Bangladesh, Malaysia and Japan

Country Name	Internet Host (ISP)	Year of Estimate
Bangladesh	68,224	2010
Japan	54,846,000	2010
Malaysia	344,452	2010

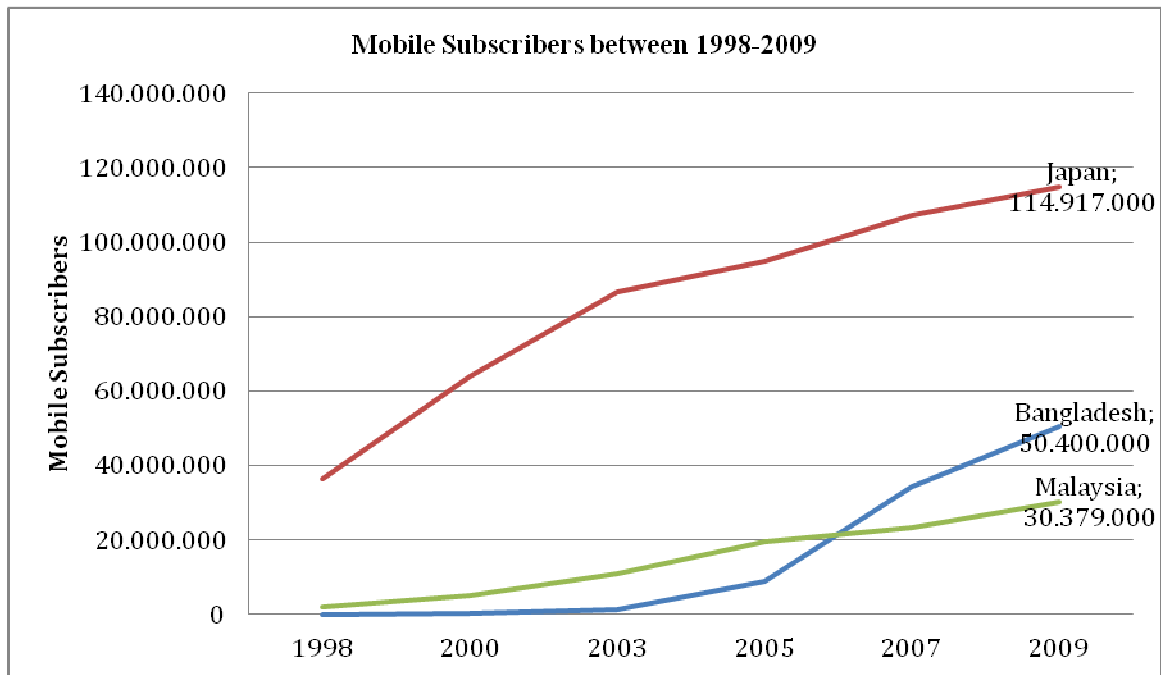*Source: CIA World Factbook accurate as of January 1, 2011*

Figure 47: Mobile Cellular Subscription
Data Source: World Bank, World Development Indicators – Last updated March 2, 2011

Figure 5 and Figure 6 show the mobile cellular subscriptions in Bangladesh, Japan and Malaysia between 1998 and 2009. The cellular subscription has increased in all three countries especially from 1998. Even in terms of mobile subscription, Japan still records a very large figure compared to Bangladesh and Malaysia. Based on the figure above we can also see that upon 2004, the mobile cellular subscribers increased for Bangladesh even more than in Malaysia.

One of the reasons of this spike was because in 2004, TeleTalk cellular mobile was launched. Teletalk is a GSM based state-owned mobile phone company in Bangladesh. Teletalk is the first operator in the country that gave Bangladesh Telegraph and Telephone Board (BTTB) [25] now BTCL incoming facility to its subscribers.

Apart from the launching of TeleTalk, during 2004 Bangladesh annual GDP growth was higher than Malaysia's as shown in Figure 6.
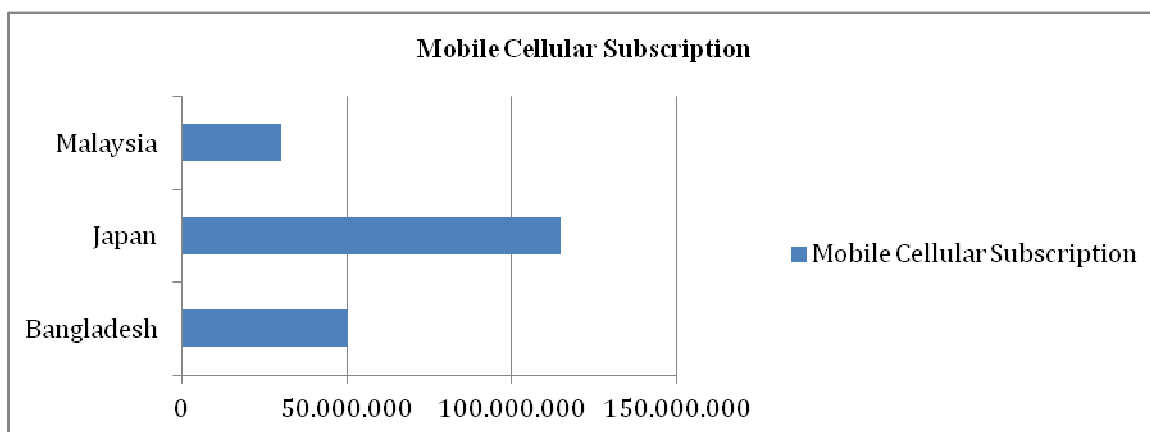
Figure 48: Bar Chart of Mobile Cellular Subscription

Figure 49: GDP Growth (annual %)
Data Source: World Bank, World Development Indicators – Last updated March 2, 2011

Over the past few years, positive benefits of ICT programs have been widely acknowledged among government leaders in developing countries. However, when undertaking such programs are suggested to be practised, most of them do not achieve expected results, especially e-government programs, have been found not to bring expected results.

The position of Government Chief Information Officer (GCIO) has been adopted by many developing countries seeking to leverage technology within the management of public administration. The position calls for an operational executive who can make important strategic decisions that can impact public agency ICT.

The role of CIO/ GCIO in developed countries has evolved as a response to the development of ICT and the force of market dynamics. In fact, the CIO concepts start from the private sector with a desire of the higher effective operation and an increase in the firm value via applying ICT strategy. Then, it spreads to the public sector to create GCIO positions with the expectation of applying ICT more effectively and providing better public services. Governments also strengthen GCIO's authorities by law.

Contrary, developing countries follow the model of developed country with the belief that the addition of the GCIO position in high level management can catalyse the potential of ICT for economic

development. In other words, their CIO/GCIO is imposed by the government regulation rather than as a result of ICT development process and economic requirements. The comparison of the GCIO creation process is illustrated in Figure 7.
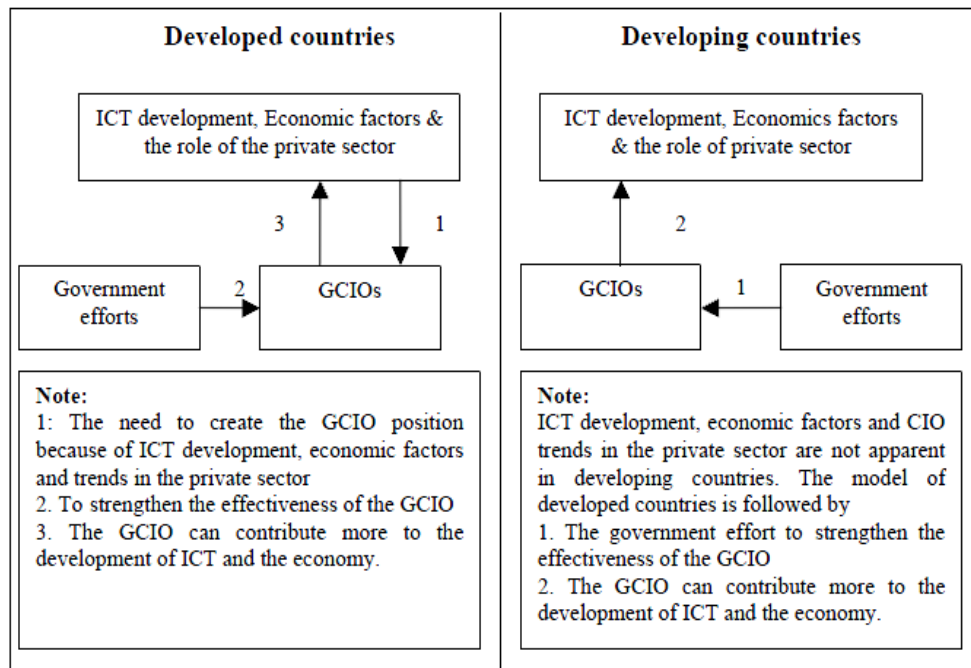

Figure 50: Comparison of the Creation of GCIOs in Developed and Developing Countries

7. Future Challenges

The biggest ICT challenge in Bangladesh is to implement E-Governance to all government sectors for establishing rule of law. To achieve this goal information technology is the major tools, the technology dealt with the information must be driven by the manpower that have philosophical commitment and patriotism. However, due to the high level of corruption many would not happy if E-Governance is applied in the country as it would highly reduce their illegal source of income. Therefore, it is up to the government to ensure that the target has been achieved for the betterment of the nation and to its subject.

In Bangladesh, almost half of the population are female. However, most of them are not familiar with the modern ICT technology. Thus the second ICT challenge is to educate women with ICT knowledge. Thirdly, almost 80 percent of Bangladesh's population lives in the rural areas and 54 percent of them employed in agriculture. However, most of the rural areas in Bangladesh are not developed and sometimes don't have any communication infrastructure. Thus it is very important for the government to take proper planning to bring those rural areas under communication development network.

Malaysia has built a competitive ICT industry and has achieved high penetration rate for communication thus far. However the ICT industry in Malaysia continues to face several challenges.

The transferal of the profit pools to content and services is a challenge that Malaysia faces. Infrastructure and access are increasingly perceived as commodities, globally. Therefore, by moving into content and service the telecommunication operators risk is becoming a low margin, and profit margins are growing positively as mostly it is required by dominant global companies. At present, 80% to 90% of the content accessed on the Internet in Malaysia is from overseas [7].

Modern telecommunications technology is able to expose additional potential especially in education and healthcare sectors. Malaysia has made decent progress though the exposure of these technologies is these sectors are conducted in a fragmented approach that regularly driven by the public sector.

Implementation in these sectors guarantees higher penetration rate in ICT industry in Malaysia. Unfortunately, at present telecommunications has limited leverage for the increasing rate and productivity in other sectors.

In Malaysia, the current infrastructure has reached maturity, with limited growth expected in fixed lines and mobile penetrations. Future applications and content will require new infrastructure. Particular challenges in Malaysia are the rollout of a nationwide fibre network and fourth generation (4G) mobile networks, with very different challenges in urban and rural areas. In urban areas, coverage and quality will be paramount whereas in rural areas, mass affordability and inclusiveness are the key drivers.

8. Our Recommendations

The adoption of ICT and related business processes and management skills is pertinent for the developing countries in the rapidly changing and highly competitive global market. The benefits of ICT usage in a developing country is dependent on a national enabling ICT environment that relies on several factors such as access, infrastructure, education, human capacity, global and national governance issues and legal framework. Based on the comparative analysis in Section VI it is obvious that the developing countries like Bangladesh and Malaysia are still lacking on the implementation of certain factor as below:

- Education
  - o Though Bangladesh and Malaysia have already introduced ICT education at the elementary and secondary level, but the effectiveness of this education should be evaluated periodically. This will not only ensure that the syllabus are on par with the latest trends and technology advancement but also enables the younger generation to relate this knowledge with the latest ICT issues.
- Human Capacity
  - o The E-Revolution has to deal not only with external difficulties, but also with the internal resistance to change, which can be an obstacle for the modernization of the public offices. In fact, many employees do not see e-government as an opportunity, but as a threat for their future. The employees may refuse to adopt the new working methodologies or continue to work in the same manner they worked before behind the administrators' backs. An organized management of change has to be established. The organizational change has to be discussed with the people involved and they have to be well informed on the transition.

- Global and National Governance Issues
  - o Legal Framework of national ICT   Policies
  - o The role and contribution of Public Authorities in providing infrastructure and human capacity and encouraging the use of ICT
  - o Support ICT's use by SME's, and consumers, including remote areas, by providing easy and low cost access to ICT solutions.
  - o Organise regular consultative meetings and share knowledge with other destinations in order to define appropriate ICT strategies and implementation plans and timetables.

- Legal Framework
  - o Without governments understanding these opportunities and challenges, and failing to address these issues in the form of legal policies, and by not adopting pro-active implementation the nations will fail to take advantage of the opportunities to improve the economy, and is unlikely to compete with other developed countries.

9. Conclusion

A major pre-occupation in the literature on ICTs and development has been the question of the "digital divide". It is often illustrated by data on access to particular ICTs. The digital divide is defined as the disparity in ICT diffusion and use between industrial and developing countries (or, indeed, between rich and poor, men and women, urban and rural areas within individual countries). For example, data published in 2002 showed that although the average OECD country has roughly 11 times the per capita income of a South Asian country, it has 40 times as many computers, 146 times as many mobile phones, and 1,036 times as many Internet hosts. In many ways, this digital divide merely parallels similar disparities in access to and use of other development "goods" – health, education and so on – which are more readily available to rich than poor, or in industrial countries than in developing countries. A digital divide is to be expected: the key questions for policy-makers are the extent to which it matters (in terms of equity and any secondary effects in other sectors) and to which it is likely to grow or diminish over time, and the identification of ways in which it might be bridged.

Developing countries need to adopt ICT's and associated business processes and management skills in order to remain competitive in the constantly changing and increasingly competitive global market. The positive effect of ICT in a developing country depends on a national enabling ICT environment that relies on multiple factors such as accessibility, infrastructure, global and national governance issues, and human capacity. One of the most important steps to get the maximum benefit from ICT a country needs to make sure the accessibility of the ICT to all levels of the society. Once a country assures that ICT has reached everywhere in the society, then only the country can expect to get the all-out benefit. Doing so, the infrastructural growth of the ICT should also be taken into account. Skilled man power is one the most vital issues to get the benefit of ICT. To support the accessibility, infrastructure, and human capacity, a country also needs legal framework for the national ICT policy. The role and contribution of public authorities in providing infrastructure and human capacity and encouraging the use of ICT should be considered in the policy. The policy should also consider necessary steps to provide easy and low cost access to ICT solutions to the rural areas as well as the urban.

Investing more money in the telecommunication industry will definitely uplift these two nations into new culture of civilization in the world and such measures can contribute to another culture of excellent.

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