

USING PORTER'S DIAMOND TO DETERMINE THE CONDITION OF ICT IN A DEVELOPING COUNTRY: A STUDY ON BANGLADESH

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ABSTRACT: *In this study, an attempt has been made to illustrate the circumstance of ICT in Bangladesh and that is basically descriptive in nature and mainly concentrates on secondary sources. ICT sector in Bangladesh has improved over the few years. The evolution to a more competitive environment has resulted in greater investment, more service providers, variety of innovative products, improve quality, lower cost and greater accessibility-all of which have a positive impact on the proliferation of ICT industry. The competition in telecommunication has increased and also the broadband penetration. E-Governance that can enhances the efficiency and effectiveness in the public sector and contributes to generate knowledge-base society. In the competitive world, there is pressure for e-Commerce, e-health, e-service, e-learning and e-transaction and this can make incessant advancement of ICT. Articulate and substantial policy and program promote ICT. Effective e-HRD program and R&D can enhance the innovativeness, efficiency and capabilities.*

KEYWORDS: ICT, E-Governance, E-Commerce, E-Health, E-Service, E-HRD]

INTRODUCTION

The information technology industry has gradually increased in Bangladesh. In this competitive world ICT is an inevitable ingredients where a country can makes a predominant position in the world market through its continuous innovation and research and also it accelerate the value addition capacity of each sector for strengthen the national economy. ICT assists to make integration with the global economy and international community. ICT has enriched our social, political, socio-cultural and economic development and also reduces manifold difficulties. ICT that includes any communication device or application, encompassing: radio, television, cellular phones, computer and network hardware and software, satellite system and so on, as well as the various services and applications associated with them, such as video conferencing and distance learning. In Bangladesh IT professionals are doing different kinds of activities like data management, networking, engineering hardware, database and software design and many more. Mean while, the present government has an indomitable willing to escalate ICT by modernizing the telecommunications infrastructure, formulating a substantial regulatory framework for the digital economy that support the private sector and foster corporate competitiveness, developing human resources through the restructuring of education, training and research institution and also enhancing international cooperation and partnership in the ICT field. Bangladesh has competitive

advantages in labor cost and through it our country indubitable makes prevailing position in international market. Bangladesh is a developing country, the standard of living of general people is not lucrative but if ICT disseminate rapidly then brings a new aspiration and enterprising to flourish their standard. In 2025 the Bangladesh want to become a middle-income country and ICT will be a great option to bring this hope into reality.

Objective:

1. To evaluate the condition of ICT in Bangladesh
2. To provide a conspicuous idea over ICT that can play a major role for sustainable economic development
3. To perceive the advantages and drawbacks for proliferation of ICT in Bangladesh.

LITERATURE REVIEW

In 1990, Michael Porter of the Harvard Business School published the results of an intensive research effort that attempted to determine that some nation succeeds and others fail in international competition. Porter and his team looked at 100 industries in 10 countries. The book that contains the results of this work, the competitive advantages of Nation, has made an important contribution to thinking about trade. Porter theorize that four (Factor endowments, Demand condition, Relating and supporting industries, Firms strategy, structure and rivalry) board attributes of a nation shape the environment in which local firms compete and these attributes promote or impede the creation of competitive advantages. Two additional variables can influence the national diamond in important way: chance and government.

Factor endowment: Porter recognizes hierarchies among factors, distinguishing between basic factor (e.g., natural resources, climate, location and demographics) and advanced factors (e.g., communication infrastructure, sophisticated and skilled labor, research facilities and technological know-how). Advanced factors are the most significant for competitive advantages and also advanced factor are a product of investment by individuals, companies and governments.

Demand condition: The role of home demand plays in upgrading competitive advantages. The characteristics of home demand are particularly important in shaping the attributes of domestically made products and creating pressure for innovation and quality. A nation firms can gain the competitive advantages if their domestic consumers are sophisticated and demanding.

Related and supporting industry: The third board attribute of national advantage in an industry is the presence of suppliers or related industries that are internationally competitive. The benefits of investments in advanced factors of production by related and supporting industries can spill over into an industry, thereby helping it achieve a strong competitive position internationally.

Firms Strategy, structure and rivalry: Porter makes two important points here. First, different nations are characterized by different management ideologies that help them or do not help them

to build national competitive advantages. Second point is that there is a strong association between vigorous domestic rivalry and the creation and persistence of competitive advantage in an industry.

The Role of Chance: chance events, such as major innovations, can reshape industry structure and provide the opportunity for one nation's firms to supplant another's.

The Role of Government: All the policies and regulations made by policymakers at all levels of government can benefit or adversely affect the competency of a country and an industry. The emerge of ICT in Bangladesh is not a primordial; it is in the initial stage. In the initial stages manifold congruous policies are taken by the government, it surely assists to make a revolutionary change in the ICT sector. Infrastructure in ICT is not disarming one so that government should concentrate on infrastructure development and ultimately it generates an avenue to strengthen our ICT sector because in Bangladesh having around 160 million of people and this people can contribute for strengthen ICT sector in near future

RESEARCH METHODOLOGY

The study has been conducted mainly on the basis of literature survey and secondary information. Various seminar papers and summary of discussion in those seminars, taskforce reports of research organization, journals and some periodicals on computer and information technology such as eBiz, computer tomorrow and computer jagat have been surveyed for the purpose of the study. Some computer adroit person has also been interviewed for the purpose of accumulating facts and information

ANALYSIS AND DISCUSSION

The focal thing of this paper is that to determine the condition of ICT in a country like Bangladesh and make an assessment of ICT with the assist of Porter;s Diamond.

Factor endowment: Bangladesh has identified ICT as a "thrust sector" as it represents potential for successful reforms, job creation, industry growth and high spillover effects to other sector as well as improving governance and facilitating inclusion. In Bangladesh there are close to 500 software and ITES companies in Bangladesh, of which more than 100 companies export their products to over 30 countries. Every year over 6,000 IT graduates come out of these universities and colleges. A large part of the IT graduates also possess global It vendor certifications (e.g. from Microsoft Cisco, Oracle, Sun) on top of their academic degree. Excellence of IT workforces from Bangladesh is well-accepted fact at home and abroad, over 10,000 It professional from Bangladesh overseas company or as an offshore development center (ODC) by one-hundred-percent foreign capital. Over 90 Universities and 700 colleges across are working successfully in various IT companies in USA including Microsoft, Intel, IBM, Sun, Oracle, Texas Instruments, Cisco, Nortel and Lucent. Government " thrust sector" initiative for ICT include exemption of income tax, value -added tax, and custom duty for ICT industry,

establishment of national ICT policy organizing the ICT National Taskforce, establishment of ICT incubation center long term equity fund and short term working capital financing, enactment of Copyright Law etc. The government to facilitate all the infrastructure support needed by outsourcing companies is building special Hi-Tech and Software Technology Parks. BTRC sources said the two submarine cables would be set up under the sea, having landing stations at Kuakata, Patuakhali, Barisal and Chittagong. Terrestrial fiber link has to be established between Dhaka and the landing stations. The demand for bandwidth will rise in every sector in Bangladesh, which now uses 17 gigabyte of its 44-gigabyte bandwidth capacity, as the government aims to bring the whole country under fast Internet connectivity. Moreover, the Access to Information (A2I) project of the Prime Minister's Office has initiated a move to connect the country's 1.5 lakh to 2 lakh offices. The monthly rental bandwidth price for leased Internet access through submarine cable will be a maximum of Tk 12,000 per Mbps. Government initiating for E-governance, e-commerce, e-trade and e-education which makes an avenue for escalating IT and its related activities in near future.(Anon, 2011)

Table 1: Comparison of ICT success among countries

Factors	China	India	Korea	Bangladesh
Human Resources <ul style="list-style-type: none"> ▫ Language skills ▫ Programmer monthly wage (US\$) ▫ Technical skills ▫ Graduates 	Limited \$650 [Warburg]	Very \$500 [Warburg]	Fair N/A	Limited \$350 [DI estt]
Entrepreneurial culture <ul style="list-style-type: none"> ▫ Risk-taking tradition ▫ Venture capital access ▫ Diaspora inputs ▫ Drive to set world standards 	High-rising Medium-rising High Medium and rising	Medium-Rising Medium-Rising Global Leader Global Leader	Good OK; chaeboll Good Excellent	Low Low Low but rising Low
Telecom and Internet <ul style="list-style-type: none"> ▫ Availability ▫ Affordability ▫ Dialup (20 hrs/mo) [GITR] ▫ Dedicated 64 kbs/mo Dedicated 2 mbps/mo 	OK and improving High but dropping \$6.64 \$1248 [2001-GPC	Uneven OK for exporters \$6.66 \$120-400 [DI]	Global Leader Global Leader \$12.12 N/A	Poor High cost \$25..46 N/A N/A
Other supporting infrastructure <ul style="list-style-type: none"> ▫ Software parks ▫ Reliable power 	Good Suzhou Park jj..v.. w/Singapore Uneven	Global Leader (e.g.. Bangalore) Uneven	Global Leader	Poor Uneven
Business climate <ul style="list-style-type: none"> ▫ Geopolitical risk ▫ Simple startup procedures ▫ Incentives for exporters ▫ Labor code flexibility ▫ Intellectual property safeguards 	Moderate Risk No Yes Liberalizing Piracy – 94% (GITR)	High -risk No Yes Liberalizing Piracy - 63% (GITR)	High Risk No Yes Liberalizing Piracy-56% (GITR)	Moderate No Yes Uneven Piracy – N/A
Marketing/promotion <ul style="list-style-type: none"> ▫ Image as market leader ▫ Promotional effort 	Good to Excellent Medium	Global Leader Excellent	Excellent Excellent	Very low Very low

Demand condition: In Bangladesh, there is urgency for ICT advancement, which surely brings an unprecedented revolutionary alteration in the standard of people as well as to escalating the economic development and improves the communication between rural and urban. The local market constitutes a significant part of the business of the software and IT services. There is consistent growth of IT industry. The local software company recorded a total TK 790 crore in revenue last year (Mamun, 2010). Banking and other financial sectors, including capital market, insurance, leasing, and micro-finance institutions, still continue to be the major focus for most IT companies. Capital market has been flourished and that is why many of the local software firms have developed software for merchant banks, brokerage houses and issue managers. Manufacturing sectors, including readymade garments (RMG), textiles, pharmaceuticals, and other consumer goods industries have created sustainable demand for IT solutions, human resources information system, and production and financial management solutions. Service Industry like, telecommunication, hospitals and educational institutions have been proliferated and creating the demand for local software firms (Rahman, 2011). The local software firms mainly provide different services like web site development, customer relationship management, sales automation, office management, and security solutions (Mamun, 2011). To make a digital Bangladesh the present government has identified the mobile phone as a key medium of electronic service delivery to citizen (Parvez, 2011). Over 33% of the people in this country have a mobile phone. . In this challenging world there is always pressure for e-Governance, e-Commerce, e-Trade, e-Education, e-Health, e-Cash and so on (Anon, 2011). The infrastructure of IT is not congenial. In Bangladesh there are lots of IT base outsourcing firms like, Software Limited, Outsourcing Media, Bangladesh, Ulteriorious, Insoftbd web solution, Realistic TM, Realetic TM, Coders and Designers, Clipping Images, RSM-Informatics, Archiana Technology and so on. In locally these are the firms operating their business. The country earned a total of \$35.36 million from the export of software and IT enabled services in 2009-2010, while the target till the end of 2010-2011 is \$37.48 million. A total of 4,501 Union Information Service Centers (UISCs) were launched across the country. With the opening of 4,501 UISCs all unions of Bangladesh will be linked with the information super high way. Janata Tower the countries first Software Park makes an astounding progress for the inception of Digital Bangladesh.

Related and Supporting Industry: In Bangladesh the related and supporting industry like chip, hardware and Internet industry are flourishing. Both brand and cloned PCs, laptop, LCD monitor, mouse, Keyboard, CD, speaker, DVD, CD ROM drive, calling card, internet card, mouse pad, pen drive, memory card, printer, scanner are available at a cost-effective price. In Bangladesh the literacy rate, secondary education rate and most importantly our tertiary education rate is improve. Bangladesh has had more than 60 call centres set up with a combined capacity of over 2,000 seats. Since 2007, Bangladesh has experiencing exponential Internet Market growth. This steep growth in Internet penetration since 2007 was driven by two main factors namely tariff reduction and introduction of broadband Internet Technology.

Table no: 2 Internet uses rate:

Year	User	Population	Percentage (%)
2000	100000	134,824,000	0.1
2007	4,50,000	137,493,990	0.3
2009	5,56,000	156,050,883	0.4
2010	9,95,560	158,065,841	0.6

Source: Bangladesh association of Software and Information Services (BASIS), 2010.

According to the finding of the report with the appropriate initiative and policy frameworks in place, analysis suggest 20 million Internet subscribers in Bangladesh by 2020, equaling approximately 10 subscriber per 100 inhabitants, These figure translate to a household internet penetration level of 32% and business adoption of around 66% Internet/data penetration has become a major indicator of social/economic development as countries are using Internet to participate in the international economy and to exploit new technology. So that to meet that demand there is an extensive pressure especially the data market emergence and convergence of data, voice, IPTV, VAS and video. The mobile penetration in Bangladesh has increased very rapidly, now the number of mobile subscriber and fixed phone subscriber in this current year is 7.30 crore and 0.17 crore respectively. Annual growth rate is 44.6 which can create an avenue for exploration in ICT sector. In Bangladesh our software Industry has the potential to make a sustainable growth because of growing demand in the international ground (Ara, 2010).

Table no 3: Income of Software Export in Bangladesh

Fiscal Year	Growth in million
2009-2010	35.36
2008-2009	32.91
2007-2008	24.82
2006-2007	26.08
2005-2006	27.01

Source: Bangladesh association of Software and Information Services (BASIS), 2010

Innovation capacity and quality that makes competitive advantages in the world market by impeccable research and development (R&D) (Rahman, 2011). Such R&D program is going not only to increase the use of ICT solution by our diverse wealth creation sector but also increase the competitiveness of software and ICT service companies in the global market place.

Table No 4: Internet and its condition in Bangladesh

Subject Matter	2009-2010 Rating (133)	2010-2011 Rating (139)
Internet User	132	137
Internet access in school	132	132
ICT Use and government efficiency	114	116
Internet Bandwidth	125	134
E-participation	90	95

Source: The Global Information Technology Report, 2009-2010 and 2010-2011

Firm's structure, strategy and rivalry: In Bangladesh different private banks and financial institutions are operating their business. All the banks are very much sophisticated and modern tech- oriented which diminishing stress and ensures comfortable transaction. Inception of e-banking system assists to flourishing ICT industry because most of banks are using software which are locally made and the performance, quality, feature are not behind from the international standard.

The economy of Bangladesh is expanding and also the infrastructure of ICT is improving. E-Commerce is in initial stage. Internal and external communications, Correspondence, Contracts, Electronic funds transfer, Accounting functions, Buying and selling of goods and services, Credit card payments, Exchanging data without human interaction are flourishing. Different International Firms like IBM, the world's largest provider of enterprise business software has a plan to work with the governmental agencies of Bangladesh to implement cutting edge e-Governance programmes. They also want to be a partner with the country's banking industry to help implement BASEL guidelines. Samsung opens Research and Development (R&D) centre in Bangladesh for exploring the young IT professionals. There has been a rising global confidence in Bangladesh and its IT industry in the recent years. Goldman Sachs recognized Bangladesh as one of the Next Eleven (N-11)- a list of eleven countries having strong potential for becoming the world's largest economies along with BRICs (Brazil, Russia, India and China). BITS Solution Ltd, Databiz Inc, Devnet Limited, Global Outsourcing, Infinity Technology International Ltd, Inspiring Through Information Web (ITIW), Mazumder IT Limited, SW Multimedia Ltd having an advantages in the international market because of innovation, high product development, continuous market base research and unique quality at a low cost. Government has the intension to make "Digital Bangladesh -2021" so that policy, program are revised which are now very much supportive and justifying for improving the infrastructure in ICT sector.

Chance: Chance events have different impacts on nation, which are good and bad. With the increase of using Internet there are enormous opportunities for Bangladesh to be well establishing country in ICT. Bangladesh will be a lucrative option in outsourcing because of low cost, not just that there is skill and competent people who have IT knowledge as well as English proficiency. Bangladesh also has the location advantage for expanding ICT sector. Chance events affect national competitive advantages; nation plays an important role in what nation exploit them. Bangladesh needs to exploit the opportunities by having low cost.

Government: Government defined infrastructure development is fundamentally an important factor for becoming “Digital Bangladesh” so that simultaneously an initiative need to taken for improving ICT sector by conglomeration of an inevitable resources like skill labor forces, administrative arrangement, policy formulation and so on. A range of action has been taken for considering 2015 as a medium plan as well as 2021 for long term. In this fiscal year 2011-2012 the allocation of budget is 6.38billion. The allocation of budget has been increased gradually. Different types of substantial programs have undertaken for the expansion of ICT like, expansion of ICT in secondary and higher secondary educational institution country wide, establishment of national data centres, establishment of 4501 Union Information and Service Centres, establishment of 172 e-centres at upzilla level. The government has a plan to withdraw custom duty and VAT on monitor, digital camera, multimedia projector, networking cables, flash card, laptop bags, UPS and IPS. Government impose 15% VAT on Internet service although it is very high; but government has the plan to reduce it for acceleration of Internet users. Janata tower the countries first high tech Park is underway.

Gap Analysis: Compare to the three countries, the condition of Bangladesh is not satisfactory. In Bangladesh, there is unavailability of adroit and skill labor forces and that is why there is mammoth deficiency and poor proclivity of producing innovative product like software. Right now Bangladesh facing lots of challenges in ICT sector especially in Internet infrastructure, which is miserable, and also there is absence of intellectual property right creates a vulnerable and catastrophe situation for advancement in ICT sector

Table 5: Gap Analysis (Factor influencing success)

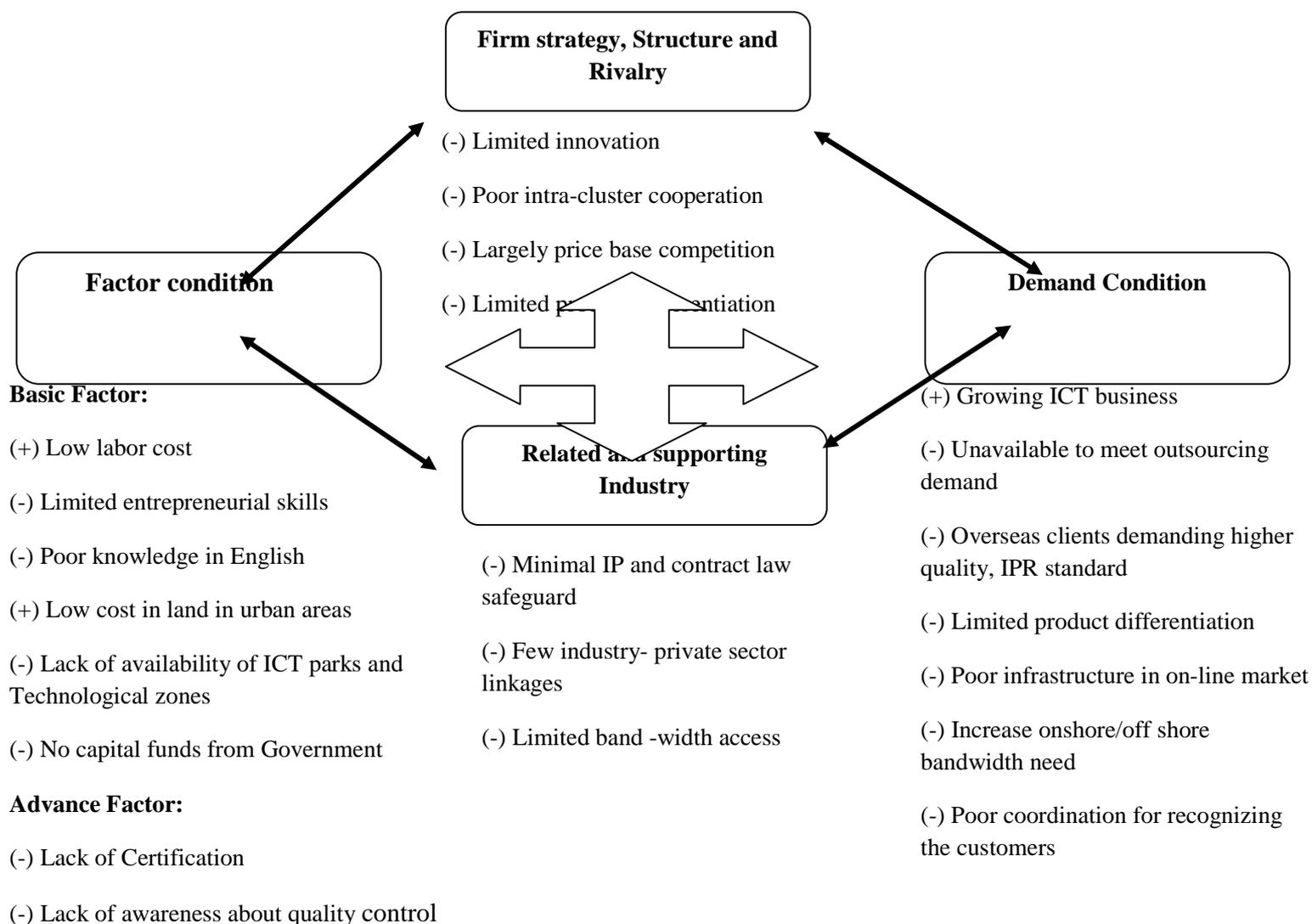
Country	Innovative software product	Skills	Work force attitude	Technical and process quality	Global Marketing and promotion	Intellectual property rights	Affordable bandwidth
China	Very High	World Leader	High	Medium	Medium	Very low	Good
India	World Leader	World Leader	High	world Leader	Excellent	Medium	Good
South-Korea	Very High	Excellent	High	High	High	Medium	Very Good
Bangladesh	Low	Low	Low	Low	Low	Very low	Poor

Source: The Global Information technology Index, 2010

Assessment the condition of ICT sector in Bangladesh by using Porter Diamond:

Porter contends that the degree to which a nation is likely to achieve international success in a certain industry is a function of the combined impact of factor endowments, domestic demand conditions, related and supporting industries and domestic rivalry. The presence of all four components is usually required for this diamond to boost competitive performance. Government

can influence each of the four components of the diamond either positively or negatively. Different points are determinates to access the current trends of IT industry in Bangladesh, here (+) indicates positive sign and (-) indicates negative sign.



FINDING

Bangladesh has high potential to become huge source of skilled human resources with having multi-diversify skills like software design and development, Networking, Programming languages and Data Constructs. Every year around 6,000 IT graduate come from different universities and institution and they engage in different IT firms like, Intel, IBM, Sun, Oracle, Texas Instrument, Cisco, Microsoft and so many. In Bangladesh the demand for clips, hardware

and use of Internet is flourishing. In the year of 2009-2010, approximately \$35.36 million earned from the software. IBM, Dell and Cisco like to establish Research and Development (R&D) centre in Bangladesh. Two submarine cables would be set up under sea. E-governance, E-commerce, E-health will be introduced in Bangladesh. M-banking, m-transaction, m-health, m-agriculture and m-education have enormous popularity. BITS Solution Ltd, Databiz Inc, Devnet Limited, Global Outsourcing, Infinity Technology International Ltd, Inspiring through Information Web (ITIW), Mazumder IT Limited, SW Multimedia Ltd having an advantage in the international market because of innovation, high product development, continuous market base research and unique quality at a low cost.

- In local market there has been consistent growth of IT. Banking and other financial sectors has been flourishing, therefore there is enormous acceptability of local software firms. Manufacturing sector like readymade garments (RMG), textiles, pharmaceuticals, and other consumer goods have created sustainable demand for IT base solution, apart from it telecommunication, education and hospital industry has been rapidly increasing and that is why there are massive demand for IT base services. The local software companies recorded revenue around total 790 crore in the last year. In Bangladesh there are lots of IT base outsourcing firms like, Software Limited, Outsourcing Media, Bangladesh, Ulterioris, Insoftbd web solution, Realistic TM, Realetic TM, Coders and Designers, Clipping Images, RSM-Informatics, Archiana Technology and so on. In locally these are the firms operating their business, but they have a good option to expand their market in globally. These sector employees approximately 30,000 professionals. The ratio of internet user is not satisfactory, 20 million Internet subscribers in Bangladesh by 2020, equaling approximately 10 subscriber per 100 inhabitants but having poor infrastructure and inconsistent plan, policy and programs.
- The real advantages of IT industry in Bangladesh are the labor cost and also the age groups of people. Bangladesh ranked among 30 countries for offshore services. In a world of instant communication, Bangladesh's geographical position between Europe and the United States has given it a time zone advantages. In Bangladesh there are close to 500 software and ITES companies in Bangladesh, of which more than 100 companies export their products to over 30 countries, like North America, European Union (EU) and East Asian country. Bangladesh having mammoth power shortages, it makes a vulnerable and deplorable crisis for the continuation of economic growth. In Bangladesh there is imbalance between demand and supply of skill labor forces. In this fiscal year 2011-2012 the allocation of budget is 6.38billion, which is insignificant for expanding this sector.

RECOMMENDATIONS

- The government should take the initiative for producing competent IT professionals. They have to change the current curriculum of education and also establish different kinds of institution that can support IT industry. Bangladeshi IT firms should invest their money in training and leading-edge programming skills. They also need to concentrate on quality standard, especially ISO 9000 certification. Government should make the affiliation with

the international firms for strengthen research and Development (R&D) facilities and also build up infrastructure. E-governance and e-commerce should instigate as early as possible. The Internet and the applications riding on high-speed IP networks should provide a unique and cost-effective way to enhance national competitiveness.

- Government should take the initiative that makes inspiration for the young guns come forward and taking substantial action for expanding this sector. The government should reduce the bandwidth fee and government should also provide the digital projector in each of the education institution and also distribute the Tk12000-Tk15000 laptop as early as possible. Each of the education institution should be digitalized and in school there should be e-learning facility for the student and also the teachers. Public-private partnership should be allowed to further extension of ICT in Bangladesh. VoIP and private international gateway for data and voice should also be allowed. There should be a strong data network within the country and between the countries and outside the worlds are necessary. BTRC should be allowed to work without the intervention of the government.
- Janata tower the country's first IT Park should be opened as early as possible for sustainable development in this thrust sector. Bangladesh already connected to submarine cable network SEA-ME-WE-4 which provide an internet bandwidth of 24 gigabytes but more speed needed and alternative connection is inevitable for making connectivity with the foreign clients and government should taking the program for spiraling this sector. Government should create the congenial environment for foreign direct investment (FDI) in this sector. The allocation of money in this budget is not enough so that it should increase for enlargement of ICT. Government and private initiative should be realized and encouraged to establish more cyber cafe for expanding Internet in rural area. Government should give the 3G licenses as early as possible to reduce distressing and cumbersome situation. In Bangladesh there is an urgency to make a knowledge base society. Government should emphasize to establish high capacity fiber optic telecommunication backbone. E-banking, e-Health and e-service should be disseminating.
- **10. Conclusion:** The pace of alteration and technological evolution has accelerated the competency of the people who can enhance capability and also can deal with any manifold innovations. The impact of ICT for the transformation of economy, business and society is being remarkable. Bangladesh is well behind for the advancement of ICT. The country need to strengthen ICT enable services that can influence for making sustainable economic development as well as ensure competitive position in the world market.

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