DEVELOPMENT OF HI-TECH PARKS IN BANGLADESH: PROSPECTS AND CHALLENGES

Joint Secretary Md Hasanul Islam, ndc

Introduction

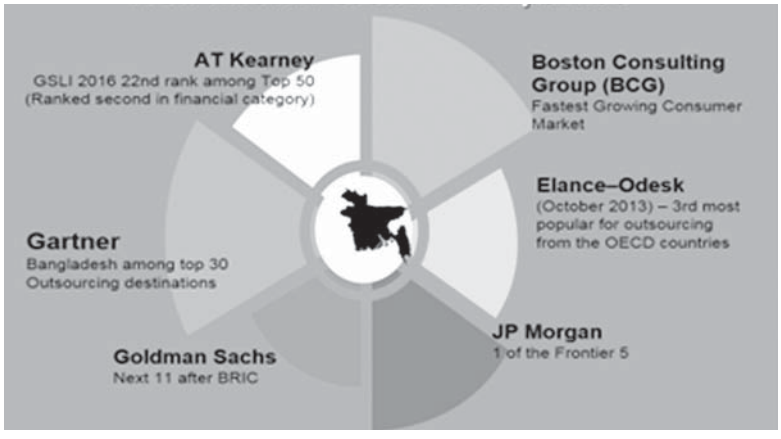
The Government has declared 'Vision 2021' with a target to make Bangladesh as a middle income country using Information and Communication Technology. Government has taken various initiatives to achieve the target. Among them conducive business environment for Hi-Tech Parks Industries is mentionable. Bangladesh Hi-Tech Park Authority (BHTPA) to make provision for the establishment and expansion of Hi-Tech Park industry for creation, management, operation and development within the country.

According to US Bureau of Labor Statistics, high technology industries are those whose expenditures for research and development are at least twice as great as the national industry average of 3.1 percent of annual sales. By definition, high technology industries are knowledge intensive industries. An extreme example would be an R & D organization running on commercial basis (Lawson, et al., 2007).

Hi-Tech Park development depends on telecommunications, internet & mobile penetration is most important. ICT access by households the percentage with computer is 5.6%, internet 4.8% and mobile phone 87.3%. On the other hand ICT percentage of individual aged 5 years and above who used computers and internet were 5.6% and 6.7% respectively. Meanwhile, the percentage of individuals used mobile phone is 79.0%. For individuals aged 15 and above, the figures found 6.5, 8.2 and 83.8% respectively (BBS, 2015).

Bangladesh is one of the promising LDCs having potentials to grow further. Goldman Sachs investment bank described Bangladesh as one of the Next-11 countries (N-11) due to its prompt growth potentials (Lawson, et al., 2007).

Figure 1: Bangladesh Resent Assessment by Well-known Global Companies is Remarkable (Choudhury, 2017).



Source: Choudury, 2017

Bangladesh has made substantial progress in reducing poverty, supported by sustainedeconomic growth. Based on the international poverty line of $1.90 per person per day, Bangladesh reduced poverty from 44.2 percent in 1991 to 18.5 percent in 2010 and is projected to decrease to 12.9 percent in 2016. Progress was supported by strong economic growth, with 6 percent plus growth over the decade and reaching to 7.1 percent growth in 2015/2016. Rapid growth enabled Bangladesh to reach the lower middle-income country status in 2014 (World Bank, 2016). The government aimed to reach into the status of middle income country by 2021.

Background

Bangladesh achieved sustained annual GDP growth of 7.1 percent during FY15-16 despite the global financial crisis and global food price shocks. This has been accompanied by significant poverty reduction and social transformation. The Government hopes to develop a growth trajectory that will henceforth support an overall increase in real GDP growth of 7.4% per annum and reduce poverty from 25.6 percent to 13.5 percent by 2021. Hi-Tech Parks are considered to research and IT business by providing for a physical and social infrastructure that stimulates knowledge creation & innovation. Hi-Tech Parks will get a special attention of the universities' students and local secondary/higher-secondary students as an entrepreneur. The Parks will build-up a bridge between academia and industry.

Rationale of the Study

Today's world is completely dependent on excellence of ICT services and success history of IT economy, the role of Hi-tech Park is predominant. Nurturing start-up companies created numerous leading corporations/enterprises throughout the world, e.g. Google, Yahoo etc. Success of Silicon Valley is mostly credited to the graduates of Stamford University, USA and thousands of start-up companies. In Bangladesh, the total size is estimated to be around US $400 million where 70,000 professionals are employed in the industry shown in Table 1. It has another US $400 billion global market for IT (BASIS, 2013).

Table 1: Market Scenario and Industry Growth	
IT Industry at a glance(2012-13)	
Number of Companies	800
Total revenue including exports	400 m UD$
Exports	101 m UD$
Number of employees	70000
Est. industry growth	40%
Source: 1. BASIS probably (2012-13) data 2.http://www.boi.gov.bd/index.php/potential-sector/ict-and-business-services	

On the other hand IT industry information as Registered Software and ITES Companies 1500, export destination countries 60. The exporting companies only registered companies with an exclusion of 400 freelancer and human resources employed in the industry 3,00,000. The industry turnover US $600 million and export earnings US $250 million (Hira, 2017).

Figure 2: BASIS Vision

Source: BASIS data/Choudhury 2017

The figure 2 indicates BASIS vision 'One Bangladesh'. Its export earning progressively is increasing in IT. BASIS has launched One Bangladesh campaign with a view to achieve US $1 billion export revenue within 2018 from IT/ITES export, creating 1 million Human Resource (HR) and contributing 1% GDP from IT/ITES sector.

The 5 years Targets of One Bangladesh are:

- To earn 1 billion US Dollars in Software, ITES and BPO export by 2018,
- To train and create employment for 1 million Software, ITES and BPO Professionals by 2018,
- Bringing 1 Crore people of Bangladesh under internet connectivity each year, and
- Contributing 1% of our GDP from Software, ITES and BPO sector by the year 2018.

BASIS realized the IT trade body to get suggestions from experts on preparing a roadmap on how to reach the export target under its One Bangladesh campaign (BASIS, 2014). Currently, IT Parks are being developed with PPP, supported by the World Bank and ADB.

Connecting Start Ups Bangladesh

To encourage innovative ventures to the global market ICT Division, BHTPA, BASIS have launched 'Connecting Startups Bangladesh'. The 10 winning startups had received office space on Janata Tower Software Park. The other 40 startups received co-working spaces. The 'Connecting Startups Bangladesh' initiative has been kick started to promote local startups on an international platform (BASIS, 2016). It is mentionable that Global IT outsourcing amounts US$104.6 billion in 2014 where US$ 76.9 billion in 2016 (Statista, 2016). Thus, to harness benefits of IT and the potentiality of country's young generations, more adoption and innovation mechanisms are indispensable.

Hi-Tech Parks

To make the provisions of establishment of Hi-Tech Parks in different places with in the country for setting up of management & operation. Parks means a place specified for making of Hi-Tech Park by the government or a place specified by a private entrepreneur for establishing Hi-Tech Parks approved by the government; and includes any IT park, IT village, Technology park, Science park establish for the industry based on the Information and Communication Technology, Telecommunication and information & Technology (Bangladesh Gazette Extraordinary, 2010). Now a days Hi-Tech Parks largely play a vital role in economy.

Government Investment Spots

In Bangladesh there are many location for investment as follows:

- Bangabandhu Hi-Tech City,Kaliakoir, Gazipur is developing on 355 acres of land with world class business-environment under PPP.
- Sheikh Hasina Software Technology Park, Jessore consists of a 15 storied Multi-Tenant Building (232,000 sft.), a 12 Storied Dormitory (48,000 sft.) and an amphitheater of latest design and technology with world-class business facilities is ready.
- Mohakhali IT Village is under consideration. Janata Tower Software Technology Park 12-storied building having 72,000 sft. space are using by 16 IT companies and start-up.

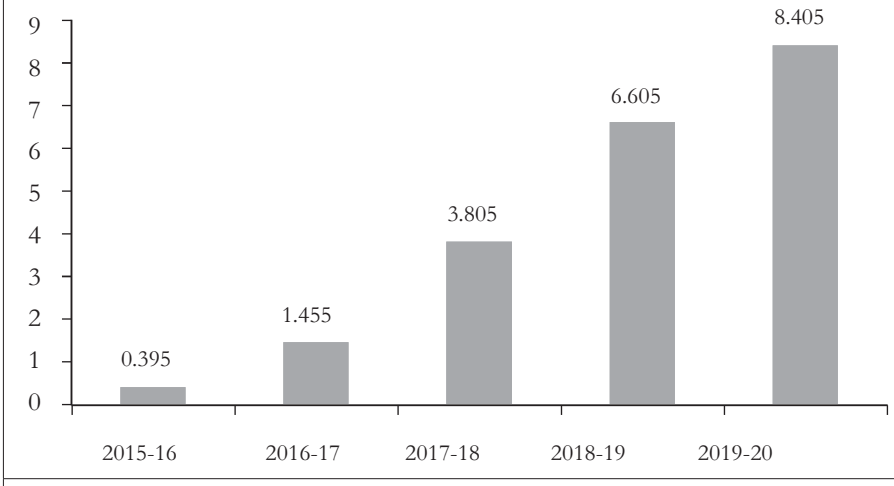
- Sylhet Electronic City is being development under PPP model on 162.83 acres of land. Basic Infrastructure of this park is under construction by the government.
- Bangabondhu Silicon City, Rajshahi is being constructed on 34 acres of land. Basic Infrastructure of this park is going on. World Bank also providing money for infrastructure development.
- Sheik Kamal IT Training and Incubation Center, Natore is going on. Total 12,000 sft training space of this center will be opened for training purpose at the very beginning of 2017.
- Establishment of Sheik Kamal IT Training and Incubation Center construction at 7 different districts of the country is also going on. Total 2,52,000 sft training space will be opened for training purpose at the very beginning of 2020 (BHTPA, 2017).

Hi-Tech Parks as Bangladesh IT hub

The government plans to make Bangladesh a hardware-software manufacturing country and want to earn US$5bn annually and create 1m jobs by 2021 from the industry. Bangladesh aims to become a middle income country through the success in the ICT industry. BHTC is the first full-fledged special economic zone for IT/ ITES and hi-tech industry in Bangladesh (Husain, 2017).

UK-based multinational professional services network (Price water-house Coopers-PWC) has suggested BHTC can accommodate 75,000 employees per shift on a two shiftbasis. In three shifts, BHTC can accommodate approximately 210,000 employees. If there is a total of five hi-tech parks of approximately the same size, it can automatically be overcome the accommodation aspect of the 1m employee challenge. The challenges that are faced are getting all five hi-tech parks running. It will be required an investment of about $2bn. An additional $1bn is required for developing the skilled work force. This can be achieved in 15 years. If BHTC is successful, 200,000 employees are assured in the next 10 years. After that the goal of another 800,000 employees in the other four i-tech parks can be reached in the next five years. (Husain, 2017). Space availability of Current plans and demand are shown Figure 3.

Figure 3: Space Availability Current Plans and Demand



Source: BHTPA Records and Estimates

Private Software Parks in Bangladesh

The Private Software Parks play a vital role for the development of IT and contribute a lot in the economy of a country. With the spirit of investment and employment BHTPA already declared 11 Private STPfrom April, 2016 - March, 2017 in different location where 3581 IT knowledge personnel are working (BHTPA, 2017).

Investment Areas

Computer Software, Hardware, IT Based Services, R&D, Communication, Electronic Products, Manufacturing & Assembling, HR Development Institute, Bio-tech & Bioinformatics is the key for investment. Sheikh Hasina Software Technology Park, IT person worked for foreign investors which is an international standard (BHTPA, 2017).

GOB Provides Incentive

For the development of HTP/STP government declared different incentives for the Developers & Investors in Hi-Tech Parks. All the initiatives are favorable for the foreign and local developers & investors (BHTPA, 2015). The incentive package are as follows:

- Twelve years tax exemption for Developers,
- Ten years tax exemption for IT/ITES Companies
- Duty free import of capital machineries, etc.
- Bonded Warehouse station facilities in HTP/STP
- Duty free import of vehicles
- 100% ownership for foreign investors
- 100 % profit repatriation for investors

Emerging Asian countries considerable benefits in higher employment/income and accelerating growth from IT sectors. Continuous growth of the IT sector in Malaysia fully supported by the government created 800 new IT companies with over 98,000 new jobs, bringing billions of dollars in investment and creating significant new jobs. Indian IT industry growth was encouraged by huge foreign investment, contributing significantly to India's GDP growth. It is estimated that the outsourcing sector has a worldwide market of USD 500 billion; India's share is US$140 billion compared to Bangladesh's US$700 million (Helal & Rahman, 2016).

Global Situation

Developed countries have established Hi-Tech parks. In less developed countries differences in access often exist between urban and rural areas (Jussawalla & Taylor, 2001). Addressing inequalities in access to ICT an economy requires substantial investments in infrastructure and human resources. The ICT sector requires less initial investment in capital and infrastructure than do more traditional sectors, which may be why high-tech industries are growing faster than medium-tech industries in developing countries (UNDP, 2001). Bangladesh and other countriesemploy people and increase GDP contribution shown inthe table 2.

Table 2: High Potential to Employ People and Increase GDP Contribution					
Parameter (2013)	Bangladesh	India	Malaysia	Philippines	UAE
GDP in Billion USD	150	1877	313	272	402
ICT Revenue in Billion USD	0.6	108	10	NA	14.3
ICT revenue as percentage of GDP	0.4	8	12	NA	3.5
People employed (Million)	0.1#	3.1	0.14	0.78	NA
Exports Billion USD	0.1	76	3.56	13.2	NA
Source: World Bank; BHTPA; IMF, MIIT-China. (Data has been derived from multiple sources).					

Singapore

The Singapore government expanding research and development expenditure from S$2 billion in 1996-2001 to S$16.1 billion in 2010-2015. Singaporean government has aggressively transformed innovation ecosystem known as Technology Corridor. Science and Technology's expanding of research centers, world class universities of Singapore considered assource knowledge. In 2015, Singapore ranked 5th in Nature's Publishing Index in the region (Global Science Spaces, 2015) .

However, Singapore Science Park is the definitive address for R&D and innovation in Asia. ore than 300 MNCs, local companies and national institutions, create the ideal and working environment for an exclusive community of over 10,000. The Singapore Science Park is the perfect home for modern hi-tech businesses involved in R&D and innovation across major fields of technology (Singapore Science Park , 2016).

Malaysia

The Malaysian government was one of the first to attempt to replicate the Silicon Valley model in a developing country. This US$40 billion initiative, called the Multimedia Super Corridor (MSC), serves as the backbone for the

country's information superhighway. Malaysia provides generous tax incentives to attract multi-national corporations (Digital Opportunity Initiative, 2001). The Multimedia Development Corporation envisions a 20-year time-frame for the full implementation and execution of the MSC, when Malaysia will have achieved leadership in the Information Age (MSC, 2017).

Taiwan

The Silicon Dragon in Taiwan, along with the roles of high-tech 'incubators' and government-administered science parks. Taiwan's information products reached US$19.2 billion, ranking third after the US and Japan. Hsinchu Science-based Industrial Park grew to 272 companiesin 1998 with over 72,000 employees. The Tainan Science-based Industrial Park attract companies producing semiconductors, wireless telecommunications, computer, microelectronic precision machinery, optoelectronics, and agricultural biotechnology products. It is planned that main 12 companies of the biotechnology, optoelectronics, and telecommunication industries will move into the new Park area (Jussawalla & Taylor, 2001).

Regional Situation of Hi-Tech Parks

India

The development of India's information technology industries started in 1991 reforms and subsequent policies boosted economic growth. The World Bank reports that the economy grew at 7.5% a year in the mid-nineties. Much of the recent entrepreneurial energy in India has been directed toward theICT sector. The growth of the ICT sector is due in large part to the large pool of highly educated, low-cost, English-speaking technology professionals.

Software Technology Parks of India (STPI), Bangalore.Bangalore has the distinction of being the first city of communication service in India. In August 2000, a cyber-Park - Technology Incubation Centre was set up in Bangalore to promote the growth of the IT sector (Sareen, 2005).

Electronics City is an industrial park spread exclusively meant for electronics industries. It houses more than a hundred industries, including IT industry, leaders such as Motorola, Infosys, Siemens, Wipro etc.

Creation of Employment Opportunities

With more and more IT companies setting up their software and services development centers, Bangalore has become the undisputed IT nerve center of ASIA. In fact, Bangalore is fuelling the new phenomenon of "Reverse brain drain" with IT professionals gathering here from all the world. According to data available, the total number of IT companies in Bangalore during 2004-05 was 1200, and 1,15,000 professionals were on the roll (Sareen, 2005).

Bangladesh Experiences

Bangladesh can draw on experiences of these countries to design and implement a rapid IT promotion strategy tailored to her own resources and objectives. The government can consider the following strategy to compliment which will accelerate the IT industry and utilize this sector as a platform for sustainable growth. Through injecting a major investment of US$1.0 billion over five years (US$ 200 million per year), the government can accelerate progress in this sector.

The strategy can intensify efforts in specific areas as

- Speeding up IT training/skills,
- Actively attracting international IT companies/investorsto establish IT centers R&D;
- Helping Bangladeshi entrepreneurs to start IT companies by providing funds/incubation, sales/business development/marketing support.

The proposed strategy can generate the positive outcomes that will set Bangladesh towards the goal of sustainable growth. Moreover, this could also lead to the creation of high income jobs that would encourage foreign trained Bangladeshis to return (thereby reversing the brain-Drain).

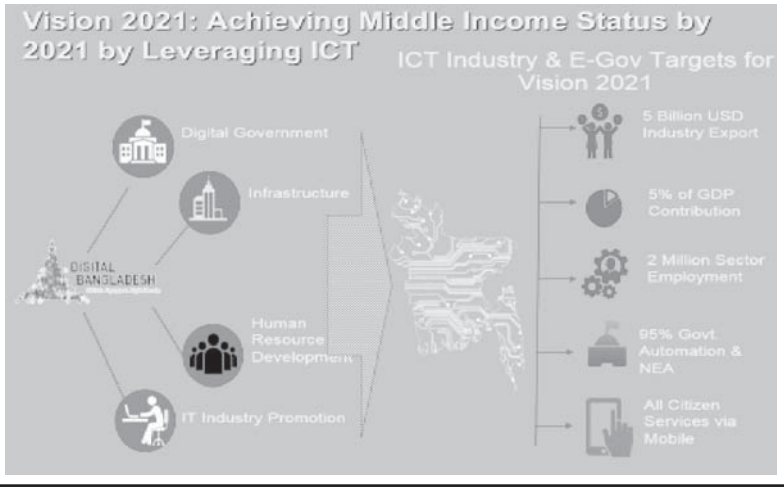
Results and Discussions

The government of Bangladesh has decided a roadmap for establishing Digital Bangladesh by Vision 2021. It is based on four pillars e-Government, Connecting Citizens, Human Resource Development, and IT Industry Promotion. Bangladesh has been undergoing an impressive, rapid transformation phase in the ICT sector since 2008.

IT Knowledge economy

Knowledge Economy is defined as "It is the economy that creates, disseminates and uses knowledge to enhance its growth and development" (World Bank, 2005). It needs less number of employees. For instance, Facebook earned US$19.4 billion in 2014 by only 55 employees, whereas the Bangladesh Readymade Garment Industry comprising 4,500 factories and employing about 5 million workers created value addition total annual output worth US$25 billion (Choudhury, 2017). The concept of Knowledge Economy covers how an economy harnesses and uses new and existing knowledge to improve the productivity of agriculture, industry and services, and increase overall welfare.

Figure 4: Vision 2021 Achieving by Leveraging ICT



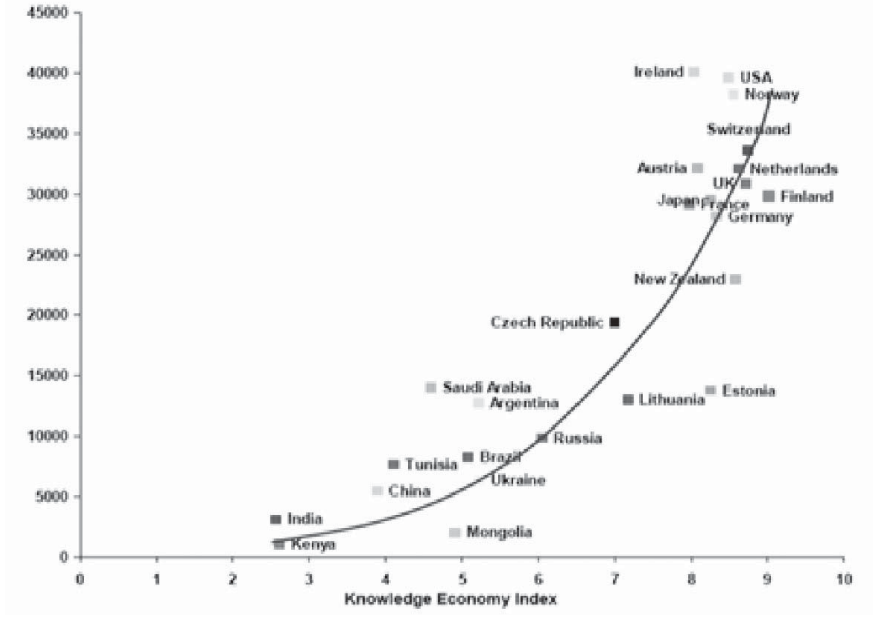
Source: Choudhury, 2017

The Figure 4 shows several indicator will maintain to achieving promote ICT industry and e-Government target for vision 2021.

Benefit of Knowledge Economy

Economy is the key indicator of success of a country. Developed countries achieved their target by using technology. It is evident that most of them attained pick in economy by using their skilled human resource. Figure 5 shows that growth of knowledge economy is significantly exponential in developed countries (Choudhury, 2017). Hi-Tech Parks create more earnings & employment.

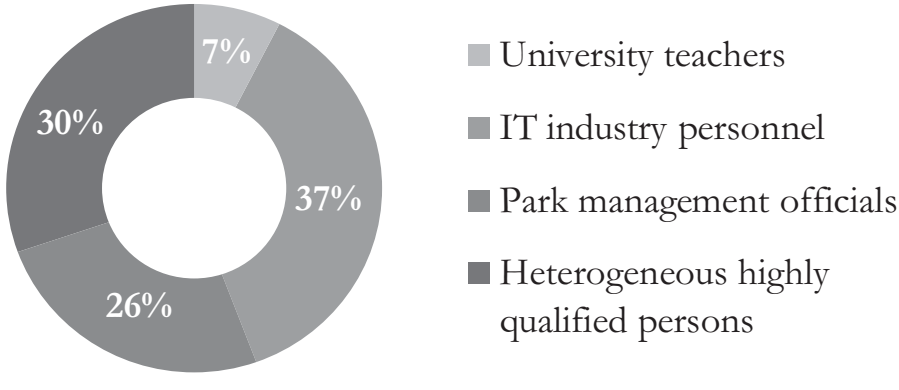
Figure 5: Benefit of Knowledge Economy



Source: Choudhury, 2017

Data Analysis

Figure 6: Participant Status about Hi-Tech Park



Source: Researcher Collected Data

The researcher collected all the data from70 respondents participated, out of them 5 were University teachers, 26 IT industry personnel, 18 Park management officials (BHTPA, DoICT & ICTD), and other 21 were from a heterogeneous group of highly qualified persons.

Challenges and Prospects of Hi-Tech Parks

Initially Hi-Tech Parks as well as other technology parks, both at regional and global contexts remain in limited area, and mainly patronized by the government. Proactive activities of the government enhances IT industry environment and human resource development which is dependent on quality education, and importantly the government policy. In this perspective collected data are presented in Table 3 with different indicators.

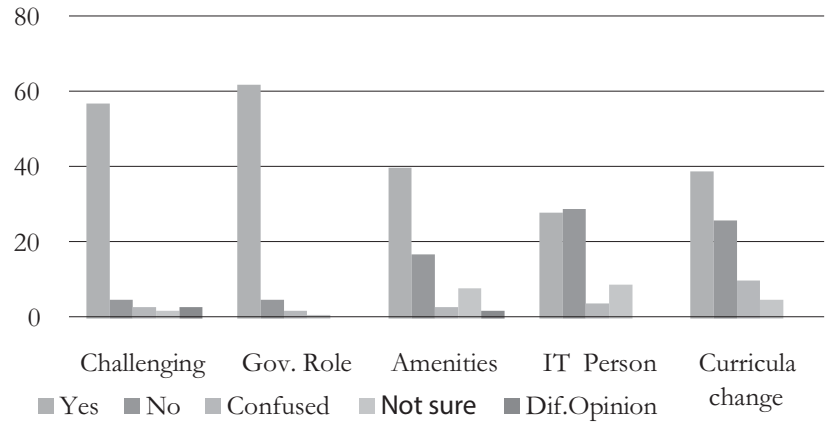
Table 3: Hi-tech Parks Development Challenges

Type of Indicator	Yes	No	Confused	Not sure	Different opinion
Development of Hi-Tech parks in Bangladesh is challenging	57	5	3	2	3
Government have the major role in achieving development of Hi-Tech parks	62	5	2	1	0
All the amenities are available in the proposed parks	40	17	3	8	2
Enough IT graduate & trained person are for the industry with global context	28	29	4	9	0
Academic curricula & industry demand and need base job opportunities can changing	39	26	10	5	0

Source: Researcher's Collected Data.

The data indicate that most of the respondents think that development of Hi-Tech Parks is a challenging one, and IT graduates have not yet attained excellence in the global context.

Figure 7: Hi-Tech Park Development Indicator



Source: Researcher's Collected Data.

Besides this, amenities for the parks are not at optimum level at present position. Initially, the government has the pioneering responsibility in developing infrastructure for favorable investment environment with the aim of academia-industry need base curricula. The development indicator illustrated in Figure: 7.

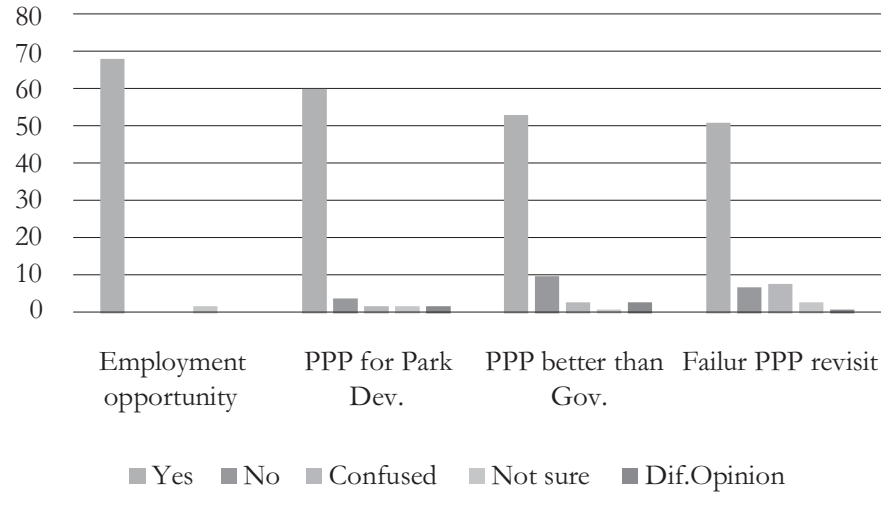
Table 4: Hi-tech Parks Development Opportunities

Type of Indicator	Yes	No	Confused	Not sure	Different opinion
Hi-Tech parks / STP economically viable & create employment opportunity	68	0	0	2	0
PPP model is effective one for Hi-Tech parks development	60	4	2	2	2
PPP model works better & more investor's friendly than the government activities	53	10	3	1	3
In PPP model Government should revisit to select the organization those who have no experience about development of Hi-Tech parks/ IT	51	7	8	3	1

Source: Researcher's Collected Data.

The data plotted Table 4 indicate that Hi-Tech parks create employment opportunities for the IT personnel which are vital for knowledge economy that requires persistent research work. Some of the Respondents opined that as the Hi- Tech Parks development is a new initiative in Bangladesh, where sufficiently experienced and skilled manpower is not available, and the process is also not as speedy as expected. PPP initiatives for development of Hi-Tech Parks are still at the initial stage in Bangladesh. Hence, it is not the proper time to make a comparative assessment of the performances of the two sectors.

Figure 8: Hi-tech Parks Development Opportunities



Source: Researcher's Collected Data.

Hi-Tech Parks development opportunities and some impediment also given Figure: 8 on the basis of collected data. Suggestions about the Hi-Tech Parks development from the respondents are important for the research and make a comprehensive recommendations. More Hi-Tech Parks/STP should be established to create opportunities for IT skilled manpower, research, and also to make them profitable.

Knowledge Transfer between Universities and Industry

In order to strengthen the university-industry linkage, focus should be given knowledge sharing hubs to be built so that the industry professionals and university graduates/faculties can be inter-connected with their ideas to each

other. All these will enhance various capacity building programs for the resource persons and university faculties, and will develop mentor groups comprising industry professionals and university faculties (BRAC University, 2017).

The universities are expected to play a crucial role to supply high quality work forces for the development of IT parks. As such, 9 universities were selected and included in the project, in accordance with the selection criteria and in consultation with University Grants Commission (UGC), BHTPA and ICT Division (ADB, 2016).

ICT Policy 2015

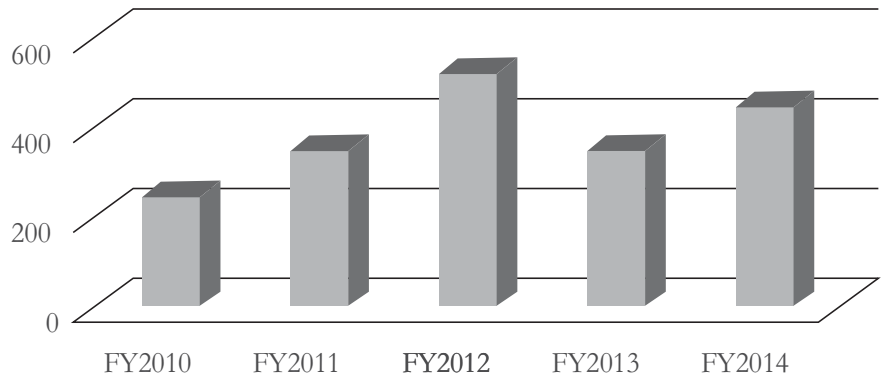
Government promulgated ICT Policy 2015 to establish 'Vision 2021' with a target to make Bangladesh as a middle income country using Information and Communication Technology and development of favorable business environment for innovative companies (ICTD, 2015).

7th Five Year Plan

Knowledge has emerged as a leading determinant of economic growth and human welfare in 21st Century. At the economy level, knowledge is transforming ways that new technology is developed and adopted to enhance productivity and lower cost. Accordingly, the focus on strengthening the Knowledge Economy (KE) is an integral part of any development strategy.

Bangladesh is still a long way catching up to the standards of the global KE. According to the latest available (2012) ranking of the Knowledge Economy Index (KEI), Bangladesh was ranked at the low end of 137 out of 146 countries. This suggested a long run ahead. This is an area of strength for Bangladesh and an updated KEI performance review will likely see an increase in the Bangladesh rating (GED, 2015).Spending on Research and Development to constitute 1% of GDP.The 7th Plan seeks to raise the GDP growth rate progressively from 6.5% in FY15 to 8% by FY20. The average growth rate is projected at 7.4% over the Seventh Plan period

Figure 9: Trend in ICT Exports (US$ millions)



Source: 7th Five Year Plan (Bangladesh Bank)

Contribution to Exports: Starting from a low base, ICT export earnings have gained some momentum during the Sixth Plan, growing from $ 246.5 million in FY2010 to $444.8 million in FY2014 (Figure 9). This is an encouraging sign and with concerted efforts, this can be a major source of export earnings during the Seventh Plan.

Conclusion

The results of the research indicate that development of Hi-Tech Parks in Bangladesh through government, PPP and Private Sector will be financially viable when some major steps are taken in this regard. The following steps are recommended.

PPP Option

The financial model should be prepared based on the perspective of the PPP investor under the model. Concession agreement of PPP Modelhas been considered as the base. Only those PPP investors should be selected who are experienced in developing and managing Hi-Tech Parks.

Promoting ICT Entrepreneurship

It is imperative to promote ICT based entrepreneurship by providing support to early-stage start-ups.A single window/one-stop service mechanism should be implemented for providing all benefits, concessions & permits, as well as all required statutory approvals to IT companies.

ICT Business Eco-system

The government may create a business ecosystem forming partnership with centers of excellence and IT industry body. It may adapt institutional arrangements by University as the center of excellence and BASIS as the industry body for the ICT sector. The BHTPA should provide full support for the development of skilled work-force aligned with the IT based service industry.

Steps to be taken

The BHTPA needs to be assigned with the responsibility of implementation including all the critical issues regarding Hi-Tech Parks. A list of potential investors needs to be prepared, and the concept needs to be conveyed. In addition, steps need to be taken to start preparation a list of well reputed Hi-Tech Parks development oriented experienced company those are able to build Park.

Human Resource Development

The importance of intellectual capital for economic development is now widely recognized. The growth of software and Hi-Tech industries across the world has generated a huge demand for highly skilled IT manpower.

Way Forward

Bangladesh's current ranking in the Knowledge Economy Index is very low. It has a long way to go to transform itself into Knowledge Economy. Improvements in Education - particularly secondary and tertiary education - are prerequisites for developing a Knowledge Economy.The action items in the ICT Policy (2009, 2015) need to be prioritized immediately and steps for rapid implementation.

Recommendations

From the findings of this study and reviewing the pertinent earlier works it is apparent that the Development of Hi-Tech Parks in Bangladesh faces multifaceted problems and challenges. From this work one thing has clearly emerged that we have a tremendous potential for materializing the vision of a Digital Bangladesh. It's clear that long-term broad vision by the public sector is essential to make the dream come true. Followings are recommended on a priority basis:

- **Selection of PPP:** Government should consider PPP as development partner having Hi-Tech Parks development experience without any biasness. PPP should be materialized with local and foreign companies.

- **Establishment of Private STP:** Government should help enhance the Establishment of Private STP so that they can run by themselves independently. Local and multi-national companies can be given to develop their own establishments in terms of physical facilities, staffing requirements, and other requirements by their own way.

- **Prepare Business Plan:** Prepare sample business plans for different Hi-Tech Parks business areas by typical software/hardware/ biotech firm to be located at the park.Explore potential organizations for manpower supply in the short term.

- **Comprehensive Afford:** Dedicated and coordinated efforts with adequate financing are a prerequisite for achieving the Vision of Digital Bangladesh by 2021.

- **Policy Change:** Bring necessary policy and regulatory changes to kick start high-tech manufacturing, targeting the consumption of local market. Continuously adjust policies and strengthen ecosystem so that value addition in high-tech manufacturing keeps upgrading from assembling of finished products to component manufacturing.

- **R & D Innovation:** Investment in R&D for process innovation and provide incentives to local producers to source them so that local market of innovation creates incubating new generation high-tech firms.

- **IT/ITES Innovation:** Focus on supporting the growth of high-end productive knowledge through innovating IT/ITES solutions for local consumption, whether in the public or private sectors.

- **Ecosystem Development:** Expedite the development of high-tech parks to create the trust among likely tenants. In tenant selection and facility development, pay attention to the development of rich in-park eco system to increase the attractiveness of parks.

Bibliography

1. ADB, 2016. Aide Memoire,Country Operations Business Plan :Bangladesh,2017-2019, Manila: ADB.

2. Bangladesh Gazette Extraordinary, 2010. The Bangladesh Hi-Tech Park Authority Act-2010 (Act 8 of 2010 Published 18 March 2010). Dhaka: Bangladesh Government Press.

3. BASIS, 2013. Annual Report, Dhaka-1215: Bangladesh Association of Software and Information Services,BDBL Bhaban (5th Floor-West),12,Kawran Bazar,Dhaka-1215.

4. BASIS, 2014. Annual Report, Dhaka-1215: Bangladesh Association of Software and Information Services,BDBL Bhaban (5th Floor-West),12,Kawran Bazar,Dhaka-1215.

5. BASIS, 2016. Annual Report, Dhaka-1215: Bangladesh Association of Software and Information Services,BDBL Bhaban (5th Floor-West),12,Kawran Bazar,Dhaka-1215.

6. BHTPA, 2015. Incentive Package (SRO). [Online] Available at: http://www.bhtpa.gov.bd/[Accessed 25 April 2017].

7. BHTPA, 2017. Project Cost of BHTPA, Dhaka: BHTPA, ICT Division,Government of Bangladesh.

8. BHTPA, 2017. Public and Private Hi-Tech Parks/STP in Bangladesh. Dhaka.: Bangladesh Hi-tech Park Authority..

9. BRAC University, 2017. Project Proposal:Skill Development Programme for Graduates and Professionals in IT/ITES Industry, and Promoting Technopreneurship through Incubation, Dhaka: BRAC University.

10. Choudhury, J. R., 2017. Knowledge Economy and ICT : Bangladesh Scenario. Dhaka: University of Asia Pacific .

11. Digital Opportunity Initiative, 2001. Creating a Development Dynamic, Final Report of the Digital Opportunity Initiative. [Online] Available at: https://www.markle.org/sites/default/files/doifinalreport.pdf [Accessed 3 May 2017].

12. GED, 2015. 7th Five Year Plan: FY2016-FY2020, Dhaka,Bangladesh: Planning Commission, Govrnment of the People's Republic of Bangladesh,Sher-e-Bangla Nagar.

13. Global Science Spaces, 2015. Singapore's Science Parks and Technology Corridor. [Online] Available at: https://www.globalsciencespaces.org/science-spaces/singapore-science-park/[Accessed 27 April 2017].

14. Helal, M. & Rahman, M., 2016. Bangladesh's IT Industry ,The Next Frontier?, Dhaka: The Daily Star (3 December,2016).

15. Hira, S. S., 2017. IT Industry Information, Dhaka: Executive,Content and Research of BASIS,BDBL Bhaban,(5th Floor-West),12,Kawran Bazar,Dhaka-1215.

16. Husain, I., 2017. Hi-tech parks to make Bangladesh IT hub (Dhaka Tribune). [Online] Available at: http://www.dhakatribune.com/tribune-supplements/business-tribune/2017/04/16/hi-tech-parks-make-bangladesh-hub/ [Accessed 16 April 2017].

17. ICTD, 2015. ICT Policy 2015. [Online] Available at: http://ictd.gov.bd/uploads/files/policy_5785e66bdab67.pdf [Accessed 11 April 2017].

18. Jussawalla, M. & Taylor, R., 2001. Asian Technology Parks: Lessons For The "Digital Divide". Proceedings of the Pacific Telecommunications Council Conference, January 2001. Honolulu, Hawaii: Pacific Telecommunications Council.. [Online] Available at: http://web.iyte.edu.tr/egetek/pages/JussawallaPaper.pdf [Accessed 2 May 2017].

19. Lawson, S., Heacock, D. & Stupnytska, A., 2007. BEYOND THE BRICS: A LOOK AT THE NEXT 11-Goldman Sachs. [Online] Available at: http://www.goldmansachs.com/our-thinking/archive/archive-pdfs/brics-book/brics-chap-13.pdf[Accessed 23 April 2017].

Author

Md Hasanul Islam, Joint Secretary to the government, Ministry of Public Administration, was born on 01 January 1963. He joined Bangladesh Civil Service (Administration) in 1991 after his Graduation in B. Sc. Ag. (Honors) & M.Sc. (Ag.) Agronomy from Bangladesh Agricultural University.

He joined as Assistant Secretary in the Ministry of land and worked in Ministry of Labor & Manpower, Bangladesh Secretariat, Dhaka. He served as Assistant Commissioner & Magistrate in district administration at Bandarban Hill Tract in1992-95. In that capacity he was involved in peace process as part of civil-military coordinated effort in insurgency. He was posted in 'Kutupalong Refugee Camp' for 4 years as Camp in Charge (CIC) under Refugee Relief and Repatriation Commissioner's Office, Cox's Bazar for refugee operation. He also performed as Assistant Director Local Government and Magistrate 1st class in the District of Sherpur. He worked as Upa-Zila Nirbahi Officer (UNO) in 2002-06 at Fenchuganj, Sylhet and Damudya, Shariatpur, respectively. Before he was promoted to Deputy Secretary he worked as Additional Deputy Commissioner and Additional District Magistrate in Jamalpur & Munsiganj. After promoted as Deputy Secretary he performed as Chief Executive Officer, Zila Parishad (District Council) Mymensingh from 2010 to 2014. He was promoted to Joint Secretary in 2016. He attended a number of professional courses at home and abroad. He did a training in public administration from IIPA, Delhi, India. He visited many countries across the globe. He is a keen lover of cricket, Lawn Tennis and listening music.