

IT STRATEGIES FOR BUSINESS COMPETITIVENESS IN BANGLADESH

Ziaur Rahman

*Department of Business Administration
Manarat International University
Dhaka, Bangladesh*

and

Ezaz Ahmed

*Department of Management and Business
BRAC University, 66 Mohakhali C/A
Dhaka –1212, Bangladesh
email: ezaz@bracuniversity.ac.bd*

ABSTRACT

In the growth envelope, Information & Communication Technology plays the facilitating role of revitalizing the competitiveness of businesses across any country. This article offers a pedagogical perspective on ICT enabling strategies that need to be catered to and assimilated in Bangladeshi enterprises for enhancing their competitiveness in the global frontier. This study takes a macro level perspective on the focus of ICT education and its professional concentration at levels in Bangladesh. However, this article depicts the unbalanced educational thrust that is not alleviating the true scope of business competitiveness in Bangladesh. The findings from this articles show that economic stability and ICT infrastructure is not only required for effective and efficient development of the nation but also a culture of technology affiliation among the resource starved nation and a strategic plan for guiding the ICT sector is a must. Using primary and secondary market data, governmental policies, private and public initiatives, this article offers a picture of contemporary ICT environment, its shortcomings, association with the affairs of business development in Bangladesh and, finally, strategies for advancement among the landscape of different nations.

Key words: IT, strategies and business, Bangladesh.

I. INTRODUCTION

Six decades ago, at the time of the birth of computers, its main applications were to scientifically analyze computing related to firing of canons and cryptanalysis (i.e. breaking of enemy codes used for their communications). However, over the last few decades the computer technology has made giant strides and ensured a permanent seat in the affairs of the world. Without a computer, one becomes dysfunctional in today's world; in the growth spectrum, its continuous participation has rendered substantive productive gains at personal, professional and organizational levels. Information and Communication Technology (ICT), a recently coined term utilizes the immense and ever expanding powers of computers. Starting from the days of first generation computing, today the world possesses astronomical computing power that

allows us to use it for office productivity, data analysis and data sharing, number crunching, planning and forecasting, researching, communicating and video-conferencing, modeling, simulating, designing, warehousing and mining, and in many other aspects of decision-making. Truly, the ICT sector has mushroomed into a multi-trillion dollar enterprise with its scope of increasing as we progress towards a digitally connected world.

For the domain of knowledge to advance, the world is increasingly becoming dependent on the ICT sector due to its precision, speed and monopoly over inter-connected global workplace. In the era of technology leapfrogging, dominant competitive positions are required for success and sometimes for mere existence. Bangladesh, in spite of having the potential resource base, continues to be an agrarian economy with around 28.9% (Strategy

Paper, European Commission [2002-2006] of its work force still making their livelihoods from agricultural farming. However, in the knowledge economy, the world discounts heavily labor-intensive employment and offers a premium price for technology-enabled services. The demand and supply economics of labor market to a certain extent ensures this equilibrium. This article attempts to offer a strategy for Bangladesh by investing and knowledge building in the area of ICT where there is a steep learning curve.

II. LITERATURE REVIEW

ICT is an emerging sector in Bangladesh with not much research available in this area. In exploring ICT strategies for Bangladesh the concept of education, status of current education at different levels in Bangladesh and the opportunities and weaknesses in the education sector gave us a clearer picture in analyzing the prospects of ICT education in Bangladesh. In this regard, the article by Richard W. Harris & Arthur Sullivan, Academic Quality Assurance: Global Imperatives and National Responses, The Journal of Business And Economics (AJBE) was resourceful.

Recent articles in the National press and reputed magazines also had some statistics that were quoted and used in furthering our findings. M. Abdur Razzaque's Journal article[2002] on The Internet and Lotus Notes, Journal of Engineering and Technology allowed us to better formulate ICT strategies by reviewing the ICT landscape and the current and future technologies in use. Md. Saiful Islam and Shareeful Islam's Journal article on E-Commerce: Technology and its Perspective in the Developing Countries, Journal of Engineering and Technology was reviewed for introducing concepts of service sector expansion of the ICT sector and how we can introduce new ICT technologies in various service oriented industries. Professor Jamilur Reza Chowdhury's article on Promotion of Information Technology for Human Welfare and opportunities for Bangladesh, BCS Computer Show 2002 bulletin was resourceful and some of the ideas put forth in this Journal resonates some of his vision. His article clearly identified some of the growth areas in which Bangladesh should move into and had plenty of statistics for us to use as secondary data.

Dr. Sayeed Andaleeb's keynote speech on Transforming Academia: Nurturing Quality in

Higher Education in Bangladesh, IUBAT Newsletter was introduced to put forth the idea of focused education and its prospects. The concluding section of this article introduces concepts that reflect his views to an extent. Finally the web site of European Commission, Bangladesh Computer Samity (BCS), Bangladesh Association of Software and Information Services (BASIS), Federation of Bangladesh Chambers of Commerce & Industry (FBCCI), University Grants Commission and Secrets of Electronic Commerce - A guide to small and medium-sized enterprises was used in finding various secondary information for our Journal Article.

III. INFORMATION AND COMMUNICATION TECHNOLOGY IN BANGLADESH

A. Cyber Culture

Bangladesh has embraced the ICT revolution in earnest. However, this specter was slower in comparison to other advanced economies. Since the slow growth in the number of computers and telecommunication lines, Internet was not pervasive. Pertinent other reasons, such as, poor economic conditions, lack of interest in the Internet medium and poor knowledge about the power of this new age business tool also contributed to the slow growth of Internet connections in households and businesses. More recently, following the footsteps of international ICT revolution, Bangladesh and LDC countries have become cyber advocates. Internet connectivity is rising geometrically; the cyber culture is slowly developing. Browsing and emailing have become quite a common phenomenon amongst the middle class and the business environment. This recent phenomena has induced some local companies to organize and enter into the cyber business to support the growing market needs. This phenomenon is noticed across different urban city centers in Bangladesh where cyber centers and cyber clubs are drawing a good number of clients on a daily basis. Cyber cafes have mushroomed in Bangladesh, especially in Dhaka with around 200 cafes. This number is by no means a large number when compared to India or China where there are over few thousand Cyber Cafés in both countries. An association of the cyber clubs has already been formed that uses advocacy to lobby for their privileges with the Government.

B. ICT Education

ICT education in Bangladesh had been on going since mid-eighties; however, a reasonable thrust for ICT education practically started in the early part of 90s and obtained full velocity during 1996-1999 period when major ICT training houses out of India and Singapore established their market presence in Bangladesh. (Aptech: 1998, NIIT: 1997, Genetic: 2000). Many other entrepreneurs also setup their flavor of ICT training centers, fueling the growth of this sector. The private sector led growth enticed the Government to offer some guidance in this sector by making policy changes that aided in the development of this sector, although the direction was not well conceived and misallocation of resource resulted out of it.

C. Government ICT Plans

The Government of Bangladesh has recently understood the imperative to be connected to the global changes in the ICT sector and its role in job creation and economic emancipation. Through an autonomous body, Bangladesh Computer Council (BCC), established by Act No IX of 1990, it had been offering training and advisory services to Govt., non-governmental organizations and businesses. It has been offering support to Bangladesh Computer Samity (BCS)- the largest trade body in the ICT sector in Bangladesh - and Bangladesh Association of Software and Information Services (BASIS). BASIS has 81 Members (2002); however, only three firms have ISO 9001 certification. To expedite quick entry into the global IT sector, Bangladesh opened an office in Santa Clara, California to benefit from the huge global IT market by coming to the center of the action.

D. Government's Facilitating Role

The IT task force appointed by the Government in Bangladesh has been working hard to bring the IT revolution in full swing, enabling human resource & software exports and development of trained pool of IT professionals to optimize business competitiveness at par with global standards. The Government of Bangladesh is pursuing to get connected to the submarine cable (by 2004), which will further accelerate the growth of the ICT industry. Under this agreement in Bali in Indonesia, the network linking Southeast Asia, the Middle East and Western Europe (SEA –ME-WE) will cover 12

countries, including Bangladesh. The cable will bring in new frontiers of growth in the ICT sector by increasing the speed of data transfer through internet. It will be built using DWDM (Dense Wavelength Division Multiplexing) technology, with a proposed capacity of 1.28 terabits per second (Tbps) speed (Source: The Bangladesh Observer: 5/09/002). The Government in an ICT strategy paper (2002) mentioned its intent of facilitating proper environment for exports of \$2B by year 2006 and also exports of Tk. 200 crore by the end of 2003. The Government of Bangladesh has already barred all forms of taxes and duties on computers and its accessories. In addition to these, the Government has allocated Tk. 300 crore business loan to ICT and Agro-Industry sectors that will be disbursed through nationalized banks. In addition, the Govt. has taken steps to reduce the cost of telephone to Tk. 5000 in upazillas, Tk. 8000 in district towns and Tk. 10,000 at large metropolises.

The Government has established three Science and Technology Universities in Dinajpur, Patuakhali and Tangail. Four existing BITs is in the process of being converted to Technical Universities as per speech of the Prime Minister of Bangladesh. She further added that 'as many as 25,000 computer sets would be supplied to the country's educational institutions over the next four years to help turn the present educational system more technical (Bangladesh Observer Article: Information Technology and Development: Bangladeshi Perspective, November 17, 2002, P-5). In addition, the University Grants commission (UGC) is setting up BERNET (Bangladesh Educational and Research Network) establishing linkage among the Universities and providing access to the Internet. The Government is also planning to setup public kiosks all over the country. In a recent step, the Government exempted from the Multimetering System (MMS) for ISP client service. Although this goal setting is ambitious, it lacks clarity, seems directionless and offers no strategic road map as to how these goals will be materialized. Needless to say, this type of visioning shows Government's inclination to expand this sector, create employment and earn valuable foreign exchange.

E. Vision of Bangladesh Computer Samity (BCS)

"This Policy aims at building an IT-driven nation comprising of knowledge-based society by the year 2010. In view of this, a country-wide IT-

infrastructure will be developed to ensure access to information by every citizen to facilitate empowerment of people and enhance democratic values and norms for sustainable economic development by using the infrastructure for human resources development, governance, e-commerce, banking, public utility services and all sorts of on-line IT-enabled services.”

In the ICT strategy of BCS many lofty goals have been suggested that Bangladesh Government will undertake in the coming years. These goals setting are indeed helpful to jump-start the ICT sector; however, the ICT strategy is too comprehensive and, given our country's resources, it need to be narrowed down. Directly drawing from the ICT strategy paper, some of these areas of scope are explored in the following section. In 3.1 to 3.16, the ICT policies discuss on widespread ICT education at all levels, establishment of 12 of Science and Technology Universities in the fifth five year plan (two earmarked to be with ICT specialization), establishment of multimedia institutes and diploma training institutes, Teachers Training Institutes (TTI) including TTCs, NAPE, PTI, RD & COOPs, deployment of virtual teachers and CD and web based courseware development, English training for teachers, setup national accreditation system, initiate ICT distance learning, ICT infrastructure development, amendment of taxes in the communication sector, open unexplored Railways, Electricity and Gas Companies' unutilized potential to the ICT sector, share BTTB's infrastructure with private entities, create joint venture companies with BTTB to offer countrywide National Information Infrastructure (NII), shift BTTBs role from service provider to infrastructure provider, increase teledensity, develop national Internet access platform, extend Internet facility to district headquarters, place internet facility to educational institutions and libraries at a subsidized rate, set up Cyber Kiosks in all post offices, union complexes, and Upzila complexes, establish national high speed communication backbone for Internet access, establish Hi-Tech Zones through technology transfer with the cooperation of foreign companies and non-resident Bangladeshis, establish Software Technology Park, develop central depository collection and dissemination of IT information and research findings and connected to all university libraries and research organizations, coordinate IT R&D activities carried out by the public and private sector organizations, establish central on-line data bank for scientific and technological information,

expedite R&D efforts on Bangla text processing, Bangla voice recognition, translation and synthesis, give price preference to locally developed software in all public and private sector procurement, extend start-up financial support to the local software industry.

In addition in the service sector the following strategies are being suggested: Establish inter-banking payment system in electronic form, develop E-certification standards and systems, establish legal infrastructure for E-business and E-commerce to flourish. On the area of E-Governance, the following strategies have been put forth: use IT system within the public administration to improve efficiency, reduce the wastage of resources, enhance planning and raise the quality of services, implement wide-spread IT systems to provide nationwide coverage and access by citizens to the government databases and administrative systems, bring all Government ministries, divisions, departments, bodies and all district headquarters, Upzila headquarters and Union headquarters under the network of the National Data Resource Center in the shortest possible time, manage each ministry, divisions, government bodies by creating IT cells, set up web sites for ministries, divisions, agencies of government and semi-government organizations where all policy documents and information relevant to the public shall be ported and regularly updated, give preference to IT literate persons for recruitment in public offices, etc.

In the area of Legal Issues, the Government will implement Software copyright provisions embodied in the Copyright Act 2000 by promptly setting up appropriate enforcing bodies as mentioned in the Act., enact IT Act immediately, ensure Data security and interoperability through actions such as setting of encryption standards and international agreements on interoperability.

In the area of Health care, use ICT to manage electronic medical records, telemedicine, medical and health education, introduce Telemedicine System Network throughout the country for cost-effective delivery of health care services, develop Bangladesh Health Portal for appropriate growth of e-health and telemedicine referral systems, link public hospitals and medical research centers by computer networks with Bangabandhu Sheikh Mujib Medical University as the central hub to make expert services available throughout the country, etc.

In the agricultural sector, utilize ICT systems in agri-business development, agriculture research, and dissemination of agricultural technology to the farmers and preparation & maintenance of agricultural database.

To foster the welfare of the society, implement ICT systems for rural development activities, agricultural, horticulture, fisheries and livestock extension for farmers, career guidance for youth, technology guidance for rural enterprises, micro level planning, etc. Introduce IT-based systems for public grievance redressal to facilitate access to citizens through any of the kiosks, public facilitation centers or Government offices, encourage Non-government organizations to establish centers at the village level for providing hardware/software or other support services. The Government will also use both formal and non-formal channels to disseminate information about the application and advantages to communities in using the services of ICT, etc.

In addition, the Government intends to create ICT enabled environment in tourism, transportation, environment and judiciary sectors. It offers strategies to become the focal point of regional and international cooperation and exchange. The Government also intends to earmark at least 1% of ADP by 2005 for ICT sector and create a centralized fund for R&D and HRD with Bangladesh Computer Council (BCC). One per cent (1%) of all profits from Software and IT-enabled services shall be paid to this R&D and HRD fund. To make proper utilization of ICT and exploit its immense economic, social, and scientific potential a 15- member National IT Task Force headed by the Hon'ble Prime Minister has already been formed in January 2001. This apex national body will be instrumental in updating, implementing and monitoring the ICT Policy of Bangladesh.

V. WORLD SUMMIT ON INFORMATION SOCIETY (WSIS) AND THE GOVERNMENT OF BANGLADESH

Bangladesh is preparing a strategy paper for greater market access for ICT products for developing nations at the (WSIS). In the strategy paper the Govt. will seek international support in product development, research and investment to bridge the digital divide between rich and poor nations. The strategy paper will frame a set of ethical guidelines for boosting the country's

software industry, so that it can play a stronger role in the post WSIS regime. Three ministries – Science and Technology, Foreign Affairs and ICT - are preparing the country strategy paper along with help from the Bangladesh Working Group on WSIS. It is the view of Bangladesh that the global Intellectual Property Rights (IPR) regime should recognize the needs of developing countries even as these countries take steps to protect their indigenous rights.

In this summit, Bangladesh will advocate wider use of ICT in global trade to ensure greater access to world markets for developing countries. The civil society in Bangladesh has taken keen interest in the WSIS process, reflecting a changing perspective of the nation as a whole. A non-governmental organization, Bangladesh Friendship Education Society, organized an international conference on the role of NGOs in building a knowledge society in January 2002. It had representation from the Bangladesh government, media, civil society and international agencies that led to the creation of the strategy paper for the WSIS.

A. Private Sector Entrepreneurship and Facilitating Role

The private sector led ICT growth opened the doors for employment, knowledge development and sharing through classroom and on-the-job trainings, a blossoming service sector and initiated a culture of business transformation and automation. It also pushed the productivity curve and made the business environment competitive, expedient, accountable and accurate. With the first off-line ISP arriving in Bangladesh in 1993 and subsequently the on-line ISP arriving in 1997, the ICT revolution is ongoing in Bangladesh. For facilitating accelerated ICT growth, the communication infrastructure and adequate Internet users need to be in place. There are approximately 130 companies in Bangladesh with their own V-SAT connectivity; out of which 61 companies are offering ISP service. The numbers of Internet account clients have risen steadily from slightly over 1 lac in year 2000 to more than 6 lac by November 2003 (source: Agni Systems, Bol-Online). In this growth, the vital factor has been the proliferation of cyber cafes, falling cost of computers, telecom infrastructure development and emphasis on computer literacy. The APEX bodies of ICT companies in Bangladesh are BCS (Bangladesh Computer Samity) and BASIS. Under these trade bodies over few hundred

small, medium and large IT companies are registered members. Currently, BCS and BASIS have 364 and 81 members respectively.

B. Web Portals and its Facilitating Role

Web portal business has been common business model in North America, Europe, Far East and India. The likes of Yahoo, Amazon, Ebay, Google, Rediff.com, America Online, and Baze.com etc. are nemesis in the cyber business. Successful portal businesses have different business models, target markets and segmentation strategy. In Bangladesh, some companies are focusing on offering broad information on Bangladesh from entertainment to matrimonial service, from sports information to selling everything from apartments and real-estate to selling products and services, etc. Web Portals can be likened to digital newspapers where the portals act as information repository and hopes to attract large audience. As the hits (the number of viewers) rise, the web portal companies can start earning money by selling advertisement space and other services on the web. Some of the local web portal companies that are operating in Bangladesh are as follows:

www.munshigi.com, www.bdjobs.com,
www.beekree.com, www.banglacafe.com,
www.bdflores.com, www.kenabechea.com,
www.bangladesh.net, www.bangla2000.com,
www.bangladeshinfo.com, www.jobssbd.com,
www.bangladeshyellowpages.com,
www.bangladeshshowbiz.com, www.bdyouth.com,
www.bdworld.net, www.chetona.com,
www.cyberbangladesh.com, www.bangladesh.com,
www.bdbazar.com, www.bangladesherkhela.com,
www.bangladesh4u.com, www.bdyellowpage.com,
www.blaze-dir.com, www.sonalibangla.com,
www.bdbusiness.net, etc.

C. Global Industry Analysis

Software, Hardware and Dot.com business had gained momentum towards late 1990s up to the Dot.com crash in late 90s. It brought in an era of suspicion and conservative valuations. Companies became much more wary of the technology to be used and naturally put in a halt to high spending software purchases in anticipation of lean years stemming from the crisis in the ICT sector and economic slowdown. The ICT industry had gone through severe twists and turns in the early part of

year 2000; in the subsequent period the industry has matured with the emergence of some sizeable contenders and many localized enterprises addressing the needs of the niche markets. During the wave of the last few years, any business model that had Internet focused marketing strategy had flown high with millions of people putting their money behind these 'to be successful' companies. However, the future became unpredictable due to global recession and the craze in dot.coms fizzling out. Not all of the companies were as successful as they were projected to be by entrepreneurs, analysts and promoters of the industry. During the last few years, especially during the trying times of late 90s and early 2000, the ICT industry, especially the dot.com industry, went into a tailspin. The much exaggerated revenue potential was built on pipe dreams. The result was a catastrophic drop in share prices of many publicly traded dot.com companies; the investor sentiment became hostile to the concept of 'dot.com wonder' or investing in most other ICT companies, contributing to an almost standstill in Initial Public Offerings.

More recently, during the latter part of 2002, the ICT industry started to show potential with some of the largest ICT companies (including dot.coms) posting profits. With regards to dot.com industry, it was waiting to turn profitable with some positive turn of events, especially due to strong global business prospects for companies that used the Internet platform at the core of their business model.

IT revolution is in full swing our neighboring country, India. Software development and Support is a multibillion dollar business there as comparison to a mere few million dollars of business in Bangladesh; E-commerce and more specifically E-tailing is still in its infancy in India and only a tiny fraction of the nation's 10 million-odd Internet users shop on-line. Tech researcher IDC expected country's business-to-consumer e-commerce market to grow 88 per cent to Rs. 2.38 billion in 2002, led by travel bookings. The market is estimated to expand nearly nine-fold to Rs. 23 billion by end-2006. (Bangladesh Observer: December 22, 2002, P-13)

The global market for ICT enabled services is estimated to grow from approximately US \$10B to approximately US \$200B by 2010. The following table shows the distribution as per various industries.

Category	US\$bn
Human Resources	50
Customer interaction	42
Finance & accounting	20
Data search and Analysis	20
Remote education	19
Animation	2
Translation and localization	1
Engineer design	6
Network consulting and management	8
Website services	7
Market research	5

Source: Promotion of Information Technology for Human Welfare and opportunities for Bangladesh, BCS Computer Show 2002 bulletin by Professor Jamilur Reza Chowdhury [2002]

VI. OVERVIEW OF ICT STRATEGIES IN INDIA

India has become an IT giant over the last decade and a half with careful strategizing and successfully implementing. In a recent article [Home Run, Page 30, 10 November, 2003], Indian IT industry's phase-by-phase planning was shown. India, in order to maximize its potential from the ensuing global IT revolution, created a three stage approach with definite goals and

objectives to be met in each stage. It can be easily noticed from their developments in the IT sector, they had a migration path of taking easier tasks in earlier stages and more complex tasks in the advanced stages of the ICT revolution. As per the article, India had a pre 1995[stage 1], between 1995-2001[stage 2] and beyond 2001[stage 3]. These stages had addressed different market needs and as a result India's ICT and human resources were focused accordingly.

Pre 1995[stage 1]	Between 1995-2001[stage 2]	Beyond 2001[stage 3]
Work peripheral to existing ICT systems outsourced or off shored to India	Mass migration to US for Y2K jobs, systems integrator and IT consulting	Expand centers in India by Microsoft, Intel, Oracle, IBM and others
Support functions in payroll, inventory control, etc.	Secure low end jobs like testing and maintenance moves to India	Large centers(India) hires in excess of 30,000 ICT professionals
Porting software from one language to another	Emergence of India as potential IT offshore destination	US recession and 9/11 prompts US companies to outsource/offshore work to India
	Emergence of India as Systems Integrator and IT consultant	Mass migration back to India with credible technical and management skills, fueling the growth of Indian ICT revolution

The Indian strategy enables the human resource workforce and related technology resources to be deployed systematically, ensuring tangible gains for

their ICT sector. Nasscom (Largest Indian Association of ICT sector) estimates that 35,000 ICT professionals (a little under 10% of the total

Indian ICT workforce in the US) have returned since 9/11. According to NASSCOM, the bulk of the returning ICT professionals found jobs – simply because the Indian ICT industry has been growing. Last year (2002), the number of ICT workers hired in India increased by 127,750 to 650,000 (approximately 24.26% annualized growth). India Development Centers (IDC) of multinationals has the highest concentration of H1-B workers & Green

Card holders. In stage 3 of Indian ICT era, the Indian ICT sector is at the peak of its confidence, doing high-tech product engineering and even full product development. India has emerged as the global knowledge center and high-tech hub for the ICT sector. NASCOM sees a shortfall of 235,000 IT workers by 2008. In 2002-03, India exported \$7.2 B in software while the US exported \$25 B.

VII. BANGLADESH MACRO-ECONOMIC INDICATORS

	1995	1996	1997	1998	1999	2000
Income and Growth						
GDP per capita (in US \$, current)	316.4	333.5	340.5	348.1	356.6	373.1
GDP Growth (% in constant prices) ^a	4.9	4.6	5.4	5.2	4.9	5.5
Saving and Investment (in current market prices) (Percent of GDP)						
Gross Domestic Investment	19.1	20.0	20.7	21.6	22.2	22.4
Gross National Savings ^b	16.7	16.0	18.6	20.6	20.8	21.3
Export growth (annual percent change)	37.1	11.8	14.0	16.8	2.9	9.1
Import growth (annual percent change)	39.2	17.9	4.1	5.1	6.6	6.8
GDP (current prices, in billion Taka)	1,525.2	1,663.2	1,807.0	2,001.8	2,197.0	2,412.7
GNP (current prices, in billion Taka)	1,517.7	1,712.7	1,865.4	2,068.8	2,269.9	2,499.7

Sources: Bangladesh Bureau of Statistics, Revised National Accounts Data (March 2000); Bangladesh Bureau of Statistics, Statistical Yearbooks (various issues); Bangladesh Ministry of Finance. Memorandum for Bangladesh Development Forum (1999-2000); IMF, Economic Indicators of Bangladesh, March 2000; World Bank

A. IT Outlook in Bangladesh

IT Related Profession	No. of Individuals	Percentage
Teacher/Trainer	3065	16.37
Administrator	2386	12.78
System Analyst	486	2.60
Database Expert	870	4.64
Network Expert/Network Engineer	432	2.30
Programmer	1221	6.52
Hardware Engineer	979	5.23
Operator	9154	48.90

Source: Computer Jogot: September, 2002, Page – 35.

IT sector's expansion can be seen by the number of seats available for IT related subjects in various universities and institutes in Bangladesh.

University/ Institute	No.	Students Per Year
Public University	7	297
Private University *	52	1500
National University	1	600
BIT	4	240
Total		2337

* Modified to reflect changes up to December, 2003.

Source: Bangladesh Observer Article, November 17, 2002, Page- 5

B. Market Trends

The Internet and its Support Facility

The Internet is a common terminology in today's digital world. In general, the Internet means a collection of TCP/IP (Transmission Control Protocol/Internet Protocol) based global network of computers. Under the Internet space (Internet Super highway or Corridor), there are millions of computers connected globally. Some common facility that Internet offers has aided to advance human lives on earth. Some of these direct value editions are:

E-Mail & FTP (File Transfer Protocol) Service

Online Chatting & Net Meetings

On-line Money Transactions

Web Browsing & accessing geographically dispersed information

Search Engine Facility for expediting information collection and research

E-books and Online Education and Testing Facility

Data warehousing and Data mining

Global trading through e-commerce (B2B, B2C, C2B, C2C, G2G, G2B, B2G, G2C, etc.)

Internet banking and securities trading

Cyber laws and related services, Encryption, Standards organizations, etc. service sectors

In the Internet space, there is no dearth of information. Information on any area under the roof of this universe is available in the Internet. This endless medium of knowledge has created such an explosive potential that everyone can reap benefit from. Many business models that never existed

prior to Internet have become successful due to the advent of Internet. Companies have emerged that provide services in varied areas. Some of the common businesses that have ventured into the Internet space are:

Online Banks & Brokerages

Online Retailers

Online Portals for general or specialized areas

Companies offering FTP sites providing download facility for programs, games, drivers, updates and fixes

Search Engine companies like Yahoo, Alta Vista, Lycos, Excite, About.com and Web crawler

ISP and Internet Telephony companies

Domain registration, data warehousing and mining, and hosting companies

C. Strategic Roadmap

Bangladesh's progress depends on developing a roadmap that is realistic, achievable and can be implemented in phases. In reviewing the ICT policy of Bangladesh, we found that the focus of is definitively too broad. If we were to compare the strategies taken by India, we notice that its approach was in three phases (as explained in the body of our Journal). In the first phase, some developments were earmarked with special emphasis placed on the availability of human resources, technology, infrastructure and financial resources. In the case of Bangladesh, we have formulated such grandiose plans for progress without realizing the facts of the land. As per the macro economic indicators, Bangladesh still remains a very poor country with per capita income around US \$371. With this income level per capita,

all our strategies must be in line with this reality. Bangladesh has to take plans where resource commitment is less but allows our human resources to be trained in areas where there is employment vacuum globally. For instance, India did not focus on Call Center Management, Systems Integration or Systems Architecture in their developing years in the ICT sector. It is only now in the third phase of the Indian development cycle that it is concentrating on high-end areas in the ICT sector. India planned this migration path and made prudent strategic investments in realizing its vision. In this regard, India also allowed thousands of ICT workers to find overseas employment, namely in the US and other western countries. Through their migration, they went and acquired advanced knowledge and gained valuable industry experience for full implementation of projects. For Bangladeshis, this possibility was really not there, as their theoretical knowledge was not backed by practical knowledge. India's advanced and mature ICT industry played a contributing role in this development process of its human resources. The ICT development in Bangladesh must be planned with some measurable goals (the Indian approach may be assessed in depth). In Bangladesh, the NGO sector and its funding has little connection to the development of the tertiary level education. We propose re-routing of funds for college/university education and research.

In addition, we must devise our country's ICT strategy based on international employment opportunities. For instance, a programmer in a language gains proficiency in three or four years on the job and then can look for international opportunities; however, if that same person concentrated in some software applications such as Access, SQL, ORACLE, SPSS, NT, GIS, etc., then he/she can gain international level competencies within two years. In our country's race to advance in the globalized world, we must find shorter and quicker

paths to get our graduates and resource persons to be situated at local and international levels. Once we achieve this milestone, we can proceed to the next stages of developing competencies in areas of advanced specializations. We must also keep in mind that our work force at international locations will fuel the growth for outsourcing jobs and setting up of offshore facilities. In India, in its third stage of development, major multinationals (especially in the ICT sector), had setup International

Development Centers (IDC) that accelerated learning and practical expertise.

VIII. CONCLUSION

The information presented in this Journal offers us the view that Bangladesh is very much an infant in the world of ICT. Where large industry segments like data warehousing, process integrators and complete ICT solutions providers have emerged on the global frontier with multibillion dollar business and thousands of trained human resources in the ICT sector, Bangladesh's ICT sector is fledgling with not much clarity of vision. The Government's statement of becoming a \$2B industry by 2006 has no substantial basis. The integration with the submarine cable still continues to be delayed. For any growth in the ICT sector to happen, connecting to the Internet backbone is a pre-condition. The Government's ICT policy is extremely diverse and almost covers all areas of the ICT industry; however, it fails to offer constructive guidance on the time line and money to be expended in each sector. It also does offer no suggestions on prioritizations development initiatives within the ICT sector. The Government has been talking of ICT revolution and that plans to introduce computers into all primary schools in Bangladesh. Indeed it's a good idea, but if the tertiary sector (University level education) does not offer quality graduates then only half-literate human resource would not be able to get self-employment or create an ICT revolution. It is our strategy that the Government may have to take an elitist view point and train only a few hundred of the brightest and best of students at the university/college/school level and put in enough resources that they become really qualified at the time of graduating from colleges/universities. The Government should also offer tax benefits to organizations that computerize their facility and introduce advanced ICT enabled environment in their administration, procurement and business transactions.

With the current Human Development Index (HDI) for Bangladesh at 0.37, the UNDP allocates Bangladesh 145th place in a group of 162 countries. The ground reality for Bangladesh needs to be assessed before leaping forward. Bangladesh, itself suffers from image crisis and this crisis cannot be removed overnight and ICT explosion cannot just happens overnight. In an extremely connected world of cause and effects, the Government must also expedite in improving its status in multiple

quarters, such as in the area of corruption, human rights, software piracy act, legal enforceability, etc. The Government may also initiate public-private partnerships and ICT ventures that will have a ready market within the Government and local organizations. The Government or by allowing the private sector, establish technology incubators by foreign companies that will employ and train local ICT resources. Instead of jumping into every possible sector, the Government or the private sector may focus their energies on development in some emerging sectors where Bangladesh may have competitive advantages due to labor cost advantage, spoken English ability, time differences, etc. The area of 'information commerce' even within the local boundaries of Bangladesh has not gained currency yet, but through awareness its benefits can be brought out. This awareness will be the fuel to develop many ventures that can be ported to the Internet. The use of Internet is still costly in Bangladesh due to high tariff rates and lack of access to telephone or broadband, the Government may offer subsidy to organizations for connecting to the Internet. This gesture by the government will allow entrepreneurs to develop many different business models that will bring monetary benefits while creating employments.

Foreign funds support is mostly sustenance focused. The Government should lobby with these organizations to change some of their focus and deploy resource so that our university level human resources get trained with global competencies and generate revenue (even foreign currency by overseas employment or finding offshore or outsourced work) to support themselves and their family and contribute to the national exchequer.

In the final analysis, the ICT sector has immense potential, if only guided with sound vision and market focused outlook. In this journey for advancement, a key partnership between the Government and the private sector must be ensured through joint efforts, communications and above all, by engaging, educating and uplifting the lives of the brightest human resources in Bangladesh who in turn will act as agents of change to bring up the standards of their family/ peers and normal citizens of Bangladesh. Bangladesh need to refocus its energy by providing outstanding quality education to this select group of people and gradually introduce ICT education over the next decade to secondary and primary levels en masse.

REFERENCES

- [1] Richard W. Harris & Arthur Sullivan [2002]: Academic Quality Assurance: Global Imperatives and National Responses, The Journal of Business And Economics(AJBE), Vol 1., No. 2, August 2002.
- [2] Md. Saiful Islam and Shareeful Islam [2002]: E-Commerce: Technology and its Perspective in the Developing Countries, Journal of Engineering and Technology, Vol. 1 No. 1 Jan-Jun 2002.
- [3] Professor Jamilur Reza Chowdhury [2002]: Promotion of Information Technology for Human Welfare and opportunities for Bangladesh, BCS Computer Show 2002 bulletin.
- [4] Dr. Sayeed Andaleeb [2002]: Transforming Academia: Nurturing Quality in Higher Education in Bangladesh, IUBAT Newsletter, January-December 2002.
- [5] M. Abdur Razzaque [2002]: The Internet and Lotus Notes, Journal of Engineering and Technology, Vol. 1 No. 1 Jan-Jun 2002.
- [6] Computer Jogot: September, 2002, Page 35.
- [7] Homerun: Businessworld, 10 November, 2003, Page 30
- [8] Bangladesh Observer, November 17, 2002, Page 5.
- [9] European Commission, Directorate General External Relations, Country Strategy Paper Bangladesh [2002-2006]: europa.eu.int/comm/external_relations/bangladesh/sp/02_06_en.pdf
- [10] The European Commission's Website: www.eudelbangladesh.org/en/eu_and_country/cooperation
- [11] The website of the Ministry of Science & Technology: www.mosict.gov.bd
- [12] Secrets of Electronic Commerce (ISBN 92-9137-195-5), A guide to small and medium-sized enterprises[2001]
- [13] Sharier Khan, Bangladesh to stress on access to ICT markets[2003]: www.oneworld.net/article/view/71534/1

[14] IT Policy:
www.bccbd.org/html/itpolicy.htm#3.6

[15] IT Policy, BCS website: www.bcs-bd.org/itpolicy.html

[16] Website of Bangladesh Association of Software and Information Services:
www.basisbd.org

[17] National Policy on Information and Communication Technology, Second Draft, Federation of Bangladesh Chambers of Commerce

& Industry [March 2002]:
www.basisbd.org/fbcci.rtf

Appendix:

World Wide Web(WWW): System for browsing internet sites, called the Web because it is made up of many millions of sites.

TCP/IP: Transmission Control Protocol/Internet Protocol

URL: Uniform Resource Locator (the internet address of all sites)