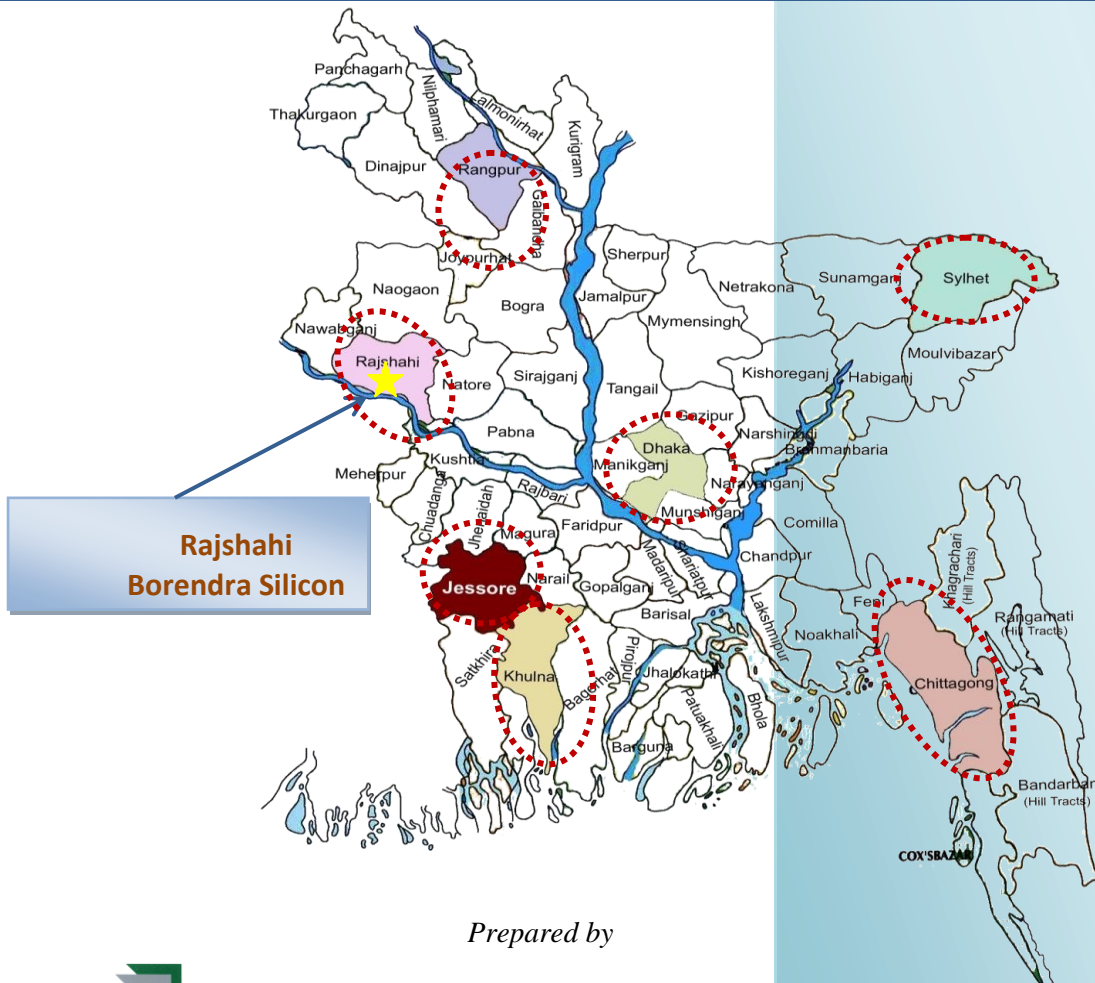**Bangladesh Hi-Tech Park Authority**
Ministry of Information & Communication Technology

DRAFT REPORT

Feasibility Study
Rajshahi Borendra Silicon City

Rajshahi Borendra Silicon

Prepared by

Infrastructure Investment Facilitation Company
Dhaka, Bangladesh

Volume 1 of 2
MAIN REPORT

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Feasibility Study for Rajshahi Borendra Silicon City

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ACRONYMS AND ABBREVIATIONS

MOICT	:	Ministry of Information and Communication Technology
ICT	:	Information and Communication Technology
DBS		Digital Bangladesh Secretariat
BCC	:	Bangladesh Computer Council
GIS	:	Geographic Information System
IGW	:	International Gateway
ICX	:	Interconnection Exchange
IIG	:	International Internet Gateway
SRDI	:	Soil Resource Development Institute
DESC	:	District e-Service Centre
DC	:	Deputy Commissioner's
e-GP	:	Electronic Government Procurement
CPTU	:	Central Procurement Technical Unit
IMED	:	Implantation Mentoring and Evaluation Division
PROMIS	:	Procurement Management Information System
BACCO	:	Bangladesh Call Center Outsourcing
AIS	:	Agriculture Information Services
BHTPA	:	Bangladesh Hi-Tech Park Authority
BANBEIS	:	Bangladesh Bureau of Information and Statistics
IT	:	Information Technology
ITES	:	Information and Technology Enabled Services
SICT	:	Support to ICT Task Force
MDG	:	Millennium Development Goals
PRSP	:	Poverty Reduction Strategy Papers
PSTN	:	Public Switched Telephone Network
ISP	:	Internet Service Provider

Acronyms and Abbreviations

VSAT	:	Very Small Aperture Terminal
BTRC	:	Bangladesh Telecommunication Regulatory Commission
SASEC	:	South Asian Sub Regional Economic Cooperation
ADB	:	Asian Development Bank
BOT	:	Build-Operate-Transfer
CCCI	:	Chittagong Chamber of Commerce & Industry
UIC	:	Union Information Center
LGD	:	Local Government Division
UP	:	Union Parishads
STP	:	Software Technology Park
MTB	:	Multi Tenant Building
UISC	:	Union Information Service Center
UNDP	:	United Nations Development Programme
CCOAB	:	Cyber Cafe Owners Association of Bangladesh
CMMI	:	Capability Maturity Model Integration
NIKS	:	National Information and Knowledge System
IIFC	:	Infrastructure Investment Facilitation Company
BASIS	:	Bangladesh Association of Software and information Services
BPO	:	Business Process Outsourcing
IPR	:	Intellectual Property Rights
CMMI	:	Capability Maturity Model Integration
MFI	:	Micro Finance Institutions
RGM	:	Ready–Made Garments
ERP	:	Enterprise Resource Planning
HR	:	Human Resources
ADP	:	Annual Development Programme
CIT	:	Computer and Information Technology
IP	:	Internet Protocol
IPS	:	Inter Process Service
3G	:	Third Generation

Acronyms and Abbreviations

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BTCL	:	Bangladesh Telecommunication Company Ltd
BSCCL	:	Bangladesh Submarine Cable Company
TSS	:	Telephone Shilpo Sangtha
ECNEC	:	Executive Committee of The National Economic Council
BCS	:	Bangladesh Computer Samity
PPP	:	Public Private Partnership
IRR	:	Internal Rate of Return
IDA	:	International Development Association
SPV	:	Special Purpose Vehicle
VGF	:	Viability Gap Fund

Acronyms and Abbreviations

IIFC

Executive Summary

BHTPA, in its Executive Committee meeting held on 26 April 2012, took a decision of establishing ICT villages at divisional levels of Bangladesh. In this regard, BHTPA intended to conduct feasibility studies for ICT Village at Mohakhali, Dhaka and at six sites at Rajshahi, Rajshahi, Khulna, Sylhet, Rangpur and Chittagong. A Consulting Services Agreement was signed between Bangladesh Hi-Tech Park Authority and IIFC on 30 April 2013 to conduct feasibility studies on the selected sites. In accordance with the Consulting Services Agreement, IIFC has prepared the Feasibility Study for the Development of an ICT Village at Rajshahi as the 2nd site of the assignment.

The objective of the ICT Village project is to establish knowledge based industries throughout the country, particularly related to Software and IT Enabled Services, and thus contribute to the national economy and achieve the goals of Vision 2021: Digital Bangladesh. The Government of Bangladesh intends to create basic infrastructure for establishing IT Parks in Rajshahi. Government has allocated 38 acres of land for developing the IT village. This land will be used to develop a world-class business environment, conducive for IT/ITES industry. This ICT village will attract investments from both foreign and local entrepreneurs.

Bangladesh ICT Industry

The IT/ITES industry is one of the fastest growing industries in the world. The IT/ITES industry is growing and is playing an increasingly prominent role in Bangladesh's economy. This industry serves both domestic and international markets. As mentioned earlier, there are over 800 registered software and ITES companies in Bangladesh. There are a few hundred more small unregistered companies (BASIS). Out of the total IT/ITES industry approximately USD 800 million (BASIS survey), the software industry takes up 39% (USD 117 million). Recently, there has been strong growth in freelancing, where young professionals directly serve overseas clients. These professionals mainly work from home and do not own registered companies. According to BASIS, there are about 10,000 freelance professionals in Bangladesh.

The local market is the predominant source of business for the software and IT service industry (63% of BASIS member companies are solely focused only in the local market). There has been a consistent growth, in the local market, of 20-30% over the last few years (WB Report). The global IT/ITES market continues to grow and due to its large market size, there is a huge potential for Bangladesh to grab additional market share. Investment in ICT sector is provided through Public sector, Foreign Direct investment and Private sources. Public sector investment is provided through Annual Development Programme (ADP). Foreign Direct Investment in ICT sector mainly covers on Telephone and Mobile industries while private sector investment were made through private

Banks and Joint venture companies. Private sector investment in IT sector could not be obtained.

The government of Bangladesh emphasizes the need for a comprehensive Master Plan in order to achieve an overall development of the ICT sector. This Master Plan is being developed according to a framework based on Vision 2021 and ICT Policy 2009. At the center of the proposed framework will be the National Information and Knowledge system (NIKS), a platform for developing and delivering services to citizens in both rural and urban areas.

Different Ministries and agencies i,e Ministry of ICT, Ministry of Post and Telecommunication, Ministry of Law and Justice and Parliamentary Affairs, Ministry of Information, Ministry of Commerce, Ministry of Education, Planning Division, Bangladesh Computer Council, Bangladesh Telecommunication Regulation Commission, Bangladesh Hi- Tech Park Authority etc are involved with the ICT sector. There are eight Regulatory Authorities involved in enabling the development of ICT businesses i,e Ministry of ICT, Bangladesh Computer Council, Bangladesh Hi-Tech Park Authority, Ministry of Post and Telecommunication, Ministry of Commerce, Ministry of Information, Bangladesh bank, Bangladesh Telecommunication Regulatory Commission. For enabling the development of ICT sector Government of Bangladesh provides the legal support services through different acts including ICT act, IPR protection, authorization of digital signatures, e banking facilities for e transaction, e commerce, e procurement etc.

Demography: Rajshahi Division

Rajshahi Division consists of 8 districts, 70 Upazilas and 1,092 Unions. The divisional capital of Rajshahi is only four hours road journey away from Dhaka, the capital city. The districts include Bogra, Joypurhat, Naogaon, Natore, Nawabganj, Pabna, Rajshahi and Sirajganj.

Rajshahi Division has a total literacy rate of 48.0% out of which 50.5% are male and 45.6% are female. 27.29% of the total population of Rajshahi Division are in the age group of 15-29 which is about 52,46,751 individuals (male 26,67,448 and Female 25,79,303). This indicates that there is a large young population able to enter the IT/ITES industry. Of the total number of 44, 61,097 households (urban 7, 07,371 and Rural 37, 53,726) in Rajshahi Division 79.9% of urban people and 49.3% of rural people use electricity as a source of light. The major educational institutes in Rajshahi are University of Rajshahi (RU), Rajshahi University of Engineering and Technology (RUET), Rajshahi College, Azizul Haq College, Bogra, Edward College, Pabna (under National University), Pabna University of Science and Technology.

Yearly IT Graduates from universities of Rajshahi Division is 621 and the IT professionals mostly Diploma holders from Polytechnic Institutes of Rajshahi Division is 4,863. When the total IT skilled professionals added together from the universities in Rajshahi Division will stand at 5,484. This means that a

sizable young population is ready to take the work with proper training and guidance. These groups of population are very much useful for the IT/ ITES provided they are well trained for the business.

The Project Site

The proposed site for the development of Rajshahi ICT Village is located in the Nabinagar Mouza in Paba Upazila at Rajshahi district. The site is bounded by the DC office and District Judge Court on the east, Bhatar Pukur on the west, Rajshahi-Chapai nawabganj old road on the north and Padma river on the south. The site is almost 13 km away from Shahmakhdum airport of Rajshahi and about 7 km from the Rajshahi railway station. An embankment passes through the north to south side of the site and ended at the River Padma. The site is a non-arable flat land with a shallow ditch in the middle and north side. Unauthorised dwellings are on the land with two pacca mosque, pacca sanitary latrines and a pacca internal road. The local households are situated around the periphery of the proposed site.

The land area of the proposed site for the development of Rajshahi ICT Village is almost 38.14 acres excluding the embankment and the three pieces of land (Dag nos of these lands are 412, 416 & 417). The land presently belongs to the two different government agencies namely Roads & Highways Department (R&H) and Water Development Board (WDB). Total 10.43 acres of land is under the R&H Department and 27.71 acres under WDB. The J.L. no. for the land is 50.

There are two different ways to go to the proposed IT village from Rajshahi Town, one is Chapai - Rajshahi old road (7 km from Rajshahi Town) and another one is Rajshahi Town road. Both the roads belongs to Roads and Highways. About 650 unauthorized dwellings are on the land with two pucca mosque, pacca sanitary latrines and pacca internal road.

The nearest sub-station (33/11 kV) for power supply is located within 1 km from the project site at Haragram, Mollapara under Sales and Distribution (S&D) Division - 2 of Rajshahi Distribution Zone of Bangladesh Power Development Board (BPDB). The second nearest sub-station is located at City Center near the Shah Makdum Eidgah maidan under the Sales and Distribution (S&D) Division -4 of Rajshahi Distribution Zone of BPDB, which is 3.5 km from the project site. Both the stations with capacity of 2X20 MVA are owned and maintained by BPDB. To ensure continuous power supply, a sub-station with a capacity of 6,000 kVA needs to be set up inside the Village.

Bangladesh is mainly connected with the global telecommunication carrier through submarine cable network (SEA-ME-WE-4). Additionally it has international information highway through terrestrial interlink with India and China to get connected with the rest of the world. Bangladesh is connected to India through two Inter-Terrestrial Cable (ITC) points at Benapole and

Chuadangah. This alternate route provides redundant transmission network in connecting with international backbone in a more cost efficient way.

Market Survey

To explore the market demand and industry trends of ICT industries for the development of ICT Villages at Rajshahi, IIFC surveyed the ICT companies at Rajshahi. IIFC team also surveyed the ICT companies at Dhaka to assess the willingness of the companies to relocate / expand their business to proposed ICT Villages at Rajshahi. An online survey was also conducted amongst ICT freelancers in the country to assess their willingness to work on the proposed ICT village.

The sample size for survey of ICT companies at Rajshahi is considered as 21, which is almost 100% of total population. BASIS has 500 member companies based in Dhaka. IIFC has considered these listed companies as total population for survey of ICT companies in Dhaka. The sample size is considered as 50, which is 10% of total population. IIFC chose the companies for survey those have mixture of these four types of business.

1. Software Development and Services,
2. Business Process Outsourcing,
3. ICT Training and
4. Other ICT Units.

The ICT industry in Rajshahi is only beginning to grow. There are few software companies in Rajshahi; most ICT companies in Rajshahi supply computers or operate cyber cafes. The survey result shows that most of the companies in Rajshahi fall within the income range of USD 0-150,000 (upto Tk. 1.2 cr). The office space rental is quite reasonable and cheap. Electricity bill and fuel cost are also not so high. This is because major proportion of ICT Industry in Rajshahi constitutes of very small companies. Average bandwidth cost is also very low. As most of the companies conduct hardware based business, their requirement for bandwidth is very low.

Survey result shows that 100% of the companies at Rajshahi have shown their interest to relocate or expand their business to the proposed ICT village. During the survey of ICT companies in Dhaka, it was also noticed that 50% (16 out of 32) companies shown their interest in outsourcing/ sub-contracting work-orders to proposed ICT village at Rajshahi. During the survey of ICT companies in Dhaka, it was also noticed that 43% (15 out of 35) companies have shown their interest to expand their business from Dhaka to Rajshahi ICT village. Most of respondent prefer to have an office space of 1,000 sft to 1,500 sft for business. According to survey the reliable power supply is the most priority need of ICT companies in Rajshahi. Cheap rent/ cost of land, secured business environment, strong customer base are the other important factors. The survey results shows that for the Dhaka based ICT companies reliable

power supply is the most important factor. The next items include fiscal incentives, cheap rent/ cost of land, reliable internet connectivity, and secured business environment.

For the Rajshahi based ICT companies availability of conference hall is the most important factor among the ancillary services. Having 24/7 technical support and R&D Center are the next priorities. For the Dhaka based ICT companies R&D Center stands out as the most important facility with availability of training center following next.

During the survey of freelancers, it was also noticed that only 5% (1 out of 22) freelancers have shown their interest to work on the Rajshahi ICT village. From the survey data it is found that reliable internet connectivity is the most priority need of freelancers. From the perspective of freelancers availability of training center is the most important factor among the ancillary services. Having 24/7 technical support, conference hall, and R&D Center are the next priorities.

Demand Forecast

With inputs from market survey, the demand forecast of Rajshahi ICT village has been carried out. Based on historical data of sample industry volume and their trend of growth rate, the forecast growth rates are determined for a period of thirty years. From the surveyed data, the three different factors are generated:

1. Factor for Space Requirement per person (SRP) - (sft/person),
2. Revenue Earning Factor (REF) - (Tk. m/person) and
3. Bandwidth Capacity Factor (BCF) - (Mbps/person).

Based on these factors, the demand for space requirement (sft/Tk m), employment generation (person/Tk. m) and bandwidth requirement (Mbps/Tk. m) of Bangladesh ICT Industry for a period of thirty years are determined.

Therefore the volume for Rajshahi ICT Industry is considered as 3% of total Bangladesh ICT Industry. The volume for Rajshahi ICT Village is considered as 85% of total Rajshahi ICT Industry. Industry volume of Rajshahi ICT village is derived for a period of thirty year based on the forcast growth rates. Based on the industry volume, the space requirement, bandwidth requirement and employment generation of Rajshahi ICT village is also generated.

The total leasable area of Rajshahi ICT village is 115,200 sft for MTB. Based on the demand forecast in different scenarios, the occupancy rates in different scenarios will be assumed.

Table 1: Demand Projection for MTB in Different Scenarios

Scenarios	Space Requirement (sft) of Rajshahi ICT Village									
	Y1	Y2	Y3	Y4	Y5	Y6	Y7	Y8	Y9	Y10
Base Case *MTB*	57,618	65,796	75,376	84,491	94,734	106,246	119,187	133,737	148,685	165,461
Optimistic Case *MTB*	63,939	74,906	88,025	101,297	116,601	134,251	154,610	178,098	203,392	232,490
Conservative Case *MTB*	52,756	58,821	65,758	71,281	77,326	83,943	91,188	99,123	105,736	112,795

The above table shows that, the demand for space of 115,200 sft will be filled up within 7 years in base case, 5 years in optimistic case and 10 years in conservative case.

The percentage of space requirement of different category of businesses in the ICT village are considered as follows:

(a)Software Development	(b) BPO	(c) Training	(d) Other
69%	19%	6%	6%

A maximum of 86 tenants can be accommodated in the MTB of the ICT village. The number of units for each category of business and their standard space requirements are as follows:

	Sub-category	Suggested Number of units	Space Requirement (sft/tenant)
1.	Software Development and Services	53	1,500
2.	BPO	14	1,500
3.	Training	5	1,500
4.	Other	14	500
	Total no of Units	**86**	

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On the other hand, ICT village will have seven (7) industrial plots of 2.50 acre each. Based on the demand forecast in different scenarios, the occupancy rates in different scenarios will be assumed.

Table 2: Industrial Plot Area Take Up in Different Scenarios

Scenarios	Industrial Plot Area Take Up									
	Y1	Y2	Y3	Y4	Y5	Y6	Y7	Y8	Y9	Y10
Base Case *Industrial Plots*	2.5	5.0	7.5	10.0	12.5	15.0	17.5			
Optimistic Case *Industrial Plots*	2.5	5.0	7.5	12.5	17.5					
Conservative Case *Industrial Plots*	-	2.5	2.5	5.0	5.0	7.5	10.0	12.5	15.0	17.5

The above table shows that, the demand for industrial plots of 17.5 acre will be filled up within 7 years in base case, 5 years in optimistic case and 10 years in conservative case

The rate of fill up of the ICT village will depend on the growth rates of ICT industry. The ICT village is projected to create a large number of jobs. Approximately 13,000 jobs can be created which will greatly impact the economic development of the country.

Technical Planning and Design

Total project site area is 38.78 acres (approximately), in two adjoining areas.

Area-1   Approximately 3.17 acre of land, beside the Rajshahi-Chapai highway, old C&B land. This land is kept for future expansion of ICT village and other ancillary utility buildings, such as Residential hotel building, Club house, etc.

Area-2   Approximately 35.61 acre of old WDB land, accessible through I-bund embankment, on the side of river Padma.

The total 38.78 acres land used to belong to different government agencies like Public Works Department (PWD), Communication and Building (C&B), later Roads & Highways (R&D) Department and Water Development Board (WDB). Presently the land is transferred to ICT ministry.

ICT village will have the following construction and development:

1.   Multi Tenant Building, MTB (The Silicon Tower)

This is a 10 storied steel structure commercial building of 20,000 sft. foot print, having 3 Blocks. Blocks A and B are office spaces, connected by a third Block-C, which contains utility installations, such as reception, foyer, lobby, lift, stairs, escalator, washrooms and toilets, large open area for display and exhibition, etc.

This building will have a total floor area of 200,000 sft in 10 floors.

2.   The Dormitory Building

This is an 8 storied steel structure dormitory building, of 3-star standard. This will have a total floor area of 80,000 sft. In 8 floors) and will provide suitable accommodation for the workforce of ICT village.

3.   The Residential Buildings

This is an 8 storied steel structure residential building. Four (4) interconnected buildings of 100' x 25' plinth area are provided. These buildings will give a total floor area of 80,000 sft. In 8 floors and will provide family accommodation for ICT officials.

4.   Other Utility Buildings and Installations

Other constructions in the project area are:

- ▲ Substation and Generator building
- ▲ Gymnasium and Playgrounds
- ▲ Internal roads
- ▲ Internal drains
- ▲ Boundary walls
- ▲ Entry Gate and the gatehouse
- ▲ Deep Tube-wells, pumps and Water Reservoirs
- ▲ Recreational area and Club House
- ▲ Parks and Green areas
- ▲ Security Guard's Barrack

5.   Vacant Industrial Plots

There is provision of Industrial Plots (Bare Land) in the ICT village. There are 7 green-field industrial plots of 2.5 acre each, which are to be developed by individual lease holder companies.

6.   Future Expansion Possibilities

In the available land, there will be reserve space for future extension of MTB and ICT facilities.

In addition to the above land, the Ministry of ICT has sought for additional lands on the eastern side of the project site, which are presently empty, for project expansion purpose. This will cater for more industrial Plots.

A Master Plan for the proposed ICT Village at Rajshahi has been prepared with the given functional programs to accommodate:

1. A MTB (Multi Tenant Building, primarily for Software development) with Conference / seminar / food Courts etc.

2. Future Expansion of the Software development possibilities

3. A Dormitory/ Hostel and a Gymnasium Building with bedroom and related facilities etc.

4. Ancillary Building with Substations, Generators, and miscellaneous storage space etc

5. Recreational spaces

6. Adequate parking (as per code) on site

The following Table gives a tentative floor area distribution of the Multi-tenant Building.

Table 3: MTB Floors Distribution Table

Floors	Block " A " (7,200 sft)	Block " B " (7,200 sft)	Block " C " (5,600 sft)
Ground Floor	Banks	R&D Center, Food Court	Reception, Foyer, Lobby, Toilets, Escalator, Lift, Stairs, Display space, Open-to-sky space
1st Floor	Admin. Offices Conference Hall Meeting Rooms	Data Center	- Do. -
2nd Floor	BPO (Call Centers)	BPO (Call Centers)	- Do -
3rd Floor	BPO (Call Centers)	Other ICT Units	- Do -
4th Floor	Software Dev. Area	Training Center	- Do -
5th Floor	Software Dev.	Software Dev.	- Do -

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Floors	Block " A"	Block " B"	Block " C"
	(7,200 sft)	(7,200 sft)	(5,600 sft)
	Area	Area	
6th Floor	Software Dev. Area	Software Dev. Area	- Do -
7th Floor	Software Dev. Area	Software Dev. Area	- Do -
8th Floor	Software Dev. Area	Software Dev. Area	- Do -
9th Floor	Software Dev. Area	Software Dev. Area	- Do -
Total sft.	72,000	72,000	56,000

The main buildings of the ICT Village will be structural steel structures. The columns and beams will be of prefabricated structural steels. This will aid in quick erection and implantation of the building. In fact the erection of the steel structure can be made in a matter of four to six months as against fifteen to eighteen months for a RCC (Reinforced Cement Concrete) structures.

Capital Cost Estimates

Total capital cost is estimated to be **Tk 1,052.03 million** (2013 Tk)**.**

Table 4: Total Capital Cost Estimate

Total Capital Cost	m Tk
Hard Cost	845.96
Soft Cost	206.07
Total Capital Cost	**1,052.03**

It is assumed that 30% of civil construction costs will be needed in Year 1, 50% in Year 2 and 20% in Year 3. In addition, ancillary facilities such as generators, lifts etc will be needed in Year 3 of construction while upfront costs such as land filling will be need in Year 1.

Table 5: Capex Spread

	Calendar Year	2014	2015	2016	2017
Total Hard Costs	m Tk		262	353	359
Total Soft Costs	m Tk		86	53	78
Total Capex	m Tk		347	406	436

Investment Models

The ICT Village may be financed through government fund or Public Private Partnership. Government funding may be Bangladesh government own fund or donor fund. Development of ICT village through PPP may occur for the entire village or for PPP for O&M of entire village.

The critical factor in choosing an institutional option lies with the mode and financing of acquisition or purchase of land for developing the village. The institutional option varies with different levels of participation from government and private sector. The following table provides a comparison of options in terms of land development, financing, on-site development, regulation and operating and managing the ICT village.

Table 6: Comparison of Options

Criteria for Comparison	Model A: Government Led Model	Model B: O&M Outsourcing Model	Model C: Concession PPP Model (BOT)	Model D: Leasehold Transfer Model
Land Acquisition	BHTPA	BHTPA	BHTPA	BHTPA
Off-site Development	BHTPA	BHTPA	BHTPA	BHTPA
Land Development	BHTPA	BHTPA	Private Investor	Private Investor
Overall Layout (Preliminary)	BHTPA	BHTPA	BHTPA	BHTPA
Overall Layout (Final)	BHTPA	BHTPA	Private Investor	Private Investor
Financing and Construction	BHTPA	BHTPA	Private Investor	Private Investor
O&M	BHTPA	Private Investor	Private Investor	Private Investor
River Training Works	BHTPA	BHTPA	BHTPA	BHTPA

Executive Summary

Private Investor Selector Process and Criteria

Engaging a private operator is typically a step-by-step process. The Private Operator selection process will start with Request for Qualification (RFQ) by BHTPA. After feasibility study is finalized, BHTPA will issue a public notice for inviting qualification statements for participating in the investment. A short list of the qualified Private Operators will be made, based on evaluation of the statements. After the approval of the short list of Private Operators is obtained, the tendering process will start with issuance for Request for Proposal (RFP). RFP will be issued to the pre-qualified Private Operators for selecting the suitable private operator and rank them. The selected private operator will enter into an agreement with BHTPA. BHTPA will provide layout, conceptual design of the facilities and land designation to the private operator.

The successful investor will be decided based on evaluation of the proposals and subsequent approval of the relevant authorities. The potential Private operator is expected to have the following competences and abilities:

a. Good knowledge of operation and maintenance of hotel or tourism facilities.
b. Ownership and operation experience of companies operating facilities of similar size
c. Knowledge of laws, rules, and regulations governing O&M of such facilities
d. Working knowledge of the operation and maintenance of commercial complexes
e. Ability to prepare forms and narrative inspection reports.

The potential private operators will be evaluated based on the following minimum qualification test criteria. The tests will be performed in two parts:

1. Part I Evaluation – Qualification Test
2. Part II Evaluation – Financial Ranking

The bids will be ranked based on the financial score or a combination of the technical score and financial score, which will be designed in the RFP stage.

Financial Analysis

The financial model has been prepared based on **Model C: Concession PPP Model (BOT)**. Under this model, the Private Investor will sign a PPP Contract with BHTPA, under which it will be responsible for land development of the entire area, including site filling and construction of internal infrastructure such as internal roads, drains etc. Private investor will also be responsible for construction of the Multi Tenant Building (MTB). After construction completion, Private Investor will lease out office space in the MTB to ICT

units and collect rent from them. Private Investor will also lease out the industrial plots and collect rent. In return for the right to use BHTPA's land the private investor will pay Royalty to BHTPA, which will consist of a lumpsum upfront payment and variable royalty based on gross earnings.

Private Investor will also be responsible for operation and maintenance of the ICT village including the MTB and Industrial plots throughout its PPP Contract Term. After end of Term, the O&M of the ICT Village will be handed back to BHTPA.

BHTPA will be responsible for construction of the Dormitory and the Residential Buildings with its own fund or with support from donor agencies. BHTPA will also be responsible for regulation of the ICT village.

Key parameters for the base case scenario are presented in Table 7.

Table 7: Overview of Key Parameters in Base Case

Category	Parameter
Investment Model	**Model C: Concession PPP Model**
Term	30 years from start of construction
Construction Start	2015 (January)
Construction Completion	2017 (December)
Commercial Operation Date	2018 (January)
Land Area	38.78 acres
Leasable Area	
Industrial Plots	17.5 acres
MTB - Core Business	115,200 sft
MTB - Non Core Business	19,200 sft
Number of ICT Units at the Village	86
Type of ICT units to be located at the ICT Village	• Software Development and Services • Business Process Outsourcing • Training Center • Other ICT services
Size of Industrial Plots for lease	2.5 acres
Size of MTB office spaces for lease	500 sft and 1,500 sft
Lease Rates	
Industrial Plots	Tk 10/sft/year
MTB Spaces	
ICT Office Space, BPO offices and Training Centres	Tk 40 /sft/mon

Category	Parameter
Data Center, Cafeteria, Bank,	Tk 50 /sft/mon
Conference Hall	Tk 20,000 / day
Lease Rate Escalation	12% per year
O&M Service Charge	Tk 2.50 /sft/month
Debt/ Equity Ratio	75:25
Loan Component	80% IPFF Loan, 20% PFI loan (commercial banks)
Loan Term	
IPFF	20 years
PFI (Commercial Banks)	7 years
Grace Period for Loan Repayment	
IPFF	7 years
PFI (Commercial Banks)	3 years
Interest Rate	
IPFF	9.45%
PFI (Commercial Banks)	14.45%

Approximate share of revenue for each revenue source is shown in the following Table 8:

Table 8: Revenue Items

Facilities	Share of Revenue
Software Development and Services units	45.0%
BPO units	13.0%
Training Center	0.5%
Other ICT units	0.4%
Data Center	11.0%
Banks	11.0%
Food Court	1.0%
Conference Hall	4.0%
O&M Service Charge from Tenants	5.0%
Industrial Plots	9.0%

The private investor will pay Royalty to BHTPA for the right to use BHTPA's land for his business. Royalty payment will be in two forms:

Executive Summary

- Upfront payment of Tk 5 million at signing of PPP Contract
- Yearly payment of 2% of Gross Revenue

The result of financial analysis are presented in Table 12.20 in terms of Bangladesh Taka, including the Equity IRR of the project, the project IRR, the project and equity payback periods and the debt service coverage ratios.

Table 9: Key Financial Indicators in the Base Case Scenario

Output	
Equity IRR (a/t)	**13.77%**
Project IRR (b/t)	**14.84%**
Royalty Received by Government	
First 10 years (mil Tk)	**19**
Full Term of Contract (mil Tk)	**320**
DSCR	
Average	**1.53**
Maximum	3.77
Minimum	0.41
Equity Payback Period (year)	**18**
Project Payback Period (year)	**15**

Financial analysis shows that Investment in the project will provide a return of 14.84% and a return of 13.77% on equity. It will take 15 years for investment payback, with equity payback occuring in 18 years.

Equity IRR of 13.8% in the base case demand scenario indicates that the project may not be attractive for private investment under this PPP option. Equity IRR of at least 25% is required to attract private investors in PPP projects. The payback period for the project is also very long which will discourage private sector investment.

Financial analysis of Model D has been conducted as an alternate PPP options. In Model D: Leasehold Transfer Model, the Private Investor is allowed to transfer the leaseholdings of the built-up office spaces to individual businesses before and during construction of the MTB. In this model, the private investor will have a 10 year Term from signing of Contract

and will be allowed to transfer lease holdings of the built-up space to individual businesses for long term leases (99 year leases). The businesses will pay a one-time Leasehold Transfer amount to private investor and will pay yearly service charges to the Operator of the MTB, which will be private investor during its 10 year term and afterwards will be BHTPA.

In Model D, demand for space is expected to be higher than in Model C as business owners are more comfortable with long term leases. In addition, private investor will not need to take any loans as he will receive upfront payments from customers during construction. This will save interest expenses for the investor increasing financial viability.

In the base case demand scenario, it is estimated that space takeup will start in the second year of construction and all spaces will be taken up by Year 8 of Contract signing. In the optimistic case scenario it is assumed that space takeup will start in Year 2 and all spaces will be taken up by Year 6. In the conservative case scenario it is estimated that it will take 9 years for space takeup from Year 2.

The one-time payment value for transfer of leases has been estimated based on office and commercial space sale values in the Rajshahi region. The estimated values used for financial analysis is presented in Table 10

Table 10: Leasehold Transfer Rates

Leasehold Transfer Rates (Model D)	
	Tk/sft
Office Space	*15,000*
Training Center	*15,000*
Data Center	*17,000*
Banks	*17,000*
Food Court	*15,000*
Conference Hall	*8,000*

The private investor will pay Royalty to BHTPA for the right to use BHTPA land for his business. Royalty payment will be in two forms:

- Upfront payment of Tk 500 million at signing of PPP Contract
- Yearly payment of 5% of Gross Revenue

The results of the model in the base case demand scenario is presented in table 11

Table 11: Financial Analysis Results

Output	
Equity IRR (a/t)	**31.13%**
Project IRR (b/t)	**90.73%**
Royalty Received by Government	
First 10 years (mil Tk)	**638**
Full Term of Contract (mil Tk)	**638**
Equity Payback Period (year)	**2**
Project Payback Period (year)	**2**

Implementing the project under Model D gives a 31% return on Equity which is much higher than in Model C. Equity payback period is also only 2 years which indicates that this model of investment will be very attractive for private investors. In addition, BHTPA will be receiving Tk 500 million upfront as royalty compared to only Tk 5 million upfront-payment in Model C. Implementing the project under Model D will also result in BHTPA receiving a total royalty of Tk 638 million within the first 10 years as compared to only Tk 19 million under Model C.

Model D is financially viable for private investment through PPP. Higher rates of return in Model D compared to Model C as well as shorter payback periods, indicate that Model D will be more attractive to private investors. BHTPA will also earn significantly higher royalty in Model D, compared to Model C.

Environmental and Social Analysis

ICT has an environmental impacts through construction of buildings, the manufacturing, operation and disposal of devices and network equipment, but it also provides ways to mitigate the adverse effects as well as efficient energy use, for example through smart energy saving buildings and well designed telephone activities. ICT Village at Rajshahi may be labeled as Orange B category due to its environmental hazard during project construction phase. As such, the project requires an IEE for environmental clearance.

Though information technology i.e., computer use at all walks of life brings enormous benefit to the economy its adverse impact at operation level cannot be ignored. Its environmental impacts are often not realized or considered. These impacts are expressed throughout the manufacturing, use

and disposal of computers, and thus require monitoring and an understanding of each stage of a computer's lifecycle.

The positive impact during pre-construction phase includes public consultation and environmental sound design. The only negative impacts during pre-construction stage will be vegetation clearing. During site preparation, vegetation consisting of grasses, shrubs and trees will be cleared and the overburden removed so as to commence construction of the structures. Vegetation clearing is associated with loss of biodiversity, soil erosion, sedimentation and siltation, increased run off and degradation of surface water quality.

During the construction stage, land-raising from its original level certainly disrupts the natural surface of the earth which will obstruct the natural drainage system of the area if proper mitigation measures are not taken. The proposed project, changes the local landscape of the area to some extent by covering a green area into a built-up area. This will change the natural and visual equilibrium for the local people. Impact on soil is not expected to occur as the project does not use any toxic or any chemical for its process and operation. Intervention of flora and fauna and habitats due to setting up the facility and its operation is expected to be negligible. The effect of noise in the operation phase on ambient conditions is also insignificant.

The socio-economic survey was undertaken in the Project Influence Area (PIA). There are over 600 households living in the PIA. The survey was intended to cover 5% of the number of households anticipated to be displaced by the project, which is translated to 30 households.

The proposed ICT Village will increase job opportunities, increase land value and demand for houses, opportunities for business, increase infrastructure etc. Squatters residing within the project area is often a major issue which needs to be dealt with adequate care.

Project Implementation

The future success of the establishment of the ICT village depends on the proper and timely execution of a number of strategic steps which are outlined below:

Figure 1: Sequence of Proposed Activities

Feasibility Study	**STAGE 1**: Engagement of Private Investor

Request for Qualification (RFQ)	
Preparation of EIA by BHTPA	Request for Proposal (RFP) or Tendering

STAGE 2: Construction:

Construction of ICT Village

STAGE 3: Operation and Maintenance

Operation and Maintenance of ICT Village
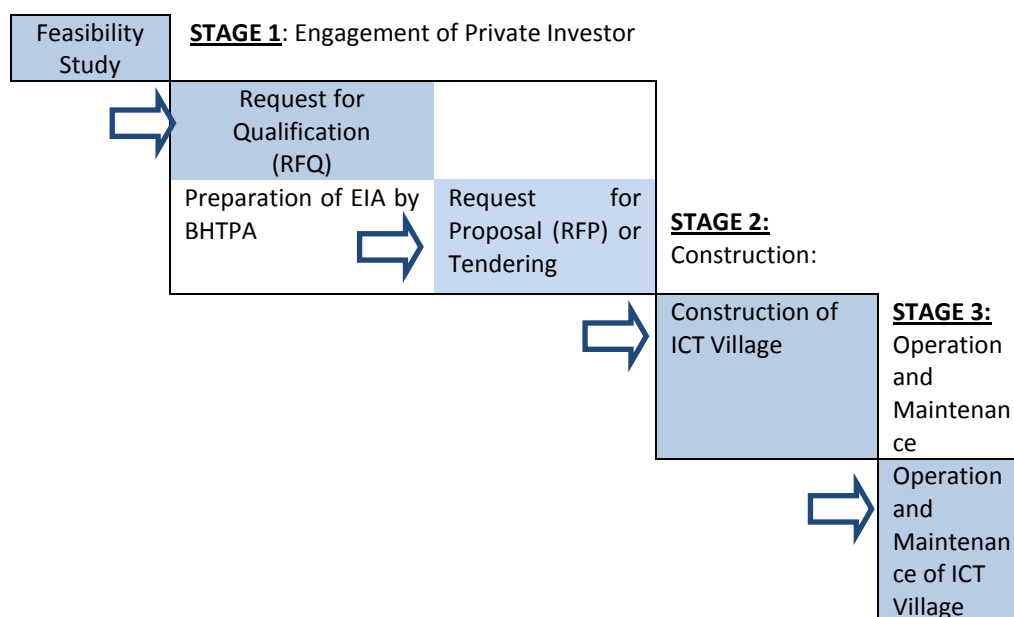
During the construction period, the authority may work out a plan to kick-start ICT development activities by promoting ICT-based entrepreneurship in that locality. To this end, BHTPA may undertake a pilot programme to set up an incubation ecosystem. A local business incubation ecosystem will help nurture entrepreneurship by providing support to early-stage start-ups. The ICT Village will gain when these start-up companies become regular occupants after a certain period.

To create an incubation ecosystem, it is imperative to have linkage to centres of excellence and IT industry body. The authority may adapt institutional arrangements by entering into a tripartite agreement (TPA) among BHTPA as the executing agency, Rajshahi University of Engineering and Technology (RUET) as the centre of excellence and BASIS as the industry body for the ICT sector. The incubator can be set up at rented facility in a cost effective way rather than constructing a new one and may continue its operation there for about four years. By that time the proposed ICT Village will came into operation and consequently, the incubator can be relocated to the Village permanently.

Next Steps

For successful project implementation, it is important to have a Project Management Unit in place in BHTPA. The unit needs to be assigned with the responsibility of project implementation including all the critical issues regarding this project. The management structure should involve a project team headed by a Project Director/Manager. The composition of the team may be changed time to time to meet the specific expertise needed during any phase of the project.

The appropriate model of inviting Private Investor and the Private Investor's scope of work that is suitable for the investors needs to be decided by BHTPA. A list of potential investors needs to be prepared, and the concept needs to be conveyed and consulted through a consultation paper in the Investor Promotion Meeting. In addition, steps need to be taken to start preparation of the Tender documents for procurement of a suitable private investor for implementation of the project.

After submission of this feasibility report, following steps need to be taken:

1)	Approval of Major Terms and Conditions	MoICT/BHTPA
2)	Approval of fiscal incentives	NBR
3)	Government decision on PPP Option and Model	MoICT/BHTPA /PPPO
4)	Preparation of RFQ document	Consultant
5)	Identification of potential investors	Consultant/ BHTPA
6)	Proceeding with the preparation of the EIA	BHTPA

1

Background

1   BACKGROUND

The demand of IT/IT enabled services is increasing throughout the world and the investors around the world want to have a competitive cost of production. Bangladesh has a sizeable unemployed and educated young population with low labour cost of production which can be utilized in this sector with proper training and guidance. GOB needs to create skilled manpower through developing world-class business environment conducive for IT/ITES to attract potential foreign and local entrepreneurs for investing in Bangladesh. There is also an advantage of Time zone. Bangladesh labour force can do the work ordered from Western countries overnight and have the job done before business hours begin the next day.

Bangladesh has one of the most attractive population demography in the world –relatively high young population base as over 34% are in age group of 15-34 years; which is favourable for IT-BPO industry. Analyst projections reveal that this number is further slated to go up. This corresponds to a young working population of over 53 million people – large enough to man the fledging IT/ITES industry for years while keeping the costs low. For creating employment opportunity in the IT sector it was felt necessary to develop infrastructures which will create an environment for innovative companies and increase foreign & local investment.

Considering these in view Bangladesh Hi Tech Park Authority decided to create basic infrastructure for establishing IT Village in 47 acres land allocated at Mohakhali, Dhaka and to established Software Technology Park (STP) in other 6 Divisions to develop world-class business environment conducive for IT/ITES to attract potential foreign and local entrepreneurs for investing in Bangladesh. Establishment of IT village in Rajshahi Division is a part of this project.

1.1   DIGITAL BANGLADESH AND GOVERNMENT INITIATIVES IN ICT SECTOR

(a) Digital Bangladesh

In recent years, there have been significant developments in the status of the ICT sector in Bangladesh. In particular, the promise of a 'Digital Bangladesh' is a prominent element of the platform maintained by the winning party in the elections of 2008. The vision of the present government "envisages that by 2021, Bangladesh will reach a trajectory of high-performing growth supported by advanced and innovative technology" and that "Information and communication technology will, by that time, take us to new heights of excellence giving the country a new identity to be branded as Digital Bangladesh" (SFYP 2011-16).

The main objective of establishing Digital Bangladesh is to innovate new means to deliver services of the government to the doorsteps of the common people by removing all the inefficiencies of the administrative systems. Government has a goal to ensure an economic growth of 10% by 2017 and rate of investment to increase to 38-40 percent from current average rate of 24-25 percent of GDP. In order to achieve this goal all government departments need to provide their services in utilizing the public resources ensuring speed, efficiency with effective administration. Therefore the concept of Information and Communication technology has been felt to be single most effective strategy for achieving the development targets of the country.

The Government's Digital Bangladesh by 2021 vision proposes to mainstream ICT as a pro poor tool to eradicate poverty, establish good governance, ensure social equity through quality education, health care and law enforcement for all, and prepare the people for climate change.

Government of Bangladesh has adopted Perspective Plan for 2010-2021 in which adequate emphasis has been given to develop ICT system to work as a driving force for the overall development of the national economy. Strengthening the information technology sector for the digital Bangladesh has been identified as an objective in the Perspective Plan.

In conformity with the objectives of "Digital Bangladesh" in the Perspective Plan, the government has pursued specific strategies within the Sixth Five Year Plan (2011-2015). The plan has put particular emphasis on the development of ICT and set strategic objectives to implement the Government's commitment. In this plan the government and semi-government departments are expected to implement ICT systems and thus, re-engineer their business processes and become better integrated. The specific strategies mentioned in the Sixth Five Year Plan are as follows:

- Building sound and policy infrastructure: Creating appropriate dynamic legal and policy system to unleash potential for participation of citizens private sector, development agencies and government for creating new services.

- E-Administration: Business process reengineering for the government agencies for efficient and transparent decision making and accessing, for improvement of transparency of the government.

- E-Citizen Services: Converting traditional service delivery mechanism into e-service delivery system to bring "service at the door step of citizens"

Furthermore, the new ICT Policy has addressed the issue of creating an action plan to achieve the objectives of "Digital Bangladesh". In particular, ICT Policy addresses the goal of transforming the nation into a middle income country by 2021. This policy emphasizes human resources development through

technology, connecting citizens, pro-poor services; ensure service delivery, and the creation of "e-administration" to ensure transparency. This policy also prioritizes e-services for Bangladeshi citizens, such as education, healthcare, agriculture, land & water resources, social safety nets and ICT based disaster management systems.

With the appropriate digital education, it is expected that E-businesses will utilize the maximum potential of ICT. Businesses of all sizes can utilize ICT for production, and access to markets, both domestic and international. Businesses will be able to conduct transactions and make payments online, internally and globally.

Adequate policies have been created to enhance efficiency and transparency in ensuring good governance. This process involves ICT systems with respect to effective parliamentary process, strengthening public services, ensuring justice for the poor, preparing ICT skilled law enforcing agencies, combating corruption, ensuring human rights and removing weaknesses from the implementation of public funded projects. The policy also emphasizes the need for implementing ICT based PPP model projects.

There have also been demonstrated successes in the creation and deployment of e-services. In order to make the Parliament more effective, government has established a system to determine the order of the question through digital ballot. As a result every Honourable member gets an opportunity to raise his/her question sequentially. A media center has been established at the parliament to disseminate information regarding parliamentary activities. These developments set the stage for holistic planning and thus improving the quality and efficiency of e-services.

In the mean time e-service centers has been established in 64 districts, legal framework has been formulated to promote e-commerce including e-payment and mobile banking. To maintain security of e-payment and e-commerce 6 certifying authorities are licensed and 3 of them started digital signature certification program. For enabling Digital Bangladesh present Submarine cable bandwidth has been upgraded from 44.6 Gbps to 200 Gbps and the second submarine cable is under active consideration of the **Government Initiatives in ICT Sector**.

In 1993-1994, Bangladesh Railway implemented the first e-Governance project in the country with respect to its reservation and ticketing system in the ICT sector. Since then, a few other e-Government projects have been initiated in Bangladesh. This includes the e-birth registration of Rajshahi City Corporation in 2001, GIS mapping of all schools by BANBEIS and SICT project under Planning Commission (2002-2007). This last initiative, the SICT Project involved the construction of the website and automation of 54 Ministries/Divisions (out of which 38 projects were completed). Many of the

completed projects in SICT did not achieve the desired goals mainly because the selected projects applied a top down approach, ignoring the inherent demands of the stakeholders.

In December 2003, WSIS in its meeting decided to build the "Information Society" emphasizing to create a people centered development oriented information society and in doing so, detailed specific e-Government initiatives were required to meet the goal of MDG and PRSP in all developing countries. In response to the convention, many initiatives have been included within the Five Year Plans formulated by the government of Bangladesh. Subsequently the present government laid the foundation for an enabling environment with the ICT Policy 2009, ICT Act 2009 and Right to Information Act 2009.

ICT Policy

The Government of Bangladesh approved the first National ICT policy in 2002. This policy, however, was poorly implemented and thus the government failed to achieve the goals set in the policy. In response to this, the ICT policy was revised in 2009 and the revised ICT Policy 2009 promises to serve as a strategic action plan in line with the proposed "Digital Bangladesh".

The primary objective of the revised ICT Policy is to address issues related to (1) social equity, (2) productivity, (3) integrity, (4) education and research, (5) employment generation, (6) strengthening exports, (7) health care, (8) universal access, (9) environment, and provide (10) support to ICTs.

The Policy of 2009 includes various action items and the required time frame for realizing the goal of national economic development. This policy, amongst others, addresses issues related to social equity in accordance with the constitution of the People's Republic of Bangladesh. It does so within a framework optimizing the effective utilization of the nation's limited natural and abundant human resources.

This policy also emphasizes the need for implementing PPP model projects for the delivery of citizen services at lower cost and at greater transparency and accountability. The national ICT Policy 2009 has clearly indicated the development goals required in every sector of the Bangladesh's economy.

The ICT policy document is structured according to a hierarchical pyramid with a single vision, 10 broad objectives, 56 strategic themes and 306 action items. The vision and objectives are aligned with general national goals; strategic themes are areas within the broad objectives that can readily benefit from the use of ICT. The action items, depending on the nature of work are to be implemented in the:

- Short term (18 months or less)

- Medium term (5 years or less) or

- Long term (10 years or less)

According to the present ICT Policy 2009, the Minister of MOICT   is responsible for the coordination and monitoring of ICT policy, while the Bangladesh Computer Council (BCC) will assist in implementing action plans. Furthermore, all Ministries/Divisions and other public organizations will implement their ICT related programs independently. In case of any change in the program, however, the existing situation will be reviewed by government agencies and further actions will be coordinated.

Taking into consideration various issues related to ICT policy, the Government of Bangladesh emphasizes the need for connectivity, coordination among stakeholders, the development of human resources, software marketing, and other associated issues.

(b) Institutional Reforms: Creation of Digital Bangladesh Secretariat

In order to implement "Digital Bangladesh" the Government of Bangladesh felt the need for institutional reforms in addition to the strategies included in the Sixth Five Year Plan (2011-2015). According to the Sixth Five year Plan, the current e-governance cell at the Prime Ministers' Office will be upgraded to Digital Bangladesh Secretariat (DBS) to facilitate activities required to ensure the establishment of Digital Bangladesh. The Bangladesh Computer Council, moreover, will be strengthened and empowered with skilled and trained manpower to support the establishment of "Digital Bangladesh" and hence provide support to infrastructure development, technical assistance and capacity building for various e-government initiatives

Single point for ICT Infrastructure

The Government of Bangladesh has decided that the development of a strong ICT ministry is crucial to institutional reform. As per the Sixth Five Year Plan, the MOICT is the key entity in ensuring a robust ICT infrastructure required to meet the objectives of the ICT Policy. In this context, a strong coordination between MOICT, Ministry of Post and Telecommunication, S&T Division, and the Ministry of Information has been emphasized. At present, BCC, and High Tech Park Authority operate under the MOICT. The Government of Bangladesh is also considering placing BTRC under the MOICT for better coordination of the e-governance system.

ICT Infrastructure

A competitive ICT infrastructure is an essential condition for the IT/ITES activities. Particularly important is the broadband infrastructure, allowing for sufficient connectivity and Internet access at internationally competitive prices. Programmers need computers and access to the Internet. Good network capability is becoming indispensable as applications move to the cloud and for participating in global software activities. Infrastructure is also essential for the development of local software markets by linking applications and content with users through national backbone networks. In view of the rapidly increasing importance of mobile technologies and applications mobile broadband is also a key infrastructure element. Present infrastructural services for the ICT sector in Bangladesh is given below:

Software development requires some degree of knowledge imparted through the formal education systems or by specialized training institutions. The availability of an educated workforce and students enrolled in computer-related education fundamentally affects the potential of the system. It is important for programmers to have a solid knowledge of coding, but they also need to be able to understand requirements and specificities of the domain for which the software is adapted and developed. Partly for this reason, it is important to develop local capabilities that have an understanding of the specific context in which the software is produced. In view of the rapid pace of change in the software field, firms are often searching for programmers with the ability to learn new skills on the job. Such skills go beyond the pure technical aspects and concern also project management and other general business skills. The size and capabilities of a country's human resources are a function of three determinants – the education system (notably universities), the system for professional, industry-based education and training, and in-house training organized by software enterprises themselves

i)   Broadband

Broadband services provide essential platforms for the development of knowledge based local, national, regional and global economies. Broadband is transforming the people's way of communicating, doing business and accessing information. It is a means to improve the efficiency, availability and reach of public and private sector services in areas of health, education and other government services and have important demonstrative effects in the socio economic sectors.

In March 2009, the Government of Bangladesh approved a Broadband Policy. Under this policy, the government ensures internet connectivity to optimize the use of information and communication technology. The government also has a plan to extend telephone and internet connectivity at reduced charges

to disadvantaged communities in Bangladesh. Besides this, the Broadband Policy also emphasizes affordable and advanced broadband services to create an enabling environment for investment in content development and the use of open source software.

To increase connectivity to the information highway, there is an initiative in place to connect Bangladesh with the Second Submarine Cable Network and thus reduces broadband costs considerably.

ii) National Connectivity

Public Switched Telephone Network (PSTN)

The Government of Bangladesh has deregulated the telecommunication industry. The private sector is now authorized to enter the Public Switched Telephone Network (PSTN) communication business. At present, eight PSTN operators (including one public) are in operation. The total number of PSTN subscriber has reached 0.10 cr by March 2013 (Source BTRC). Present Teledensity is 64.6% (Budget Speech, 2013). The list of PSTN operators along with their subscribers up to May, 2010 is shown below:
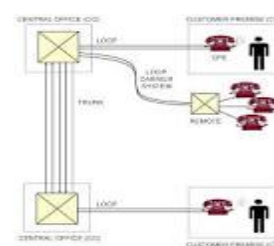
Table 1.1: PSTN Operators and their Subscribers Upto May, 2010

	Name of the Operators	Number of Subscribers in thousand
1.	BTCL	872.41
2.	Telebarta	56.42
3.	Jalalabad Telecom	10.90
4.	Onetel Communication	39.57
5.	Westec Ltd	17.0
6.	Shena Phone	11.62
7.	S A Telecom	18.03
8.	Bangla Phone	2.24
9.	**TOTAL**	**1,028.19**

Source: BTRC

Exchange of information across the world is done through International gateway (IGW), Interconnection Exchange (ICX) and International Internet Gateway (IIG) providing companies. The companies mentioned above have been given license by BTRC to operate these international gateways and interconnection exchanges.

Mobile Phone

The mobile phone has revolutionized the Telecommunication Industry in Bangladesh. Six mobile phone companies (including one public) are currently in operation. Multinational mobile phone companies are providing private sector telecommunication infrastructure in Bangladesh. The present number of mobile phone subscriber as of March 2013, is 9.99 cr and internet user is 3.4 cr (Source BTRC). The internet density have been increased to 19.9% (Budget Speech 2013)

The consumer mobile phone charges have been decreased drastically in recent years, primarily because of competition between the mobile phone companies.

Internet Access

The internet arrived in Bangladesh in early 1993. In June 1996, the Government of Bangladesh decided to allow private entrepreneurs to act as ISP (Internet Service Provider) using VSATS (Very small Aperture Terminal). Licenses have been given to 405 companies for operating as Internet Service Provider (ISP) by BTRC. The majority of ISP's are based in Dhaka; these ISP's lease bandwidth from BTRC and cater to various organization as well as provide single user connections. ISP's outside Dhaka are mainly connected through VSAT.

The Internet connections have been provided in 478 Upazilas through digital exchange. The number of internet users in Bangladesh increased dramatically from 1.0 lack in 2002 to 3.65 crore in March 2013 (Source: BTRC). Internet density has now been reached at 19.9% (Budget Speech 2013). In addition, the internet band width cost has also declined significantly, from Tk 24,000/MBPS in 2007, to Tk 4500/MBPS in 2013 (Budget Speech 2013). At present per minute call charge is 30 paisa and 65 paisa in case of other operators all over the country and the minimum charge of broadband internet service (ADSL) has been fixed to Tk 300.00 per month. The Government of Bangladesh is considering further reductions in prices, in line with neighboring countries. The internet services provided by different category are shown below:

Category	Subscriber in thousand
Mobile Internet	34,995.983
ISP and PSTN	1,223.12
WIMAX	314,469
Total	36,533,572

A comparative position of subscribers of Mobile phone, Fixed Phone with Teledensity along with their growth rate from 2007 to 2013 is shown below:

Table 1.2: Subscriber of Mobile Phone, Fixed Phone along with the Teledensity during 2007-2013

Subscriber Type /Year	2007	2008	2009	2010	2011	2012	2013 (upto March)
Mobile Subscriber (in Cr)	3.44	4.46	5.24	6.87	7.30	8.66	9.99
Fixed Phone Subscriber (In Cr)	0.12	0.13	0.17	0.17	0.17	0.10	0.10
Total Subscriber (in Cr)	3.56	4.02	4.71	5.64	7.47	8.76	10.09
Internet User (in Cr)	-	-	-	-	-	2.84	3.65
Teledensity	24.71	27.91	31.95	38.05	44.6	60.9	64.6

Source: BTRC

With the purpose of realizing the vision of "Digital Bangladesh", the Government of Bangladesh has emphasized the need to extend ICT facilities to rural areas in Bangladesh. Furthermore, the government has created a plan to extend low cost internet access to educational institutions and thus extend opportunities to students. In the mean time 1450 KM of optical fiber network has been installed. Some of the Mobile companies have already started 3G network technology in the market.

iii)   Regional Connectivity

A key priority of the Government of Bangladesh is to enable communication between Bangladesh and regional countries. Bangladesh along with India, Nepal and Bhutan has agreed to collaborate on a mega sub-regional Information Communication Technology (ICT) project aimed at improving connectivity, reducing the cost of business and expediting the economic growth of those countries. The South Asian Sub regional Economic Cooperation (SASEC) was established in 2001 by Bangladesh, Bhutan, India and Nepal with Asian Development Bank's support. It aims to promote the sub-region's economic cooperation in priority areas such as, transport, tourism, and ICT. The SASEC Information Highway Project will help SASEC countries connect with each other more efficiently and effectively through broadband. In March 2009, the Government of Bangladesh signed an agreement with ADB (Asian Development Bank) to develop network infrastructure with Nepal, Bhutan India and Bangladesh for developing the regional network.

This, in turn, will bring much needed benefits to communities in South Asia, especially to underserved rural areas. The deployment of ICT networks under this program can increase the benefits of e-health, e-education, e-agriculture, e-trade, etc to rural communities within Bangladesh and hence, harness the potential of ICT.

iv)   International Connectivity:

Bangladesh is connected with the information super highway through the submarine cable network SEA-ME-WE-4 in 2006. This provides Bangladesh with internet bandwidth of 24 GBPS establishing national high speed backbone which has been augmented to 142 GBPS in 2011 (BTRC). Currently all the major cities within the country are connected through high speed fiber optic backbone. Almost all parts of the country are accessible through Internet consistent link for phone, Fax, Mobile and high speed satellite link for the data communication. GOB is continuously reviewing the cost of internet connection and reducing where necessary. The process connecting the Bangladesh with second submarine cable will be completed by 2014. High-speed Internet connectivity through fibre optics cables costs about USD 2.67/per month for 1 kbps connection

(c)   Promotional Activities

i)   Public Private Partnership (PPP) Model Projects

The automation of Bangladesh Railway's Reservation and Ticketing System was the very first ICT based PPP model implemented in Bangladesh. Bangladesh Railway awarded this project, on a BOT basis, to Technohaven. Technohaven built the system and Bangladesh Railway

has introduced e-ticket since 29th May, 2012. Now anyone can easily buy ticket from website www.esheba.cnsbd.com sitting anywhere either at home or office by using visa card, credit card or debit card. Till January 2013 above 5 lakhs ticket has been sold in online. As a result Bangladesh Railway's inter-city passenger revenue has been increased from BDT 480 million to BDT 1.10 billion while reducing ticketing staff from 400 to less than 200. The resulting productivity gain exceeded 200%. It also reduced cost and harassment of the passengers. The infrastructure is built by the operators.

ii)   *The Chittagong Custom House Automation Project:*

Chittagong Customs House Automation project is another successful PPP model project implemented in Bangladesh. DataSoft implemented the project and it was launched in October, 2008. This project was implemented in coordination with Chittagong Chamber of Commerce & Industry (CCCI), Chittagong Customs House and DataSoft. This project, which did not require any public sector investment, was developed to increase revenue and decrease irregularities through automation. As a consequence of this automation, the 42 steps lengthy process previously used by Chittagong Customs House has been decreased to only 5. Moreover, the bill of entry cost has been reduced from BDT 180 to BDT 50only. The introduction of full automation and user-friendly procedures helped Chittagong Customs House reduce customs evasion by at least BDT 3.5 billion and double revenue earnings, which now stands at BDT 150+ billion a year. Also, this project has reduced the cost of doing business by at least 70%, saving custom processing time by 80%, and has helped establish a transparent level playing field for businesses (UNDP Report 2011).

iii) *Union Information Center (UIC):*

The Union Information Center (UIC) is a PPP model project implemented by Local Government Division (LGD) of the Ministry of Local Government, and Rural Development and Cooperatives. Under this project, approximately 4501 Union Information Centers have been established to provide useful information directly to Bangladeshi citizens. This project, supported by the Access to Information (A2I) program was undertaken by the Prime Minister's Office.

The UIC's are normally located at the Union Parishad premises, and run by local entrepreneurs and various service providers in the private sector. Local entrepreneurs manage the UICs, while Union Parishads (UPs) ensure social security of the centre, LGD helps in capacity building and mobilization, and A2I provides the technical support and digital content. The entire management of the UISC is run by a committee

headed by the UP chairman. Teachers, doctors, farmers, students, women, government and non-government field workers and UP members have also been included in the committee.

UISCs began its operations in 2009 in 30 Union Parishads (UP) through partnership between Local Government Division and A2I programme. The Quick Win initiative expanded rapidly culminating in a launch in all 4,501 UPs of the country on November 11, 2010 by the hon'ble Prime Minister of Bangladesh and UNDP Administrator.

Each UISC is operated by two young local entrepreneurs - a male and a female – under supervision of a local advisory headed by UP Chairman. The UP provides space and utility for the centre. Local Government Division coordinates with Cabinet Division and Bangladesh Computer Council to establish the basic ICT setup including computers, laptops, printers, multimedia projector, digital camera, webcam and solar panel. The entrepreneurs are free to install additional facilities to support business growth, at the same time, ensuring that the social sustainability of the centre is achieved by delivering government information and services including Public exam results, Government forms download, Birth and death registration, Online university admission, Population census data, VGD/VGF card database, Livelihood information. Employment information, Indian Visa Application, Visa processing /visa form printing, E-mail and Internet browsing, Computer Training, Video conferencing, Mobile Banking British Council's English Learning, Photocopying/Scanning.

As a consequence, people from Union Parishad can get free information on various government services, rules and regulations, passport forms, driving licenses, and much more from the UIC's. Moreover, unemployed individuals can access information about job vacancies; students can browse the internet while women can learn about their rights with respect to marriage and obtain information about maternal health.

iv) *Software for Local Farmers:*

Katalyst an NGO, partnered with the Soil Resource Development Institute (SRDI), an agency under the Ministry of Agriculture, developed an ICT-based service that has improved the access of farmers to assist how to use fertilizers in different locations and for different crops. Knowledge of the precise dosage of fertilizer is important and highly demanded as it influences the cost of input and the yield. Katalyst formed a coalition with Grameen phone and Banglalink, two mobile network operators in the country, to develop a mobile-based fertilizer information service. A local IT company, e-Generation, was asked to develop the required software application in Bangla, reflecting the local context and the specific needs of the local farmers. The new service was launched in July 2009 and has since shown positive results. Users have

experienced two main benefits: reduced costs for using fertilizers (in some cases up to 25 per cent) and higher crop yields (in some cases as much as 15 per cent).

Based on the success of the software, Katalyst has developed similar software and service to address irrigation-related information needs of farmers. It helped to keep costs down and to adapt the service to the local users' needs and capabilities. For example, the user interface is completely in the Bangla language, the data used as input were provided by the SRDI and the software is hosted on the server of a local company. The software is owned by the Government, which has decided to integrate the new service in its Agriculture Information and Communication Centers and Union Information and Service Centers. The experience underscores the value of using public–private partnerships to develop software projects. It also demonstrates the importance of having access to local expertise to develop tailored solutions at low cost.

v) **Other E-services**

District e-Service:

The District e-Service Centre (DESC) started its operation in 14th November, 2011. The DESC is an ICT facilitated one-stop service centre which provides an efficient electronic version of the century-old manual and heavily bureaucratic service delivery system at every DC office. It is located in the Deputy Commissioner's (DC) office. DESC has been designed to improve the accessibility and transparency of public service delivery system at the district level to achieve the following objectives:

- Ensure service delivery at the at the door steps of the people at the least possible time;
- Uphold citizens' Rights to Information through extensive information flow;
- Save time and labour in the processing period;
- Increase the number of clients served everyday through the use of ICT;
- Reduce corruption and increase accountability by ensuring enhanced flow of information and more transparent processes.

Services available at the DC office can be requested and received through the one stop service counters, online, by phone, by post, or by fax. The DESC was first piloted in Jessore DC office and is currently operational in all the 64 districts.

Citizens are now able to submit their applications online from service centres located at the DC office, UNO office, Union Parishad or even from their own home without having to travel to the district headquarters. Upon submitting their applications, citizens receive an SMS notification with a receipt number and date of service delivery. In addition, citizens will also be able to submit their applications through the District Portal from anywhere in the world including all the Union Information and Service Centers.

Citizens are notified through either SMS or email once the service is ready to be delivered. They can choose to receive the service in-person from the concerned DC office or by postal mail if the application is regarding request for any documents. During the waiting period, citizens are able to check the status of their lodged applications though SMS or District Portals. This has allowed citizens to avoid in-person visits to DC offices which were the practice previously.

ICT in Public Procurement:

Government has introduced e-GP (Electronic Government Procurement) systems to make the procurement system transparent, competitive and corruption free so that the genuine people can join the business with competitive price. The systems has been introduced for the Public Procurement under the CPTU , IMED, Ministry of Planning initially in four organizations i.e LGED, R&H Directorate, BWDB and Rural electrification board. Presently 12 organizations under 6 ministries and 350 government offices are running their tendering process through the e-GP portal system. 333 branches of Banks are receiving tender related fees and security money online through e-GP system throughout the country. Introduction of this system is a significant step towards building a Digital Bangladesh.

Once e-GP starts functioning in all the Ministries and Departments, one can submit tender documents from home, e-tendering makes it possible to perform automatic bid /proposal evaluation, contact management, e-payment and much more in easy and coordinated way and in lesser time. Besides, a large number of firms /persons are being able to participate in the bidding process, in effect; online tender submission will help getting rid of criminal offences like snatching away tender documents or unlawful influences. In addition , provision has been made for procurement compliance monitoring by using web based Procurement Management Information System (PROMIS), to check and monitor the submitted tenders comply with the public procurement rules and regulations properly.

Free Lancers:

Freelance work is fast becoming a prominent feature in software development in Bangladesh. It offers a new potential source of employment for the growing number of IT graduates from different institutions. It also helps develop entrepreneurial skills since freelancers have to be proactive in marketing themselves. Freelancing is not an employment in itself but does represent one possible outlet for youth employment. Given that the work is typically done over the Internet, it also provides more location flexibility. However, for effective participation of free lancers, broadband Internet needs to be widely available, accessible and affordable. In Bangladesh, some 40,000 (BASIS) freelance programmers are reportedly earning around $15 million per year. It offers a new potential source of employment for the growing number of IT graduates in the country. It also helps develop entrepreneurial skills since freelancers have to be proactive in marketing themselves. There are no official data on the actual contribution of the free lancers in software development. However, a brief look at two platforms for on-line work – oDesk.com and Elance.com – may provide better information on this field.

Previously, the remittances for the free lancers were channelled through Western Union and taxed them accordingly. However, a directive issued in May 2011 by Bangladesh Bank recognizing that these funds should be treated as export-related commercial income, which is tax exempt. This is a significant development for freelancers.

IT Incubators

First ICT incubator in Bangladesh started its activities on 1st November, 2002 under the Ministry of ICT with a government grant financing of Tk 3.60 cr. The incubator is located at BSRS Bhaban, KarwanBazar with a floor space of 68,563 sft in seven different floors. Bangladesh Association of Software and Information Services (BASIS) have been appointed as a Management Agent for the overall management of the incubator.

Software and IT Enabled Service companies are eligible to apply for space at the ICT Incubator. The tenants of ICT Incubator has been given the facility of paying office rent at lesser cost (Tk. 22.00 per square foot per month), stable power supply and free internet (2 Mbps bandwidth) connection.

Overall activities of the companies in incubator includes Developing Software ERP, Accounting & Inventory, POS, Phone Content, software etc., e-Commerce, e-Governance, Geographic Information System (GIS), Business Process Outsourcing (BPO), Data Entry & Processing, Website Development, Graphic Design, Animation and Multimedia.

At present 48 companies have been accommodated in this incubator and employment opportunities created for about 1700 IT professionals. These companies are exporting software in abroad to the extent of Tk 380 million per year.

Call Centers

Recently Government of Bangladesh has introduced Call center business which has created new areas for revenue generation for the government. A call center is a physical place where customer and other phone calls are handled by an organization, usually with some amount of computer automation. Typically, a call center has the ability to handle a considerable volume of calls at the same time, to screen calls and forward those to someone qualified to handle them, and to log calls. Call centers are used by mail-order catalog organizations, telemarketing companies, computer product help desks, banks and other large organization that uses the telephone to sell or service products and services. A call centre is operated by a company to administer incoming product support or information inquiries from consumers. Outgoing calls for telemarketing, clientele, and debt collection are also made. The centers may be used for both domestic and International requirements.

The cost of labour in the call center is quite low compared to other neighboring countries which are a great attraction for the outsourcer for call center business in Bangladesh. Presently the cost of 2MBPS connection for a call center is ranging from US $ 900 to US$ 5,000 per month depending on the size of the seats. Initial investment for a call center of 30 seats is approximately Tk 1.5 cr to Tk 2.0 cr depending on the location and type of business.

Bangladesh has the location advantage because of the 11 hour time difference with the USA. For the time zone advantage American, West

European and Asia Pacific's organizations can enjoy 24 hours customer service round the week. Our geographic location is also very suitable to establish a call center. Because our environment is support us to work round the whole year. The geographical advantage and the time zone provide a great opportunity in the business competition.

BTRC has given licenses to 245 firms, including two International organizations for operating the call center business. 72 of these call centers are in operation in Bangladesh now. employing about 20,000 professionals. (Budget speech 2013). From the interview with the President of Bangladesh Call Center Outsourcing (BACCO), it is gathered that these companies are at present earning about Tk 12.0 crore revenue per year. This service is now one of the largest parts of the IT sector where approximately 63% of the IT professionals (WB Report) are working. According to President BACCO, the employment of the professionals in call centers is estimated to increase to 200,000 by 2021.

In domestic and International market customer care through call centers is increasing rapidly. Because of the improved quality and professionalism many of the organizations consider the use of call centers for improving their customer satisfaction and increase their business earning. With the technical support from Agriculture Information Services (AIS) one of the private mobile operator started call center services where experts advice callers on poulltry, livestock, fisheries etc. In the agriculture sector there are many technological development like integrated crop management, improved nutrient balance integrated aquaculture techniques etc. Information on these can be disseminated through call centers. On-demand consultations based on call centre model can play a very important role to improve the capacity of those professionals working in the field and disseminate these complex techniques and skills more efficiently.

One US based outsourcer has expressed interest in setting up BPO operations with around 10,000 seats in Bangladesh with a proposed investment of USD 150 million.

In spite of all these activities there are few challenges of the call centers need to address which are as follows:

- Lack of uninterrupted broadband connections, telecom facilities
- Lack of redundant broadband connection
- Lack of professionals with English proficiency
- Lack of adequate Capital expenditures support

As a national priority some of the countries like India and Pakistan have already started developing professionals with English proficiency for Call centers through education reform and capturing call center business from

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abroad and creating large scale employment opportunities for their economic growth.

Mass Media:

Access to information is an integral part of freedom of thinking, conscience and speech. Electronic mass media specially radio and television has a vital role in informing policies/programs and development plans of the government. Introduction of digital technologies in broadcasting has ensured increased involvement of the people in development activities through enhanced public awareness.

1.2   Broad Goal/ Vision of ICT Villages

The objective of the ICT Village project is to establish knowledge based industries throughout the country, particularly related to Software and IT Enabled Services, and thus contribute to the national economy and achieve the goals of Vision 2021: Digital Bangladesh. The Government of Bangladesh intends to create basic infrastructure for establishing IT Parks in Rajshahi. Government has allocated 34 acres of land for developing the IT village. This land will be used to develop a world-class business environment, conducive for IT/ITES industry. This ICT village will attract investments from both foreign and local entrepreneurs.

 The specific objectives of the project are:

    i.   To promote balanced development of ICT Industries in Southern region of the country.

    ii.   To create basic infrastructure for the establishment of IT Park/STP in Rajshahi.

    iii.   To construct a Multi Tenant Building (MTB) and other utilities services at the allocated land for creating ready infrastructure for the local and foreign investor.

    iv.   To create a conducive environment to attract foreign companies for establishing and operating Software and ITES industry in Bangladesh.

    v.   To create employment opportunities for the ICT professionals.

    vi.   To promote knowledge based industry to realize the Vision 2021: Digital Bangladesh.

The proposed ICT villages when implemented will ensure the following facilities:

    i.   Single window service

ii.   Strong customer base

iii.   24/7 technical support

iv.   Qualified manpower

v.   Competitive pricing

vi.   Tie up with major telecom partners

vii.   Service of International standards

viii.   Inclusion of service for new entrepreneurs including the freelance workers.

ix.   Strong and low cost internet connectivity

x.   Office space for Software developer, call centers, Training centers, along with all recreational facilities for the user of the ICT Center

xi.   Low rent office space and

xii.   Other physical facilities like nonstop/ stable power supply, water, gas, telephone, road/rail/Air linkage etc

1.3   Assignment Background

Bangladesh Hi-Tech Park Authority (BHTPA), under the Ministry of Information & Communication Technology (MoICT) intends to develop IT villages in the cities of Jessore, Rajshahi, Khulna, Sylhet, Rangpur, Chittagong and Dhaka. The major objective of the project is to establish knowledge based industries in Bangladesh related to IT/ITES in order to contribute to the national economy. Subsequently BHTPA has signed an agreement with IIFC for the feasibility study for the development of above mentioned IT villages. In accordance with the Consulting Services Agreement, IIFC has prepared the Feasibility Study for the Development of an ICT Village at Rajshahi as the 2nd site of the assignment.

1.4   Brief Scope of Work and Approach

IIFC has been given the assignment for feasibility study keeping in view of their Technical aspect, Commercial aspect and Environmental and social aspects of each IT villages including Rajshahi. Scope of work of the Consultants in preparing the Feasibility Study for the development of an ICT Village at Rajshahi was to examine the situation of ICT industries, conduct market survey amongst potential tenants of the ICT village, prepare demand forecast for the proposed ICT Village, explore modalities of private sector participation, prepare conceptual master plan and ICT building design and floor plans for the proposed ICT Village, conduct preliminary social and environmental analysis of the site and conduct financial analysis through financial modelling.

IIFC met BHTPA officials along with other related authorities for understanding the potential outlook of the project particularly on the

preferences of the Client in terms of IT village layout and development model. IIFC consultants also reviewed various reports, data, maps and collected information for comparative information about international best practices in developing similar type of projects in other countries.

For conducting market survey and demand analysis, IIFC has taken an approach of timely delivery of outputs by quick engagement of in-house staff and outside consultants and effective mobilization of company resources. Specific attention has been paid to technical and commercial aspects. IIFC consultants met the relevant stakeholders, such as major local IT companies, free-lancing IT consultants, IT associations etc. and conducted IT industry survey and identified the types of industries that will be attracted to IT villages

IIFC also analyzed the growth trends of the ICT sector, analyzed needs of ICT companies in the country, explored options of flourishing the growth of freelancers and ICT industry entrepreneurs through provision of adequate facilities at ICT Villages and reviewed the modalities for private sector participation in the operation of the proposed ICT Village at Rajshahi.

For obtaining information about the trends, practices and prospects of ICT industry, a market survey was conducted along with a consultative process with leading ICT entrepreneurs and scholars who are contributing significantly in flourishing the business in this sector. A market survey was conducted amongst targeted ICT companies in Dhaka and Rajshahi to obtain their feedback in the development of an ICT Village at Rajshahi. An online survey was also conducted amongst ICT freelancers in the country.

Besides, a consultation process was followed with key industry players such as BASIS, BACCO and UNDP about their perception and prediction about the ICT sector in the country, especially with regards to development of ICT villages at divisional levels and their potential for employment generation and ICT sector growth throughout the country.

Subsequently the consultants prepared the market demand forecast for the IT Villages through market survey for assessment of the needs and also identified companies that may relocate or open subsidiaries in the proposed IT Villages.

Consultant also prepared a conceptual master plan and ICT buildings designs for the proposed ICT Village with consultation with BHTPA and MoICT. Based on the designs, project cost was estimated and used for financial analysis with Financial Model.

Based on the above, this feasibility report has been prepared with technical, commercial and financial analysis and a preliminary cost estimate for the project.

Chapter 1: Background

2

IT/ITES Industry Analysis In Bangladesh

2   ICT INDUSTRY ANALYSIS IN BANGLADESH

ICT industries are fully dominated by the private sectors in Bangladesh while Public sector is just providing an enabling role in their development. In the private sector some of the apex bodies like (i) Bangladesh Association of Software & Information Services (BASIS), (ii) Bangladesh Computer Society (BCS), (iii) Bangladesh Association of Call center Out sourcing (BACCO), (iv) Bangladesh Computer Samity (BCS), Bangladesh Computer Society (BCS) suppliers of computers and its accessories (iv) Internet Service Providers (ISP) and (v) Cyber Café Owners' Association of Bangladesh (CCOAB) are working for the improvement of the ICT industry in the country. A brief introduction about the activities of these organizations is given below:

i) *Bangladesh Association of Software and Information Services (BASIS)*

Bangladesh Association of Software and Information Services (BASIS) is the national trade body for Software & IT Enabled Service industry of Bangladesh. Established in 1997, the association has been working with a vision of developing vibrant software & IT service industry in the country. Members of BASIS account for the lion share of the total software & IT services revenue of the country. BASIS, through its regular programs and activities, works on the following broad objectives.

• Domestic market development by creating awareness among potential IT users from both private and public sectors, establishing market places for IT solutions and ensuring level playing field for local software and ITE service industry.

• International market development through networking and business linkage events as well as brand promotion of the industry at international level.

• Capacity building of the member companies as well as the industry as a whole through management/entrepreneurship development initiatives, technology training and resource sharing.

• Member service development and delivery in different operational and business support areas like financing, tax, export/import, remittance, foreign visit, contract & legal issues, IPR etc.

• Advocacy for business friendly and enabling government policies for the development of software and IT enabled service industry.

• Social contribution, as responsible citizen group, towards the long term national vision of becoming a technology driven knowledge economy, particularly through engaging with the young generation for motivating and guiding them for becoming future technology leaders

BASIS has already gained modest success in attaining the above mentioned goals. For domestic market creation, BASIS has wide range of programs and activities. Every year BASIS organizes BASIS SOFTEXPO, the biggest software and ITES exposition in the country.

There are over 1,000 software and IT enabled service (ITES) companies (out of which 800 are registered and 200 are unregistered) in Bangladesh (BASIS). IT enabled services provide a wide range of areas, from media and entertainment, engineering, process and infrastructure, consumer services, banking, insurance, travel, manufacturing, pharmaceuticals, and financial services.

ITES companies in Bangladesh are primarily involved in software development, data digitization and processing, call centers, animation, and multimedia and desktop publishing. A comprehensive list of IT enabled services is provided in Annex A.

ii) Bangladesh Computer Society (BCS)

Bangladesh Computer Society is working with the following aims and objectives:

a. The aim of the Society is to advance professional excellence in Information Technology(IT)

b. To promote, develop and monitor competence in the practice of IT by persons and organizations and to be the spokesman for IT professionals at international level

c. To develop knowledge and skill of IT professionals in developing, application and maintenance of IT and IT related appliance i.e. to promote continuing professional development and lifelong learning process.

d. To make data communication easy and to develop public opinion on it

e. To help develop IT skills of IT related persons and organizations

f. To maintain and promote the observance of standard of knowledge of IT for members of the Society

g. To define and promote the maintenance of standard of knowledge of IT for members

h. To promote the formulation of effective policies on information technology and related matters

i. To extend the knowledge and understanding of IT in the community

j. To promote the benefits of membership of the Society

k. To promote the benefits of employing members of the Society

l. To arrange seminars, workshops. symposiums, and lectures to improve the professional skills of members of the Society

m. To increase the use and application of IT for public welfare, spread of education and development of knowledge.

n. To arrange applied IT education

o. To maintain morality of members of the Society and to monitor and maintain level and standard of IT knowledge of members of the Society

p. To look after the welfare of the members of the Society

q. To create and enhance the opportunities and status of members of the Society in the work area

r. . To create employment opportunities for the members of the Society

s. To promote human network

iii) Bangladesh Association of Call Centers outsourcing

The role of BACCO is to encourage creation of proper policies and regulations; ensure in place are fair and appropriate operating environment; and provide assistance to interested operators who want to enter the market. The role and objectives of BACCO are as follows:

1. To ensure fair and objective call center policies and regulations are in place within the shortest period of time.

2. Advocate fair operating environment are in place from all government departments.

3. To promote Call Center and BPO services globally.

4. Make Bangladesh a major competitive offshore contender for the MNCs.

5. To ensure good governance is established.

6. To open a new high tech sector in Bangladesh and thereby earn foreign currency.

7. Assist in generating new employment and human resource for the call center market.

As of now there are about 245 call centers out of which about 72 are in operation.

iv) Bangladesh Computer Samity (BCS)

Bangladesh Computer Samity is the national association of the ICT companies (mostly focusing on the hardware segment) in Bangladesh. BCS was established in 1987 with eleven members. BCS comprises distributors, dealers, resellers of computers and allied products and locally assembled computer vendors. The objectives of the samity are:

• To unite and encourage all computer vendors to join in one platform for achieving their common interest

- To unit and encourage cooperation amongst companies, firms and industries
- To seek cooperation among all the members in the ICT business
- To safeguard the interest of its members and their development
- To boost/encourage, promote and diversify effective use of Computer in Bangladesh
- To make representation to the Government and related bodies on behalf of BCS members with a view to reduce bottlenecks, grievances, anomalies and meeting legitimate demands
- To discuss and promote legislative support and other measures connected to or having bearing on the business

In Bangladesh every year, on an average over 300,000 PCs are imported. There are about 10,000 vendors are involved in the computer business in the country. A large portion of those PCs are assembled locally (the local value addition is less than 15%). There is hardly any part of a PC that is manufactured locally.

Locally assembled and often unbranded machines dominate the pc/server market. However, most of the international giants (HP, IBM, and Dell etc.) are present in the market through their local agents. The cost of a PC or server in Bangladesh is in line with world market prices. A branded server with basic configuration costs about USD 6,000 whereas the 'unbranded' version costs about USD 2,000. The average workstation price is USD 700-900 for a brand PC and USD 400-600 for a clone PC. After sales support of the hardware is satisfactory. Most of the large organizations usually go for AMCs (Annual Maintenance Contract) with the vendors. The AMC is customizable in accordance to the client's need. Large organizations including financial institutes and Telecom companies also import a large number of servers for supporting their solutions and data centers. The structure of the PC/Server market is heavily controlled by the few importers where there are less than 10 large importers who import bulk of these items. The retail market, on the other hand, is very fragmented with thousands of small entrepreneurs with small retail outlets (these also work as maintenance set ups) all over the country (in Dhaka alone there are over 2,000 such outlets). There is a strong supply chain structure across importers and retailers. In last couple of years, there has been a significant growth in specific segments like laptops and notebooks as global prices of those items came down significantly.

v) Internet Service Provider (IPS)

The Internet Service Providers Association of Bangladesh was established in 1998. The general purpose of ISPAB is to improve business conditions of the Internet service providers operating in Bangladesh. It serves the common business interest of its members. Internet Service Providers are providing internet services to various types of clients including schools, colleges,

universities, public and private offices, private individuals etc throughout Bangladesh. As of now there are about 405 IPS companies who take the broadband lease line from the BTRC and rent it out to its various subscribers. ISP's outside Dhaka are mainly connected with VSAT. The operating License and other terms and conditions particularly the rent to the subscribers is determined by BTRC. Related works involved are:

- Promoting higher business standards Disseminating information
- Ensuring benefit for members (and their customers)
- Influencing the government for pragmatic policies
- Performing functions that are customary among trade associations

vi) Cyber Café Owners' Association of Bangladesh (CCOAB):

CCOAB is the trade association of the cyber café businesses at the national level. Established in 2003, the association safeguards the rights and interests of the members and helps the ICT in Bangladesh through combined strengths of the members. At present there are about 4,000 Cyber Cafe's are in operation out of which 1,000 are located in Dhaka. Most of the Cyber cafe's provide initial training to the beginners. There is lack of standardized training in these organizations although very few are well organized.

2.1 Economic Climate – Global and Local IT/ITES Situation

2.1.1 Global IT/ITES Situation

The IT/ITES industry is one of the fastest growing industries in the world. The ITES industry is very broad and even comprises the business process outsourcing (BPO) industry. World Bank in its report, "Leveraging ICT for Growth and competitiveness in Bangladesh: IT/ITES Industry Development" 2009, highlights various issues related to the global development of IT/ITES business and specifically, Bangladesh.

This report estimates the global investment in IT/ITES industry over the next five years (2011-2016) to be in the range of US $475-800 billion. Furthermore, less than 15% of this investment is shared by developing countries. This presents opportunities for countries such as Bangladesh to grow its IT/ITES industry. The report also mentioned that IT/ITES growth will lead to large scale employment creation, especially for the youth in addition to direct economic benefits. Moreover, growth in the IT/ITES industry will reduce gender inequality and help in Bangladesh's economic development. The World Bank report further analyzed the most suitable IT/ITES industries for Bangladesh which include:

IT application services

- Traditional services
- System integration
- Application development and maintenance

- Consulting

IT engineering services

- Mechanical design and production
- Embedded software
- Plant engineering

2.1.2 Local IT/ITES Situation

Development of software in the IT industry is one of the most important area of work in IT business. Today, it represents a critical component in the production of almost all goods and services. In cars, telecommunications, consumer electronics, medical devices and robotics it is embedded to provide the desired functionality. Companies aspiring to participate in international supply chains and to make their business profitable need access to competitive software solutions. The software in IT industry itself is an area that holds potential for continuous technological upgrading.

The overall turnover of the IT industry in Bangladesh is relatively small; approximately US $800 million (BASIS Survey 2012). There are about 800 registered IT Firms working in the market out of which about 160 companies export their software product to America, Europe and East Asian Countries. There are about 200 unregistered small and home based software and IT ventures doing business for both local and international markets (BASIS).

According to BASIS, the industry has employs about 70,000 skilled individuals including about 15,000 agents working in the call centers. Besides this, about 40,000 people work as free lancer. There are over 10,000 hardware vendors doing business in the country. The local industries are involved with less complex projects such as web content development, mobile content development, back office software development, 2D/3D animation, desktop publications and call centers. Bangladesh, however, possesses potential to move up the ladder for more complicated projects (ERP, CRM, ASP etc.) in the close future.

The cost of employing ICT skilled individuals in Bangladesh is, on average, 50% less than other countries such as India, Philippines, Malaysia, Thailand and Vietnam. (KPMG, 2012) The Government of Bangladesh provides cheaper bandwidth and plans to establish at least seven IT parks in various parts of Bangladesh. The country has favourable ICT Policy for the growth of the sector. At present, teledensity in Bangladesh is about 64.6% (as of March 2013). There are about 80 universities producing approximately 185,000 graduates per year out of which about 14,500 graduates are in IT related subjects. Moreover, all Upazilas are now under mobile network coverage.

Intellectual Property Rights (IPR) protection is a very sensitive issue for outsourcing work. Protecting intellectual property is to give incentives to invest resources in bringing new products (open source and proprietary

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software) to market. Encouraging local firms to develop new solutions has the advantage of promoting indigenous innovation and its commercialization, as well as more sustainable employment. Vendors in Bangladesh have adopted strict security measures to prevent customers' intellectual property rights being violated. Further measures are being enforced through the new ICT Act, aimed at reducing piracy.

The Government of Bangladesh has a liberal taxation policy. Income generated by the IT/ITES industry is tax exempted. Tax exemption includes digital content development and management, GIS development, IT support and software maintenance services, BPO, Data entry, graphic design, search engine optimization, web design, e commerce, online shopping, document conversion, imaging and archiving and etc.

Bold and relevant initiatives can help Bangladesh become a viable player in the IT/ITES industry (WB report). This includes identifying appropriate strategies, action programs and investments needed for the country to leverage ICT for economic growth and competitiveness. These policies can reduce gender inequality, increase youth employment, and hence lead to social development. Also, the World Bank's current Country Assistance Strategy for Bangladesh recognizes the key role of ICT in supporting Bangladesh's growth, competitiveness and good governance agenda.

2.2   Bangladesh ICT Industry [Characteristics & Potential Evaluation]

The IT/ITES industry is growing and is playing an increasingly prominent role in Bangladesh's economy. This industry serves both domestic and international markets. As mentioned earlier, there are over 800 registered software and ITES companies in Bangladesh. There are a few hundred more small unregistered companies (BASIS).

The total size of the IT market excluding Telecommunication is approximately US $800 million   (BASIS 2012), the software industry takes up 44% (US $352 mn) and ITES is about 56% (448 mn). Recently, there has been strong growth in freelancing, where young professionals directly serve overseas clients. These professionals mainly work from home and do not own registered companies. According to BASIS, there are about 40000 freelance professionals in Bangladesh, earning on average revenue of about US $ 15.0 million per year (BASIS).

BASIS carried out a survey on three hundred of its member companies in 2012. This survey sought to identify the business nature, volume and size of IT/ITES companies. In excess of 70% of surveyed companies were found to be involved in development and maintenance of software for their clients. A number of these companies also engaged in providing different IT enabled services to their clients. In total, almost half of the surveyed companies were involved in providing a range of IT enabled services (data/form processing, graphic/web design, content management etc.).

A large number of software and ITES companies who provide non-specialized services cater to business demand across different client industries. Examples of such general IT solutions include accounting solutions, web site development, CRM, sales automation, office management, security solutions and etc.

The local software industry has been trying to keep pace with the most recent developments occurring across the technology and communication space. A number of companies are developing apps for mobile and other hand-held devises. A significant number of software and IT service enterprises (mainly the larger and more established IT companies) have developed expertise targeting the government/public sector market (KPMG, 2012).

A number of companies are developing apps for mobile and other hand held devices .Some companies are also providing services (platform or content development service) according to new and innovative business models like pay per use, utilizing the mobile distribution channel. A significant number of software and IT service enterprises have also developed expertise in the government /public sector market.

2.3   Industry Strengths and Needs

In general the strengths of IT/ITES industries depend on the (i) availability of skilled manpower (ii) Competitive cost of doing business (iii) Quality of Public infrastructure and (iv) appropriate business environment.

Bangladesh has a good number of young educated unemployed population which can be the workforce of IT/ITES Industries. In the education sector, Bangladesh has 84 universities including 23 public universities where IT related courses are offered in more than 60 universities.

There are degree and intermediate colleges where IT related programs are offered in more than 40 institutes. In addition there are many Polytechnic institutes where IT related programs are offered. From all of these institutions approximately 14,500 students (BASIS estimate) are graduated every year out of approximately 5000 software graduates. Initiatives are underway to introduce computer science at secondary school level. The numbers of IT graduates are small compare to demand in the market and therefore government has to address the issue by increasing the course facilities as well as number students to meet the situation. The curriculum for the IT courses in the educational institutions should be synchronized with the requirement of the IT industries.

Bangladesh based companies- both domestic and multinationals, have build strong relationships with various universities in the country to tap and train talent at the sources. Finishing schools to bridge the skill gaps between academia and industry are also coming up, allowing ready resources availability

Bangladesh has a much lower IT/ITES labour cost compared to India, China and Pakistan. It is estimated that the IT/ITES skilled labour cost is as much as 50% less in Bangladesh than its neighboring countries (KPMG Report 2012). This is an important advantage since labour is the largest cost component across most IT/ITES segments. Thus, this labour cost advantage together with a sizable young population can attract investors and grow the IT/ITES industry in Bangladesh.

According to a DANIDA study (2006), a considerable brain drain and the attractiveness of other business sectors are reducing the number of professionals seeking an IT career. Moreover, the deteriorating quality of the IT/ITES labour force could significantly affect the quality of industry output. Besides this, a lack of employment opportunities are leading to a declining number of students in IT programs which can reduce the labour force available to IT/ITES.

Companies seeking to outsource primarily select the outsourcing agency factoring in the quality of service, language skills, cost of product, and the availability of skilled manpower in both the present and the future. In this aspect, Bangladesh has prepared quality workforce, train its manpower to comply with international standards and guidelines.

Bangladesh has a lack of CMMI certified individuals/firms while other countries continue to make progress in this area. Capability Maturity Model Integration (CMMI) certificate is most important for IT/ITES firms and its employer's for outsourcing jobs. CMMI is a process improvement certification program. This certification is used to demonstrate the maturity of individuals and firms in improving processes, mainly through outsourcing. There are 50 companies in Bangladesh capable of reaching CMMI level 3 certification and another 10 capable of reaching CMM level 4/5 by 2014 (WB Report). While these goals seem plausible, Bangladesh is lagging behind significantly in implementing national level strategies and prioritizing support to individuals and companies seeking international certification. Bangladesh has to address these issues in order to gain a larger market share of the global IT/ITES industry.

Some companies in Bangladesh have performed well in certain IT/ITES segments. By replicating best practices, expanding on strengths and making use of low cost and abundant labour, Bangladesh can expand its market share of the IT/ITES industry. In particular, Bangladesh has to increase awareness about the potential of the IT/ITES industry, and the potential of Bangladesh's labour force. Bangladesh has to take advantage of talent across the country by expanding IT/ITES businesses to cities, districts and divisions outside of the capital region of Dhaka (WB Report 2010). Moreover Bangladesh needs to tap into its female labour force to facilitate growth in IT/ITES. This can help Bangladesh increase its supply of talent, maintain its cost advantage and gain momentum in its pursuit of the IT/ITES industry.

World Bank report also recommended to develop IT parks in various places of the country.

Bangladesh has a broadband policy and according to the policy the cost of connectivity is quite competitive compare to our neighboring countries but unfortunately, the speed quality and reliability seems to be inadequate, power supply is unreliable and internet penetration is low particularly for the disadvantaged group. These issues are to be addressed to strengthen the IT industries. For doing competitive business in world market, proper business environment in the country is very much essential. This includes attractive fiscal policy, good governance, Law and order situation proper and timely judgment systems. Laws and regulations are to be reviewed regularly and inappropriate laws are to be removed.

2.4   Business Trend

The local market is the predominant source of business for the software and IT service industry (63% of BASIS member companies are solely focused only in the local market). There has been a consistent growth, in the local market, of 20-30% over the last few years (WB Report). The market is also maturing in terms of both client requirement and solution response from IT companies.

Although there is a high level of interest in IT jobs in the public sector, the private sector dominates the IT/ITES market. From a survey carried out on 110 IT solution companies catering mostly to the local market, it is found that a share of them provide business application solutions including ERP, accounting software, HR software, sales automation, inventory management system, and etc to private sector business enterprises.

Banking and other financial sectors (including capital market, Insurance, Leasing, MFI's) still continue to be the major focus for many IT companies. In the banking sector, the core banking software market is dominated by foreign software companies (though in a number of cases local solution companies are working for implementation and maintenance of this software). Interestingly, a good number of local IT solution providers are working with banks to provide a range of ancillary services related to banking. Because of the growth of the Bangladesh capital market in recent years, a number of companies have developed solutions for merchant banks, brokerage houses, and issue managers.

As regulation in the micro credit/micro finance institutions (MFI) become more stringent, and there is more pressure for operational efficiency, a number of MFI solution development companies are targeting this otherwise untapped market.

Moreover, the manufacturing sectors including RMG, textile, pharmaceuticals and other consumer goods industries have created sustainable demand for IT solutions like ERP, HR information systems, and production and financial management solutions. On the other hand, service

industries like telecom (second highest after financial sector within service sector), retail & wholesale, healthcare (hospitals, diagnostic centers etc.), education (university, schools and colleges), publishing/media and real estate have created sizable market space for IT solution companies.

The local software industry has been trying to keep pace with the most recent developments occurring across the technology and communication space. A number of companies are developing apps for mobile and other hand-held devises.

2.5   Growth Trend

The global IT/ITES market continues to grow and due to its large market size, there is a huge potential for Bangladesh to grab additional market share. Several Bangladeshi Companies have been successful in penetrating the global IT/ITES market. The Export trend in recent years is shown below.

Table 2.1: Export Trends in recent years

Fiscal Year	Export (in Million USD)	Growth(Over Last yr)
2006-07	26.08	-3.44%
2007-08	24.09	-4.8%
2008-09	32.91	32.59%
2009-10	35.36	7.44%
2010-11	45.31	28.14%
2011-12	75.81	56%
2012-13	101.63	43.53

Source: EPB & BASIS Report, 2013

Major export destinations for software companies include the US, Japan, UK, Denmark, Sweden, Norway, Netherlands, Germany, Australia, Saudi Arabia, and the UAE. Most software exporting companies are primarily involved in development and maintenance of small and midsized web applications, games or mobile applications and etc. The global growth rate in the IT/ITES industries is 16% over last five years, reaching a size of 1.06 trillion dollars in 2010 (NASSCOM Review 2010). In comparison, the overall IT industries in Bangladesh have enjoyed a growth rate of 40% over the last five years (BASIS) and this trend is expected to continue (the value of growth rate in Bangladesh is unsteady and this can be partly explained by a change of accounting methods).

Chapter 2: IT/ITES Industry Analysis in Bangladesh

2.6   Investment Trend

2.6.1   Investment Trend in ICT Sector

Investment in ICT sector is provided through Public sector, Foreign Direct investment and Private sources. Public sector investment is provided through Annual Development Programme (ADP). Foreign Direct Investment in ICT sector mainly covers on Telephone and Mobile industries while private sector investment were made through private Banks and Joint venture companies. Private sector investment in IT sector could not be obtained. However, the investment made in the last five years in the ICT sector from the public exchequer has been collected from the Revised ADP's of 2009 to 2013 and Original ADP of 2014. The public investment includes the allocations for the MOICT and allocations on ICT related projects under the Ministry of Telecommunications.

Table 2.2: Allocations in the ICT Sector under Revised Annual Development Programme (ADP)

(Tk in Crore)

	Year	Total Allocation	GOB	Project Aid
1.	2009-10	464.70	358.00	106.70
2.	2010-11	381.89	288.43	93.46
3.	2011-12	1821.40	350.99	1470.41
4.	2012-13	1202.83	262.71	940.12
5.	2013-14 (Original ADP)	14.56	5.24	9.32
	Total	**3,885.38**	**1,265.37**	**2,620.01**

An attempt was made to collect information on foreign direct investment in the mobile industries. Information obtained from the published financial statement (annual Reports) only from three companies for four years starting from 2009 to 2012. The information on the investment in the mobile industries is shown below:

Table 2.3: Net Cash used in Investing Activities

(Tk. in Crore)

Year	Grameen phone (Jan – Sep)	Banglalink (12 months)	Robi Telecom (12 months)
2009	1,253.57	1,502.50	1,s629.45
2010	591.70	1,172.10	1,205.78
2011	577.67	4,236.10	86.24
2012	1,970.27	773.20	104.58

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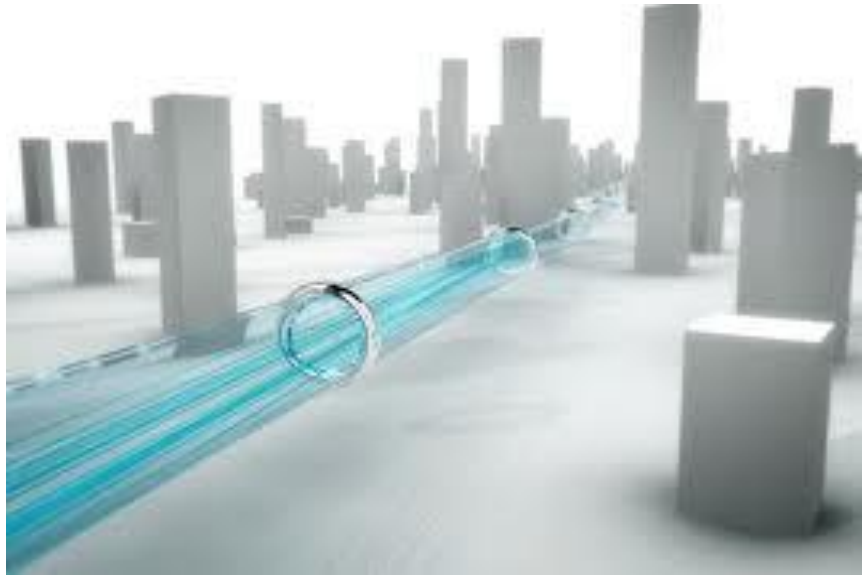
Institutional Arrangement

3 INSTITUTIONAL ARRANGEMENT

3.1 Role of Government in the ICT Sector

With regards to ICT, the government has two roles to play; an active role in increasing readiness for electronic delivery and an enabling role in encouraging the private sector to deliver electronic services. Hence Government need to create an organization to facilitate e-government, and enact policies that will incentivize private investment in infrastructure and application development.

In particular, Government policy can be used to create a liberal taxation environment to attract private sector investment. Other important policies include promoting good governance, maintaining law and order, and ensuring an effective judicial system.

The recent growth of information communication technology has promoted social productivity, improved people's living standards, transformed people's mode of production and life-style and has helped create an "information society". This change towards an information society is the outcome of human civilization and progress. Consequently, this information society should be a people-centred, development-oriented and inclusive society, which benefits each and every member of society. Keeping this in view, the government's 'Digital Bangladesh by 2021' vision plans to mainstreams ICTs as a pro-poor tool to eradicate poverty, establish good governance, ensure social equity through quality education, healthcare and law enforcement, and prepare the country for climate change.

The government of Bangladesh emphasizes the need for a comprehensive Master Plan in order to achieve an overall development of the ICT sector. This Master Plan is being developed according to a framework based on Vision 2021 and ICT Policy 2009. At the center of the proposed framework will be the National Information and Knowledge system (NIKS), a platform for developing and delivering services to citizens in both rural and urban areas. The five components of the ICT based economic development framework are:

- Connecting Citizens
- Human Resource Development
- Digital Government
- E parliament
- E business

GOB plans to address the above issues through the concerned ministries and with respect to a given timeframe mentioned in the ICT Policy.

3.2 Ministries /Agencies Involved with ICT Sector

The table below summarizes the roles of different government stakeholders along with the responsibilities of transforming the nation into a knowledge based society.

Table 3.1: Summary of the Roles of Different Government Stakeholders

	Ministries/Division/ Agencies	Responsibilities
1.	Prime Minister's Office	• Policies and Guidelines of implementing Digital Bangladesh Program
2.	MOICT	• ICT Development Plans/programs • ICT Policy • ICT Related Laws • Facilitates computerization at Government Institutions and Schools • Attract foreign investment in ICT infrastructure • Digital Certification Interoperability Guidelines
3.	Science and Technology Division	• Promote Science and Technology in the Society to nurture entrepreneurship in the society • Implementation of nuclear power and promote development of local technologies.
4.	Ministry of Post And Telecommunication	• Building and maintenance of Telecommunication Infrastructure
5.	Ministry of Law and Justice and Parliamentary Affairs	• IT Related Laws • High Tech Park Act • ICT Act • Certifying Authority's Rule • Right to Information Act • Bangladesh Computer Council Act • BTRC Act • Bangladesh Telecommunication Act
6.	Planning Division	• Secretarial Support to ICT Task Force
7.	Ministry of Education	• Curriculum for IT Education • Computerization at schools • Education Policy •

	Ministries/Division/ Agencies	Responsibilities
8.	Bangladesh Computer Council	- IT training in Government officials and citizens - Incubator for Software companies - IT Advisory support for Government institutions - Standardization on IT related issues
9.	Bangladesh Telecommunication Regulation Commission	- Regulations for Telecommunication system providers - Licensing Authority for IPS, Private telephone/Mobile operators, Call Centers etc - IP Telephony System - Vehicle Tracking Service - WIMAX Services - Fixing up the rates for different services - Third Generation (3G) Telephone - Submarine Cable System and Services
10.	Bangladesh High Tech Park Authority	- Development of IT Parks by public/private sector or by PPP model - Concessional agreement for PPP Model projects - Management rules/Regulations for efficient management of the parks
11.	Ministry of Information	Right to Information Act
12.	Bangladesh Bank	- Regulation on Fund Transfer - Mobile Banking & Credit Card based transaction System - Automated Clearing House system - Bangladesh Payment and Settlement system regulations 2013
13.	Ministry of Commerce	- Intellectual Property Rights - PPP Model Projects

Chapter 3: Institutional Arrangement

3.3 Regulatory Authority and Functions

There are eight Regulatory Authorities involved in enabling the development of ICT businesses:

1. Ministry of ICT

2. Bangladesh Computer Council

3. Bangladesh High Tech Park Authorities

4. Ministry of Post and Telecommunication

5. Ministry of Commerce

6. Ministry of Information

7. Bangladesh Bank

8. Bangladesh Telecommunication Regulatory Commission

A short description of the function of the above authorities is included below.

3.3.1 Ministry of Information and Communication Technology

MOICT is responsible for developing the ICT sector in the Country. Some of their responsibilities are:

(a) Formulate and update national policies on information and technology as well as provide assistance to the different Ministries/Divisions and Agencies regarding activities on information and communication technology;

(b) Implementation of recommendations of the National ICT Task Force;

(c) Provide grants and overall assistance to agencies in the information and communication technology sector including non-government ICT organizations/societies, undertake surveys, sampling, research and development in the information and communication technology sector and provide access to funding for such activities;

(d) Liaise with different countries and international organizations in the information and communication technology sector and also implement agreements and assistance programs in these relevant sectors;

(e) Assist in and co-ordinate the preparation of an integrated work-plan on service oriented activities relating to e-governance, e-infrastructure, e-health, e-commerce etc.

(f) Formulate policy and instructions for commercialization of ICT services in order to reach people easily

(g) To attract local and foreign investment in the ICT sector through all infrastructure development including establishing software Technology Park, hi-tech park and ICT incubator, improving the

competitiveness of local companies and increasing employment and export.

(h) Secure and give legal status to electronic records, ensure and implement reservation of all data and identity of senders and receivers.

There are two relevant agencies that operate under MOICT. These are BCC and Bangladesh High Tech Park Authority (BHTPA)

3.3.2 Bangladesh Computer Council (BCC)

BCC is a statutory body under the Ministry of Information & Communication Technology, Government of Bangladesh for encouraging and providing support for ICT related activities in Bangladesh. It is established by Act No IX of 1990 passed by the Parliament. The function of the Council shall be:

(a) to encourage the use of Computer and Information Technology (CIT) for the socioeconomic development of the country;

(b) to formulate and implement national strategic policies and plans on CIT and help developing infrastructural facilities for the introduction of CIT in Bangladesh and promote professional efficiency in the field of computer education and training;

(c) to help build-up Bangladeshi nationals to compete in the growing CIT industry in the international market;

(d) to encourage in developing human resources in the field of CIT and organize manpower export in the international market;

(e) to formulate and implement national strategies and policies related to CIT;

(f) to collabourate and co-operate with the Government and other organization and advise them for attaining the national CIT objectives;

(g) to advise and encourage the Government and other organization in using Computers and Information Technology;

(h) to advise organizations concerned regarding security measures to be adopted for using CIT;

(i) to organize, equip and maintain Computer Training Institutes, Libraries and Labouratories for the overall development of CIT;

(j) to collect, analyze, and publicize information related to CIT;

(k) to collect, print and publish reports, periodicals, papers on CIT and related subjects;

(l) to organize workshops, seminars, training on subjects related to Computers and Information Technology;

(m) to give grants to initiate or conduct research, study, or training on subjects related to CIT;

(n) to collabourate and co-operate with the concerned Government organization, private sector organization, local and foreign bodies for attaining the national CIT objectives;

(o) subject to the approval of the government, to enter into any contract or agreement of any kind with foreign firms for the purposes of the Council;

(p) to discharge any other function assigned or delegated to it by the government from time to time;

(q) to develop specifications and standards for the CIT industry at a national level; and

(r) to do such other acts and things as may be necessary to be done in connection with; or conductive to, the performance of the aforesaid function.

3.3.3 Bangladesh High Tech Park Authority (BHTPA)

Bangladesh Hi-tech Park Authority under the Ministry of SICT, established in 2010, is the official body of the government to boost up Hi-tech industries in the country. The major functions of the BHTPA are as follows:

a. To establish Hi-tech Park in the potential locations in the country ensuring its efficient operational management.
b. Provide policies for regulating its development, management etc
c. Provide policies for attracting local and foreign investors
d. Provide space, lease term and fixing up of rental rate
e. Fixing up terms and condition of Park developer for the PPP model projects.
f. Provide one stop services as follows;
g. Selection of Plot for the investor
h. Allocation of Plot and contract for leasing
i. Work permit for the investor
j. Assist resident /nonresident Visa for investors
k. Permission for construction
l. Arrange Water, Gas, electricity, Telephone and Internet connection
m. Other related works

3.3.4 Bangladesh Telecommunication Regulation Commission

Bangladesh Telecommunication Regulatory Commission (BTRC) is an independent Commission established under the Bangladesh Telecommunication Act, 2001 (Act no. 18 of 2001) is responsible to Facilitate

Connecting the unconnected through quality telecommunication services at an affordable price by introducing new technologies.

BTRC is also responsible for issuing licenses for IPS, Private telephone/Mobile operators, Call Centers, IP Telephony System, Vehicle Tracking Service, WIMAX Services, Third Generation (3G) Telephone, Submarine Cable System and Services etc.

3.3.5 Ministry of Post and Telecommunication

The primary function of the MoPT is to provide a quick and modernized telecom and postal services to the people of Bangladesh and thereby facilitate the creation of a digital Bangladesh. These services are provided through Bangladesh Telecommunication Company Ltd (BTCL), Bangladesh Telecommunication Regulatory Commission (BTRC), Bangladesh Submarine Cable Company (BSCCL), Teletalk Bangladesh Ltd, Telephone Shilpo Sangstha (TSS) and Bangladesh Post Office (BPO). Each Agency is tasked with separate responsibilities which can be found in the Annex of this Report.

3.3.6 Ministry of Information

As per allocation of business this Ministry is tasked with performing the following assignments:

(a) Audio-visual, pictorial and press coverage of all activities of the President, Prime Minister and Ministers both at home and abroad. Publicity policy-internal and external.

(b) Coordination of Publicity activities of the different Ministries/Divisions and Bangladesh Missions abroad.

(c) Press relations including journalist and other media delegations.

(d) Preparation and release of communiques, press notes, handouts, etc.

(e) Preservation and interpretation of the policies and activities of the Government of Bangladesh through press media.

(f) Advising Government through press; keeping Government informed of the main trends of public opinion as reflected in the press and liaison between Government and the press.

(g) Administration of Press and Publication Law.

(h) Administration of Radio and Television and all other matters relating to broadcasting through Bangladesh Betar & Bangladesh Television.

(i) Policy regarding government advertisement.

(j) Community listening Schemes.

(k) Preparation of Media lists.

(l) Compulsory screening of Films.

(m) Analysis and interpretation of public opinion as reflected in the national press.

(n) Sanctioning of Cinematograph films for exhibition

(o) Administration of Cinematograph Act: Cinematograph and Censorship.

(p) Liaison with International Organizations and matters relating to treaties and agreements with other countries.

3.3.7 Ministry of Commerce

The Ministry of Commerce is responsible for the following Services:

(a) Import Policy formulation

(b) Export Policy formulation and export promotion

(c) Price Control

(d) State Trading

(e) Companies Act, Partnership Act, Societies and Trade Organization Ordinance and Law of Insurance

(f) Promotion and regulation of internal commerce and insurance

(g) Commodity issues

(h) Tariff policy

(i) World Trade Organization and International Trade Organizations

(j) Administration of 19 Commercial Wings of Bangladesh Missions abroad

(k) Administration of BCS Trade Cadre

(l) Liaison with international organizations and world bodies related to treaties and agreements

(m) Administration of sub-ordinate offices and organizations under MOC

3.3.8 Bangladesh Bank

BB performs all the core functions of a typical monetary and financial sector regulator, and a number of other non core functions. The major functional areas include:

(a) Formulation and implementation of monetary and credit policies.

(b) Regulation and supervision of banks and non-bank financial institutions, promotion and development of domestic financial markets.

(c) Management of the country's international reserves.

(d) Issuance of currency notes.

(e) Regulation and supervision of the payment system.

(f) Acting as banker to the government.

IIFC

(g) Money Laundering Prevention.

(h) Collection and furnishing of credit information.

(i) Implementation of the Foreign exchange regulation Act.

(j) Managing a Deposit Insurance Scheme.

3.4   Relevant Laws and Regulations

The legal and regulatory environment needs to be conducive to software industry growth. For enabling the development of ICT sector Government of Bangladesh provides the legal support services through different acts including ICT act, IPR protection, authorization of digital signatures, e banking facilities for e transaction, e commerce, e procurement etc. These acts are as follows:

a. Bangladesh Computer council Act 1990

b. BTRC Act

c. Telecommunication Act

d. Hi Tech Park Act

e. ICT Act

f. Intellectual Property Rights Act 2010

g. Right to Information Act 2009

h. Certifying Authorities Rule 2011

i. Digital Certificate Interoperability guidelines

j. Regulation on Electronic Fund Transfer

k. Mobile Financial Services 2011

l. Bangladesh Payment and Settlement System Regulation 2013

3.5   Proposed Regulatory Framework

(A) Present situation:

Government of Bangladesh has recognized the importance of establishing the IT village for the sustained growth of the economy and increased contribution to the GDP of the country. As part of the continuing commitment the government has taken various approaches to promote foreign investment in Bangladesh. At present ITES industries are provided various Fiscal/Tax incentives by the government of Bangladesh in addition to the normal facilities/incentives given for the foreign investors. For the ITES industries in Bangladesh Tax Free services include Digital content development and management, Animations 2D and 3D, GIS , IT support and software maintenance, Website development and service, Medical transcription services, Business Process Outsourcing (BPO), Data entry, Data processing, Call centers, Computer aided Engineering and Design, and Remote IT Maintenance. For addressing the Cyber security Digital Law has been promulgated, Intellectual Property Rights (IPR) is in place. For encouraging ITES business through PPP model GOB issued a separate guideline amongst

others, Business on Telecom system network service including ICT, IT parks, e- service delivery to citizen and rural internet project has been included.

In order to encourage the foreign investors the government of Bangladesh offers one of the most liberal investment policies and attractive packages of fiscal, financial and other incentives. Major incentives to stimulate private sector direct investment are listed in the following table.

Table 3.2: Existing Investment Climate in Bangladesh

Issues	Facilities /Incentives Provided
Tax Exemption	Generally 5 to 7 years
Duty	No import duty for export oriented industry. For other industries it is 5% ad valorem
Tax Law:	i. No Double taxation ii. Exemption of income tax upto 3 years for the expatriate employees.
Remittance:	Facilities for full repatriation of invested capital, profits and dividends in most situations
Exit:	An investor can wind up any time and can repatriate the sales proceeds after securing proper authorization.
Ownership:	Foreign investor can set up ventures either wholly owned or in joint collabouration with local partner.
Investing in the Stock Market	Foreign investors are allowed to participate in initial primary offerings (IPOs) without any regulatory restrictions. Also, incomes from dividends are tax-exempt for investors.
Non Resident Bangladeshi's (NRB)	Special incentives are provided to encourage non-resident Bangladeshis for investment in the country. Non-resident Bangladeshi investors will enjoy facilities similar to those of foreign investors. Moreover, they can buy newly issued shares/debentures of Bangladeshi companies. A quota of 10% has been fixed for non-resident Bangladeshis in primary shares. Furthermore, they can maintain foreign currency deposits in the Non-resident Foreign Currency Deposit (NFCD) account.

(B) Proposed regulatory facilities:

The report *International Good Practice for Establishment of Sustainable IT Parks* published in 2008 by PWC of India and InfoDev sponsored by International Finance Corporation (IFC) of the World Bank recommends best practices for sustainable vibrant IT Park. The consultant of IIFC felt that the

recommendations mentioned within the report are also applicable in the Bangladesh context.

According to the report, the government can play a key role in terms of formulation of the appropriate regulatory mechanism to enable and sustain IT growth. The three broad principles are as follows:

- encouraging innovation through financial and non-financial measures, including protection of intellectual property;

- promoting investments through appropriate financial & tax incentives, together with efficient and user friendly processes for implementing the policies;

- facilitating capacity building by encouraging mobility of skills, appropriate employment policies, and extending financial support to select capacity building initiatives.

The government of Bangladesh can enhance its existing current regulatory framework by implementing and building on the above mentioned principles with emphasizing the improvements of law and order situation. However following issues may be considered under regulatory framework for the establishment of IT village:

1. Address to create business climate, political stability, corruption, effective government management, Timely legal procedure and effective coordination system with all stakeholders.. All this factors are related with the cost of business and profit. Foreign investors very consciously consider the governance of a country to invest. An important aspect of governance is the ease with which investors can enter and exit a market. It is an important determinant of productivity, investment and entrepreneurship.

2. Provide fiscal incentives to encourage private sector participation. This may include
   - 10 years Tax holiday
   - Duty free Import of IT infrastructure
   - Exemption from dividend Tax
   - Accelerated depreciation on machinery or plant
   - Long term (15 years) concessional interest rate in bank loan for space purchase in STP
   - Reduced Rate of interest for working capital
   - Work permits for foreign professionals can be issued by STP desk of MOICT to avoid delay to avoid delay in processing the case.

3. Better infrastructure of the host country attracts foreign investors. Inflows of the FDI depend mostly on quality and quantity of physical infrastructure like roads and highways, transport, uninterrupted power supply, gas

telecommunications and so on. Banking and other financial services also affect the FDI inflows significantly.

4. Establish an effective implementation mechanism – single-window nodal agency. Such nodal create a strong coordinating committee that fosters linkages with various government ministries/departments/agencies. Such a coordinating body could be charged with approving an IT Park developers' plans, acquisition of land, and issues relating to utilities & supporting infra-structure.

5. This will also ensure a fast track clearance and approval process.

6. Promote/Facilitate IT Industries body like BASIS specifically for promoting and development of   IT sector. This should provide an ideal forum for overseas and domestic companies to explore the vast potential available for Joint Ventures, Strategic Alliances, Marketing Alliances, Joint Product Development, etc.

7. Design flexible land use policies for attracting private real estate players. Flexible land use policies are required to attract private sector real estate players to invest in the development of IT parks, since such policies can ensure higher returns on investments for the developer. Such policies typically allow mixed land- use, i.e., residential, recreational and commercial land-use along with industrial land-use.

8. A vibrant and pro-active IT park management team with the proper skill sets that can manage and market new initiatives.

9. Enact long term policies to attract private sector involvement in education; foster linkages with educational institutions and other markets, such as the capital market, to attract private funding; promote corporate governance norms so that even if some short-term measures like fiscal incentives are removed, the continued development of the sector can be ensured.

4

Location of the Project: Rajshahi

4 LOCATION OF PROJECT – RAJSHAHI

4.1 Rajshahi Background

Rajshahi Division is one of the seven Divisions of Bangladesh. It is located in the North-western part of our country. The famous river Padma borders Rajshahi division on the south and another famous river, Jamuna, lies across the eastern border. In the West, Rajshahi division shares a border with India.

With an area of 18,174.4 square kilometer, it is bounded by West Bengal of India on the north, Khulna and Dhaka divisions on the south, Assam and Meghalaya state of India and Dhaka division on the east and West Bengal of India on the west. Rajshahi Division consists of 8 districts, 70 Upazilas and 1,092 Unions. The divisional capital of Rajshahi is only four hours road journey away from Dhaka, the capital city. The districts include Bogra, Joypurhat, Naogaon, Natore, Nawabganj, Pabna, Rajshahi, and Sirajganj.

Rajshahi is a well known tourist destination within Bangladesh. Notable places include Sompur Bihar, a large Buddhist monastery, Varendra Research Museum in Rajshahi, Mohasthangar in Bogra, Puthia Temple, Bagha Mosque, Dighapatia Palace in Natore district, Kushumba Mosque, Naogaon. Shona Mosque in Chapai Nawabgonj, Chalan Beel, the largest water body in Bangladesh etc

Rajshahi division is famous for its Mango and Rice production. It also produces Wheat, sugarcane, oil seed, onion, garlic, potato, banana, betel leaf, mulberry plant, jackfruit, litchi, berry, coconut, and papaya. Numerous archaeological sites in the division made it an attractive destination for tourists. Rajshahi is accessible by road, Air and Train.

4.2 District Demographics With Respect To ICT Sector

4.2.1 Demography of Rajshahi Division with respect to ICT Sector

Population Structure

As per census of 2011, total population of Rajshahi Division is 19,225,909 out of which 50.89% are male and 49.11% are female. Rajshahi Division has an area of 18,153.08 sq. km with a population density of 1,018 per sq. km. The percentage distribution of the population by age groups is shown below:

Table 4.1:Percentage distribution of the population by age groups in Rajshahi Division

Administrative unit	Pop of all ages	0-4	5-9	10-14	15-19	20-24	25-29	30-49	50-59	60-64	60+
Bogra Zilla	3,539,294	9.3	11.1	10.3	8.1	9.2	10.1	27.0	7.1	2.8	4.9
Joypurhat Zilla	950,441	8.4	10.2	9.9	7.8	8.7	10.1	29.0	7.5	3.1	5.2
Naogaon Zilla	2,701,907	8.7	10.6	10.0	8.1	9.3	10.1	28.0	7.2	2.9	5.1
Natore Zilla	1,774,832	9.1	11.0	10.3	8.2	9.1	10.0	27.4	6.8	2.8	5.2
Chapai Nawabgonj Zilla	1,714,249	10.5	12.6	12.1	9.3	9.2	8.7	24.5	6.3	2.6	4.2
Pabna Zilla	2,624,684	10.4	12.2	11.0	8.2	9.1	9.6	25.0	6.5	2.9	5.0
Rajshahi Zilla	2,699,688	8.4	10.3	10.7	9.1	9.9	10.1	27.7	6.6	2.6	4.6
Sirajgonj Zilla	3,220,814	11.0	13.6	11.2	8.0	9.1	9.2	24.0	6.4	2.8	4.6

Source: Socioeconomic Survey, BBS, 2011

From the above table it appears that 27.29% of the total population of Rajshahi Division are in the age group of 15-29 which is about 5,246,751 individuals (male 2,667,448 and Female 2,579,303). This indicates that there is a large young population able to enter the IT/ITES industry.

4.2.2 Literacy Rates and Education

Rajshahi Division has a total literacy rate of 48.0 % out of which 50.5 % are male and 45.6% are female. Out of the eight Zillas under Rajshahi Division literacy rate of Joypurhat is the highest and Rajshahi Zilla is the second highest. The total literacy rate of Joypurhat is 57.5% of which Male is 61% and female is 53.5% while total literacy rate of Rajshshi Zilla is 53% of which male is 55.8% and female is 50.1%. The literacy rate of other districts has been obtained from the Socio Economic Survey conducted by the BBS in 2011. This figure is shown in the following Tables:

Table 4.2: Division Wise Statistical Information

Name of Division	Name of Zilla	Adjusted Population as per census 2011			Population Density per sq km	% of Population in Age group 15-29	Literacy Rate in Percentage		
		Total Pop	Male	Female			Total	Male	Female
1	2	3	4	5	6	7	8	9	10
Rajshahi Division		19,225,909	9,628,290	9,597,619	1,018	27.3	48.0	50.5	45.6
	Bogra	3,539,294	1,778,529	1,760,765	1,173	27.4	49.4	52.9	45.9
	Chapai Nawabganj	1,714,249	843,000	871,249	968	27.2	49.4	52.9	45.9
	Joypurhat	950,441	477,723	472,718	903	26.6	57.5	61.4	53.5
	Natore	1,774,832	888,305	886,527	898	27.3	49.6	51.9	47.3
	Noagawn	2,701,907	1,351,148	1,350,759	757	27.5	48.2	51.3	45.2
	Pabna	2,624,684	1,313,771	1,310,913	1,062	26.9	46.7	47.8	45.6
	Rajshahi	2,699,688	1,362,641	1,337,047	1,070	29.1	53.0	55.8	50.1
	Sirajganj	3,220,814	1,613,173	1,607,641	1,290	26.3	42.1	45.1	39.0
Total Rajshahi Division		19,225,909	19,225,909	9,698,290	9,597,619	1,018	27.3	48.0	50.5
		19,225,909	9,628,290	9,597,619	1,018	27.3	48.0	50.5	45.6

Source : Socio Economic Survey, 2011 by BBS

4.2.3 Electricity and Internet

Of the total number of 4,461,097 households (urban 707,371 and Rural 3,753,726) in Rajshahi Division 79.9% of urban people and 49.3% of rural people use electricity as a source of light. There are, moreover, approximately 116,116 persons of which 79.9% are male and 20.1% are female individuals with access to internet in Rajshahi Division. (BBS, 2011). The government of Bangladesh recently introduced one stop citizen service in all Deputy Commissioner's offices of the country, including Rajshahi. Thus citizens of Rjshahi have access to and can submit documents online; those without internet access can do so through local e-service centers**.** There are about 5,751,072 persons out of which 52.85% are male and 47.15% are female who watch Television regularly. However distribution of population using electricity, use off TV and Internet is shown below:

Table 4.3: Distribution of Population using Electricity, TV and Internet in Rajshahi Division

Name of the Division	Name of Zilla	Use of Electricity as source of Light	Watching TV			Using Internet		
			Population	% of Male	%of Female	Population	% of Male	%of Female
Rajshahi Division		51.29	5,751,072	52.85 (3,039,442)	47.15 (2,711,630)	116,123 (0.60% of total Pop)	93,629	22,494
	Bogra	52.6	172,899	50.6	49.4	15,113	73.8	26.2
	Chapai Nawabganj	48.6	783,113	56.5	43.3	11,468	75.3	24.7
	Joypurhat	51.6	408,466	52.0	49.4	3,126	71.0	29.0
	Natore	48.8	894,830	52.2	47.8	8,811	86.0	14.0
	Noagawn	39.4	870,458	52.4	47.6	7,906	93.1	6.9
	Pabna	60.1	1,254,829	52.7	47.3	15,458	81.0	19.0
	Rajshahi	62.1	157,844	52.5	47.5	33,740	72.0	28.0
	Sirajganj	47.1	1,208,643	53.9	46.1	20,501	92.8	7.2

Source: Socio Economic Survey, 2011 by BBS

ICT Courses in Educational Institutions

The major educational institutes in Rajshahi are University of Rajshahi (RU), Rajshahi University of Engineering and Technology (RUET), Rajshahi College, Azizul Haq College, Bogra, Edward College, Pabna (under National University), Pabna University of Science and Technology. The University of Rajshahi (established 1953) is the second largest university of Bangladesh with around 50 disciplines and 6 institutes.

The Degree programs in IT are normally considered as four year course. Students pursuing following degree programs have been considered as having education for contributing to the growth of software industry:

• Computer Science and Engineering (CSE)

• Electrical and Electronic Engineering (EEE)

• Electronics and Telecommunications Engineering (ETE)

• Applied Physics and Electronics (APE)

• Mathematics (Math)

- Statistics (Stat)

- Management Information Systems (MIS)

Yearly enrolment of students in different degree programs in universities in Rajshahi and around can be seen from the table below:

Table 4.4: Enrolment of Students for ICT Education in different Universities in Rajshahi Division

Sl No	Name of Universities	CSE	EEE	ETE & APE	Total
1	Rajshahi University of Engineering and Technology	120	120	60	300
2	Rajshahi University	46	50	45	141
3	Pabna University of Science and Technology	50	50	80	180
	Total	216	220	185	621

Source: UGC Annual Report, 2014

The polytechnic Institutes provides Diploma in Computer Science and Engineering (CSE), Electrical and Electronic Engineering (EEE), and Tele communication Engineering. According to Bangladesh Technical Education Board (BTEB), the Yearly (2012-13) intake of students in IT related discipline in twenty (2 Govt. and 18 Private) Polytechnic Institutes in Rajshahi is 1,351. In addition to these Institutes a large number of students are enrolled in 49 different Polytechnic Institutes in Rajshahi Division. The list of such Institutes is given in the Annex C(ii). The enrolments of students in IT discipline in surrounding areas are 3,512 totalling a resource of IT skilled students of 4,863 from the Polytechnic Institutes. The discipline wise enrolment statistics for the year 2012-13 is listed below:

Table 4.5: Enrolment of Students for ICT Education in Different Polytechnic Institutes in Rajshahi

Sl No	Name of the Institute	Yearly Enrolment of Students in IT/IT related Disciplines			
		CSE	EEE	Telecom	Total
	Govt. Polytechnic Institutes				
1.	Rajshahi Polytechnic Institutes	91	185	-	276
2.	Rajshahi mohila polytechnic Institute	93	93	-	186

SI No	Name of the Institute	Yearly Enrolment of Students in IT/IT related Disciplines			
		CSE	EEE	Telecom	Total
3.	Tentulia Pirgacha Technical And Business Management College And Voc Institute	20	0		20
4.	National Science Research And Technology College	27	68		95
5.	Bangladesh Polytechnic Institute	69	144		213
6.	The North Polytechnic Institute	16	46		62
7.	Puthia Polytechnic Institute	6	23		29
8.	Rajshahi Haji Abul Hossen Institute Of Technology		56		56
9.	National Institute Of Engineering Technology		33		33
10.	Rajshahi Institute Of Technology		78		78
11.	Prime Polytechnic Institute	5	43		48
12.	Shah Mokdum Polytechnic Institute Of Engineering Technology	7	29		36
13.	Prokausal Progoti Institute		58		58
14.	City Polytechnic and Textile Institute	9	39		48
15.	Padma Institute of Technology		29		29
16.	Bagmara Polytechnic Institute	6	0		6
17.	Popular Polytechnic Institute		10		10
18.	Evergreen Polytechnic Institute	3	10		13
19.	Xylia Institute of Engineering Science and Technology	4	35		39

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SI No	Name of the Institute	Yearly Enrolment of Students in IT/IT related Disciplines			
		CSE	EEE	Telecom	Total
20.	Campus Polytechnic Institute		16		16
	Sub Total	**356**	**995**	**0**	**1,351**
	Other Polytechnic Institutes (including 5 Govt owned) in Rajshahi Division {(List in Annex C (ii)}	846	2,599	67	3,512
	Total	**1,202**	**3,594**	**67**	**4,863**

Source: Bangladesh Technical Education Board (BTEB)

Yearly IT Graduates from universities of Rajshahi Division is 621 and the IT professionals mostly Diploma holders from Polytechnic Institutes of Rajshahi Division is 4,863. When the total IT skilled professionals added together from the universities in Rajshahi Division will stand at 5,484. This means that a sizable young population is ready to take the work with proper training and guidance. These groups of population are very much useful for the IT/ ITES provided they are well trained for the business.

4.3   ICT Sector Growth and Investment Trend in Rajshahi

Attempt was made to collect information on the actual investment made in IT sector in Rajshahi through the Annual Development programs. Unfortunately most of the IT sector development projects under public sector were taken up from the national level and the investment for Rajshahi alone could not be segregated or even if segregated could not provide complete picture. On the other hand information of investment by the private sector was also not available. As a result IIFC had to depend on the market survey on the existing entrepreneurs of the local IT business.

ICT companies are very limited in number at Rajshahi and most of them are hardware based. In order to investigate the ICT sector investment trend, IIFC conducted a market survey to collect information of the companies involved in Software Development and Services, Business Process Outsourcing, ICT Training, Hardware Sales and Services etc and their estimated investments. The survey team conducted face to face interview of 50 selected ICT Companies (both software and hardware development) located at Dhaka and 21 Companies in Rajshahi. The survey result indicated that there is potential growth in Rajshahi although the growth is not steady which can be seen from the following table:

Sl no	Year	Growth rate in Rajshahi
1	2009	19%
2	2010	45%
3	2011	37%
4	2012	35%

The reasons behind this decreasing trend are lack of proper facilities for doing businesses like banking support, and uninterrupted power supply, effective internet connectivity, gas, telephone etc. However from the interview with the concerned people it has been gathered that with reliable internet connection, stable power supply, availability of skilled manpower, cheap rental accommodation, attractive fiscal incentives along with the adequate security system will improve the present investment situation.

As has been said earlier in this report that the overall IT industries in Bangladesh have enjoyed a growth rate of 40% over the last five years (BASIS) and compare to this figure the growth trend of Rajshahi seems to be attractive.

4.4   Site Location and Description

The proposed site for the development of Rajshahi ICT Village is located in the Nabinagar Mouza in Paba Upazila at Rajshahi district. It is situated just behind the DC Office and the District Judge Court at Rajshahi and beside the Rajshahi-Chapainawabganj Old road (N6). The site is almost 13 km away from Shahmakhdum airport of Rajshahi and about 7 km from the Rajshahi railway station. An embankment passes through the north to south side of the site and ended at the River Padma. The site is a non-arable flat land with a shallow ditch in the middle and north side. Unauthorised dwellings are on the land with two pacca mosque, pacca sanitary latrines and a pacca internal road. The local households are situated around the periphery of the proposed site. The land is bounded by the DC Office and District Judge Court on the east, Bhatar Pukur on the west, Rajshahi – Chapainawabganj old road on the north and the Padma River on the south.

4.5   Ownership

The land area of the proposed site for the development of Rajshahi ICT Village is almost 38.78 acres including the embankment and the three pieces of land (Dag nos of these lands are 412, 416 & 417). The land presently belongs to the two different government agencies namely Public Works Department (PWD) and Water Development Board (WDB). Total 10.43 acres of land is under PWD and 27.71 acres under WDB. The J.L. no. for the land is 50.

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4.6 Offsite Infrastructure To The Site

4.6.1 Access Road

There are two different ways to go to the proposed IT village from Rajshahi Town, one is Chapai - Rajshahi old road (7 km from Rajshahi Town) and another one is Rajshahi Town road. Both the roads belongs to Roads and Highways. About 650 unauthorized dwellings are on the land with two pucca mosque, pacca sanitary latrines and pacca internal road. The local households are situated around the periphery of the proposed site.

4.6.2 Power Supply

Reliable power supply stands out as the most important feature that an ICT Village can offer to its tenants. The nearest sub-station (33/11 kV) for power supply is located within 1 km from the project site at Haragram, Mollapara under Sales and Distribution (S&D) Division - 2 of Rajshahi Distribution Zone of Bangladesh Power Development Board (BPDB). The second nearest sub-station is located at City Center near the Shah Makdum Eidgah maidan under the Sales and Distribution (S&D) Division -4 of Rajshahi Distribution Zone of BPDB, which is 3.5 km from the project site. Both the stations with capacity of 2X20 MVA are owned and maintained by BPDB. However, for ensuring dependable and reliable power supply and maintaining redundancy, the ICT Village may be connected with both the sub-stations through express feeder line. To ensure continuous power supply, a sub-station with a capacity of 6,000 kVA needs to be set up inside the Village.

Figure 4.1: Location of nearest Sub-Stations from the project site
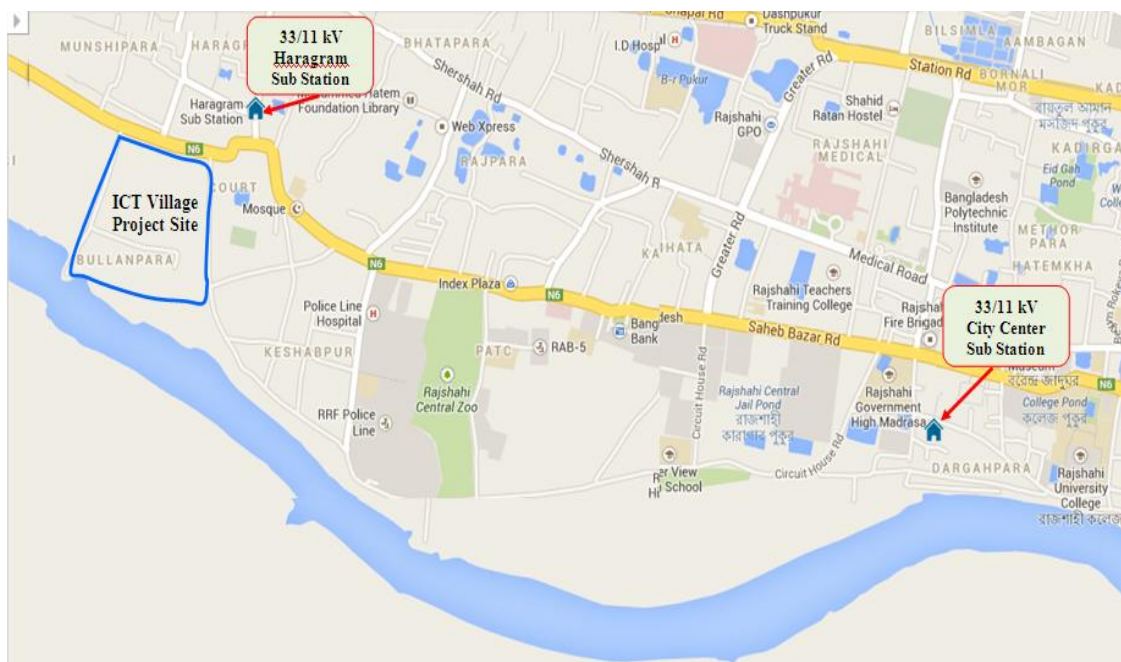
4.6.3 Broadband Network Connectivity

A robust infrastructure for high-speed internet connectivity is essential for attracting investment and ensuring the sustainable operation of the ICT Village. Bangladesh is mainly connected with the global telecommunication carrier through submarine cable network (SEA-ME-WE-4). Additionally, it has international information highway through cross-border optical fibre network with India to get connected with the rest of the world. This alternate route provides redundant transmission network in connecting with international backbone in a more cost efficient way.

Bangladesh is connected to India through two International Terrestrial Cable (ITC) points at Benapole and Chuadangah. Recently, the government has issued ITC licenses to six private operators along with the state-owned telco BTCL. In the Indian side, there are three operators connected with this network. The BTCL is directly linked with the Indian state-owned telco BSNL at Darshana in Chuadanga and the link was stretched out through Geddes to Kolkata. On the other hand, all the private ITC operators are connected with either Indian telecom giant Bharti Airtel or Tata communications. Both the Indian operators extend their link from Kolkata to Petrapole through Bongaon.

Table 4.6: Cross-border Connectivity with Indian Operators

India	Connecting Path	Bangladesh
State-owned Telcos		
BSNL	Kolkata – Geddes- Darshana	BTCL
Private ITC Operators		
Bharti Airtel	Kolkata – Bongaon – Petrapole – Benapole	Fibre@Home Limited
		Summit Communications Ltd
		Mango Teleservices Ltd
Tata Communications		Novocom Limited
		BD Link Communication Ltd
		1Asia Communication (*BD*) Ltd

All the Indian operators have upstream connectivity with different submarine cable with landing stations in the four port cities of Chennai, Mumbai, Cochin and Tuticorin. Bangladesh is primarily connected to India and the rest of the world through the 18,800 km long Sea-Me-We 4 (SMW4) submarine cable located in Cox's Bazar.

This cross-border connectivity will not only enhance the voice and data connectivity between the two countries, in the long run it will also improve internet transit traffic between Bangladesh and the rest of the world. The

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cable will offer seamless connectivity to enterprise and carrier customers for transiting traffic between Bangladesh and key business hubs like Singapore, London, Chennai, Mumbai & Los Angeles via India. The cable is further interconnected with the fiber backbone constructed by NTTN operators in the country.

Figure 4.2: Cross-border Connectivity with Neighboring Countries
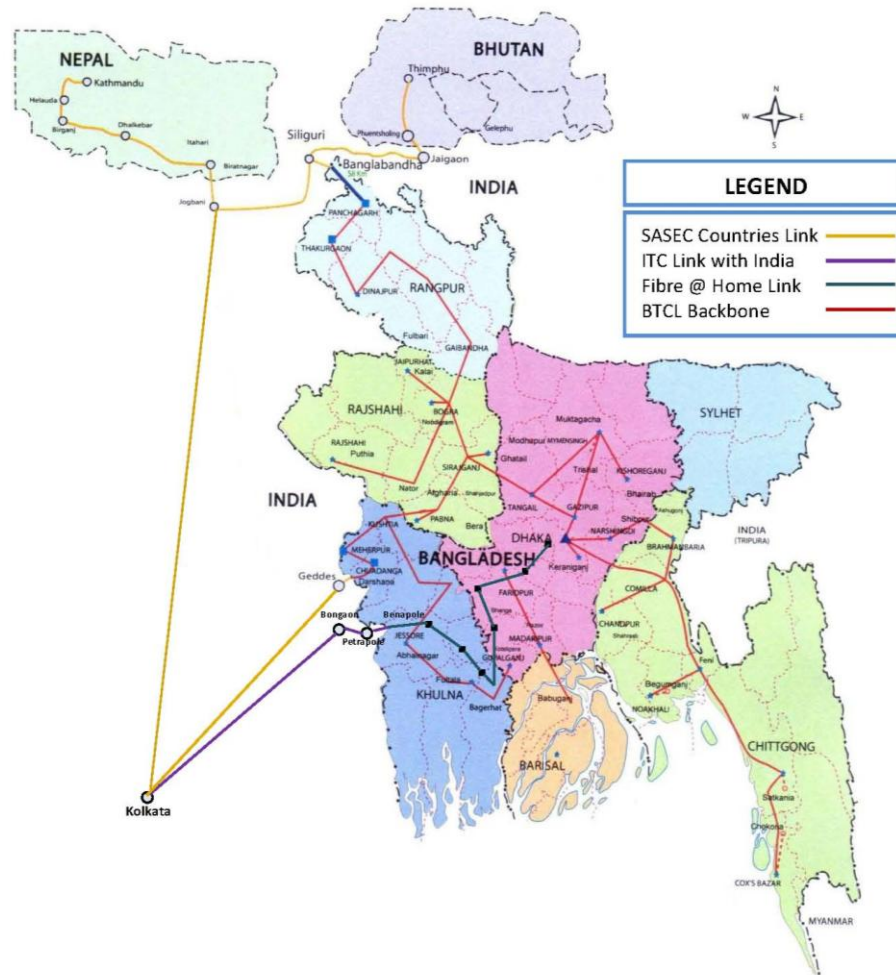
The state owned telecommunications company BTCL has the largest network in the country. It has multiple licences from BTRC, which include (a) PSTN, (b) NTTN, (c) IGW, (d) ICX, (e) IIG and (f) ISP. These allow it to provide wide array of telecommunication services throughout the country, specifically voice and data. Recently the government has issued ITC license to six private companies. Fibre @ Home and Summit Communications Limited are the only private operators with Nationwide Telecommunications Transmission Network (NTTN) licences. It allows them to develop and operate a nationwide optical fiber based transmission backbone facilitating a common connectivity platform. Both the operators have connectivity with the International Internet Gateways (IIGs). The sole business of the NTTN license holders is to carry voice, data, and videos of Access Network Service (ANS) operators and

public agencies. The big ANS operators of Bangladesh are mobile phone companies. The other ANS operators are ISP, BWA, IIG, IGW, ICX, ITC, Cable TV operators and government entities.

The demand analysis reveals that the bandwidth requirement for the ICT Village would be couple of hundred Mbps in the first five years of its operation. The requirements will increase gradually along with the tenant occupancy. All the above three NTTN operators have their POPs (Point of Presence) in the vicinity of the project site and capable of providing expected level of services to the proposed ICT Village as far as high-speed optic fiber connectivity (data and voice) is concerned. Any operator with sufficient capability may provide network connectivity inside the ICT Village and maintain their clientele among tenants independently. This will prevent any single operator from enjoying monopoly and foster a climate of healthy competition among the service providers for providing optimal level of service to the tenants.

5

Market Survey

5   MARKET SURVEY

A survey was carried out on a small number of ICT companies, to make a market demand forecast for the proposed ICT Village at Rajshahi. The survey methodology and the findings are presented below.

5.1   Market survey Methodology

5.1.1   Sample size

IIFC is conducting a survey to seek feedback from the businesses to understand

- current market situation
- supply and demand
- sectoral growth of ICT
- public perception of ICT Villages

To explore the market demand and industry trends of ICT industries for the development of ICT Villages at Rajshahi, IIFC surveyed the ICT companies at Rajshahi as well as Dhaka.

IIFC formed a survey team consisting of 5-6 people. The survey team conducted face to face interview of 50 selected ICT Companies (both software and hardware development) located at Dhaka and 21 Companies at Rajshahi. Apart from the ICT companies, IIFC team surveyed 22 freelancers through development of online survey form.

Table 5.1 : Survey Modality

ICT Companies/ Freelancers	No. of Companies/Freelancers Surveyed
ICT Companies at Dhaka	41
ICT Companies at Rajshahi	21
Freelancers	22

5.1.2   Choice of Companies

Since the ICT village will be located at Rajshahi, it was decided to carry out the survey among companies located at Rajshahi city. IIFC team also surveyed the ICT companies at Dhaka to assess their willingness to expand their business to the proposed ICT Villages at Rajshahi.

The team had elaborate discussion and training sessions on clarity of each individual question in the questionnaire, on targeted response of the questions, how to ask the questions, and for sensitive ones, how to get answers without asking the question directly etc.

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ICT companies are very limited in number at Rajshahi and most of them are hardware based. Therefore, sample size for survey of Rajshahi ICT companies is based on the existing companies. IIFC collected the list of Rajshahi ICT companies from Bangladesh Computer Samity (BCS). The sample size is considered as 18 companies, which is almost 100% of total population.

Bangladesh Association of Software and Information Services (BASIS) has 500 member companies based in Dhaka. IIFC has considered these listed companies as total population for survey of ICT companies in Dhaka. The sample size is considered as 50, which is 10% of total population.

IIFC chose the companies for survey based on their type of businesses. IIFC categorizes the businesses into the following five types:

5. Software Development and Services,
6. Business Process Outsourcing,
7. C3: ICT Training,
8. C4: Hardware Sales and Services and
9. C5: Other.

IIFC selected the companies that have a mixture of these five types of business. IIFC also collected the list of freelancers who was actively participated in freelancing from BASIS. In this regard, IIFC developed an online survey questionnaire form. IIFC send the form to the listed freelancers and request them to fill up within a specified time period.

5.2   Survey Questionnaire

Three sets of questionnaire were prepared by IIFC separately for ICT companies at Dhaka, Rajshahi and also Freelancer. The survey questionnaires are provided in Annex E.

5.3   Survey Findings

The raw data were compiled for each of the companies/freelancer surveyed, as appropriate. The results are shown separately for ICT companies and for freelancers. The findings are briefly analysed below.

5.3.1   Findings from ICT Companies Surveyed

a.   Growth

The following table shows the income growth of ICT companies in Rajshahi for the last four years. According to the survey, growth rate in year 2010 is high compared to year 2009. But it suddenly falls down in year 2011 with respect to year 2010 and also in year 2012 with respect to year 2011.

Figure 5.1: Growth of ICT Industry at Rajshahi
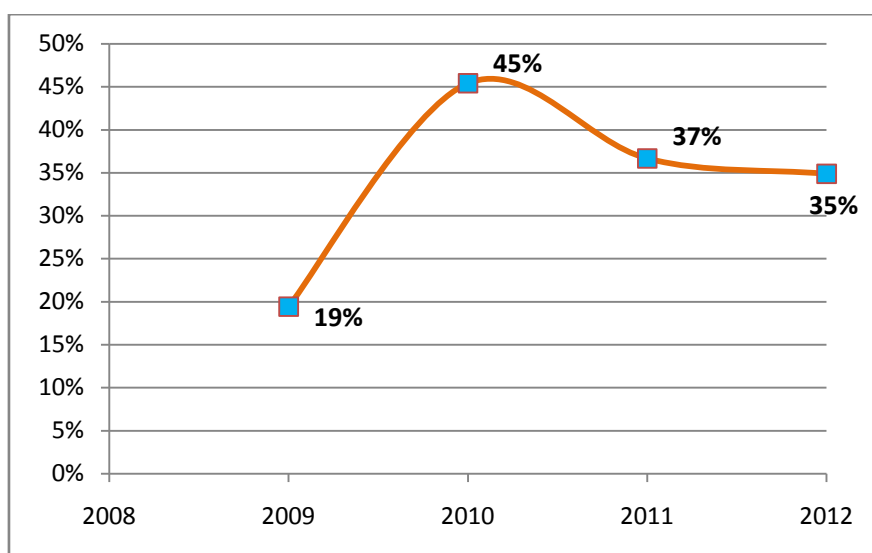
Overall the survey found that there is a great potential for growth, which has been retarded recently mainly due to various reasons. The reasons behind this decreasing trend are lack of proper facilities for doing businesses like low rent office space, lack of other physical facilities like nonstop/ stable power supply, internet connectivity, gas, telephone etc.

Figure 5.2: Income of ICT Companies
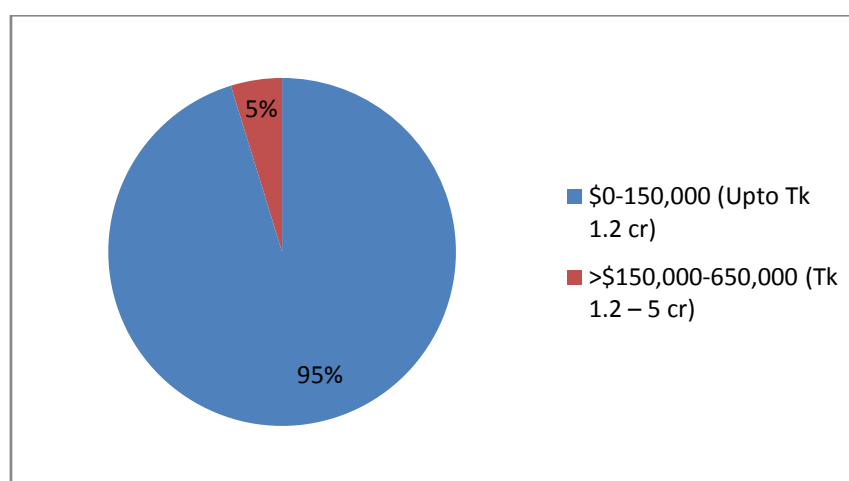
The above figure shows that 95% of companies in Rajshahi fall within the income range of USD 0-150,000 (upto Tk. 1.2 cr). Very few companies (5% of companies) fall within the income range of > USD 150,000-650,000 (Tk. 1.2-5cr).

The survey team found eagerness amongst the ICT companies to improve quality, to be able to supply to the local consumers as well as to export. They felt tremendous confidence among the ICT companies, and an overwhelming interest for moving to an ICT Village.

b.   Utility Expenses

The average utility expenses of the 21 ICT companies surveyed in Rajshahi are shown in the following table:

Table 5.2 : Utility Expenses

	Space Rental (Tk./sft)	Electricity bill (Tk. /month)	Fuel cost for generator (Tk. /month)	Bandwidth Cost (Tk. /month)
Av. value	27	5,376	2,730	3,043
No. of companies		21 (all)		

From the above table, it can be concluded that space rental of Tk. 27 per sft is quite reasonable and cheap. Electricity bill and fuel cost are also not so high. This is because major proportion of ICT Industry in Rajshahi constitutes of very small companies. Average bandwidth cost is also very low. As most of the companies conduct hardware based business, their requirement for bandwidth is very low.

The following table shows the category wise utility expenses:

Table 5.3: Utility Expenses (category wise)

Type of Services	Requirements			Expenditure		
	Space Requirement (sft)	Bandwidth Requirement (Mbps)	Space(Tk./month)	Bandwidth (Tk./month)	Electricity (Tk./month)	Fuel cost for Generator (Tk./month)
1. Software Development and Services	600	1.07	16,488	8,571	2,082	1,031
2. Business Process Outsourcing	300	1.00	8,244	8,000	250	1,500
3. ICT Training	500	0.58	13,740	4,667	2,488	1,205
4. Hardware Sales and Services	800	0.66	21,984	5,250	5,181	2,207
5. Other	300	0.50	8,244	4,000	250	850

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From the table, it is evident that bandwidth cost per month is high for software development and services due to requirement of high bandwidth speed. Electricity cost, generator, fuel cost and space rental are higher for hardware sales and services due to its higher percentage of space utilization and significant consumption of electricity.

c. *Interest to expand/relocate business to the proposed ICT Village*

An overwhelming interest in expanding/relocating business to the proposed ICT village at Rajshahi was seen when a question on this issue was asked to ICT companies in Rajshahi. Table 5.4 shows the results of the responses.

Table 5.4: Interest to expand/relocate business to the ICT village at Rajshahi

	Yes	No
Number of Companies	21	0

During the survey of ICT companies in Dhaka, it was also noticed that 50% (16 out of 32) companies shown their interest in outsourcing/ sub-contracting work-orders to proposed ICT village at Rajshahi.

Figure 5.3: Interest in outsourcing/ sub-contracting work-orders to Rajshahi ICT Village
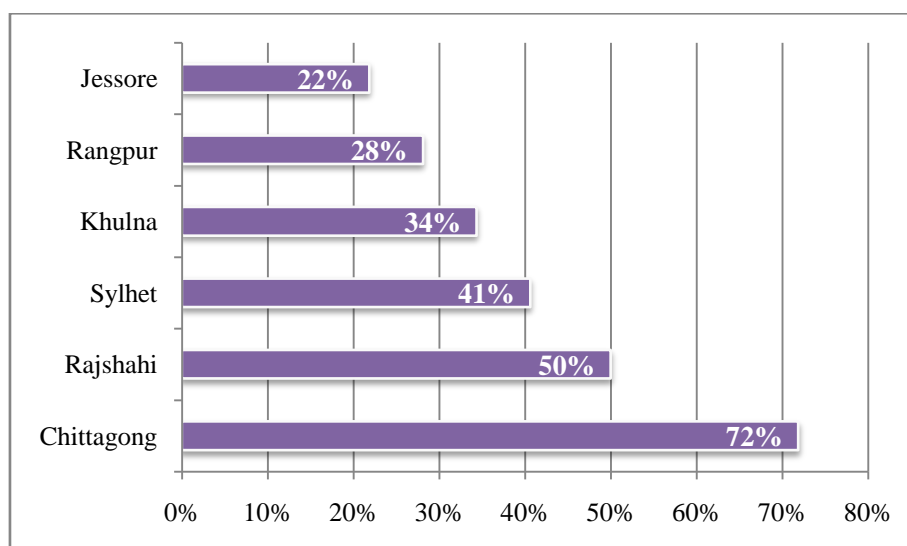
During the survey of ICT companies in Dhaka, it was also noticed that 43% (15 out of 35) companies shown their interest to expand their business from Dhaka to Rajshahi ICT village.

Figure 5.4: Interest to relocate/expand business to Rajshahi ICT Village
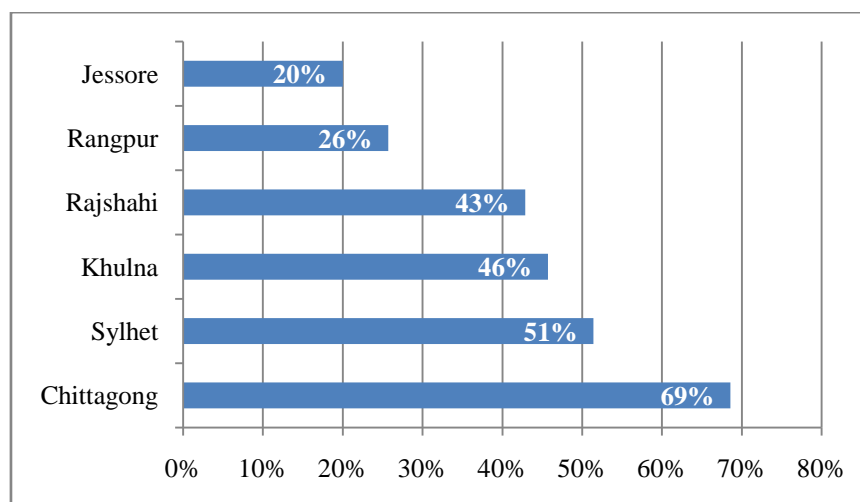
d.   Space Requirement

The response to this question is given in the following table in terms of space (in sft) required to set up business in ICT Village.

Table 5.5: Space Requirement to set up Business at Rajshahi ICT Village

Space (sft)	No of Companies	Percentage
500 sft	2	10%
1,000 sft	9	43%
1,500 sft	6	29%
2,000 sft	4	19%
Other	0	0%

It appears that the majority responded for 1,000 to 1,500 sft space for business.

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e. Facilities Needed in the Village

The following figure ranks the importance of different facilities expected by the ICT companies at Rajshahi to set up business at ICT Village.

Figure 5.5: Importance of Different Facilities in the Village
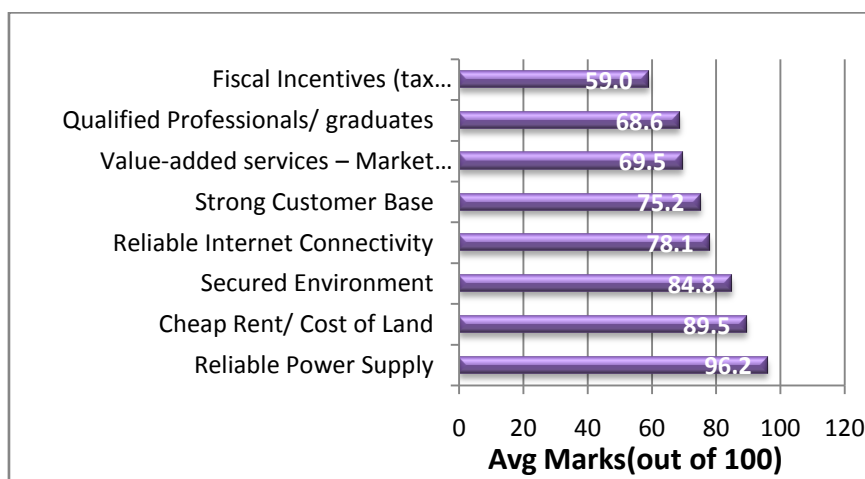
It is evident that reliable power supply is the most important factor with reliable power supply following cheap rent/ cost of land. Secured business environment, reliable internet connectivity are the other important factors ranking third and fourth respectively. Strong customer base, Qualified Professionals/ graduates in the park and Value-added services (Market access, business planning and operational support, or resource mobilization) come next and having similar importance. Fiscal incentives (tax holidays, loans etc.) get the lowest rankings.

On the other hand, the following figure shows the facilities expected in the ICT villages by the Dhaka based ICT companies who want to expand their business in Rajshahi.

Figure 5.6: Importance of Different Facilities to relocate/expand business to Rajshahi ICT Village
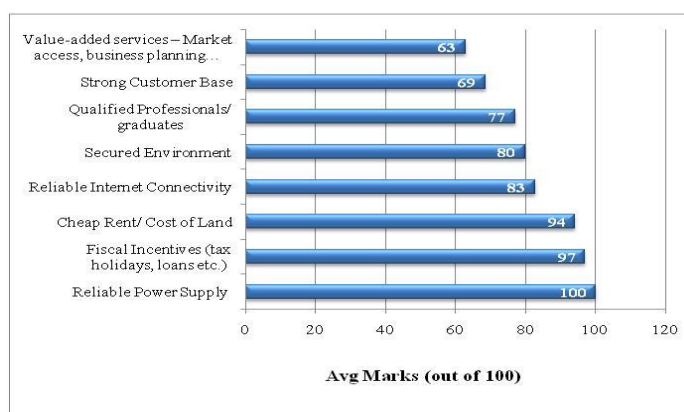
From the above figure, it can be concluded that reliable power supply is the most priority need of ICT companies in Dhaka. The next items include fiscal

incentives, cheap rent/ cost of land, reliable internet connectivity, and secured business environment. Qualified Professionals/ graduates in the park and Value-added services (Market access, business planning and operational support, or resource mobilization) also get the lowest rankings.

f. Expected Ancillary Facilities in the Village

The following figure ranks the importance of different ancillary facilities that are expected by the Rajshahi based ICT companies to set up their business in the ICT Village.

Figure 5.7: Importance of Different Ancillary Facilities in the Village
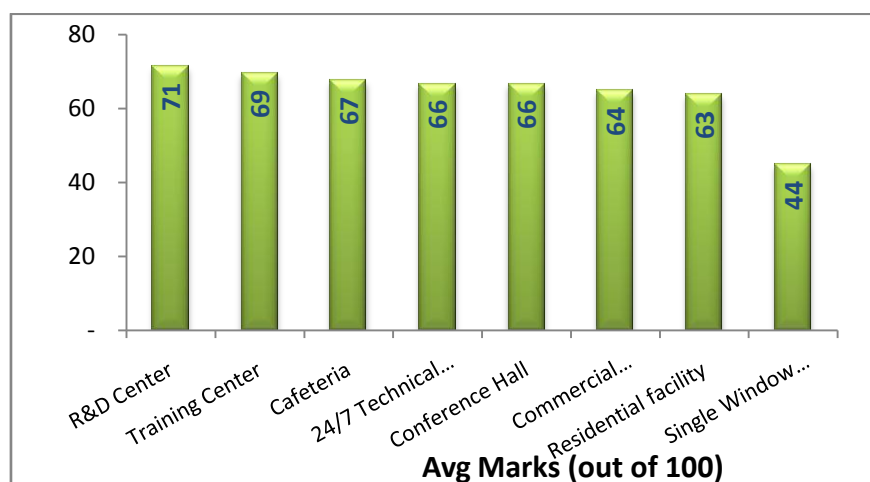
It appears that availability of R&D Center is the most important factor among the ancillary services according to the above figure. Having Training Center and Cafeteria are the next priorities. 24/7 technical support and conference hall are the other factors having similar importance. Commercial Complex (shopping mall etc) in the park and residential facility are the next priorities. Single Window Service with the lowest rankings.

On the other hand, the following figure shows the ancillary facilities expected in the ICT villages by the Dhaka based ICT companies who want to expand their business in Rajshahi.

Figure 5.8: Importance of Different Ancillary Facilities to relocate/expand business to Rajshahi ICT Village
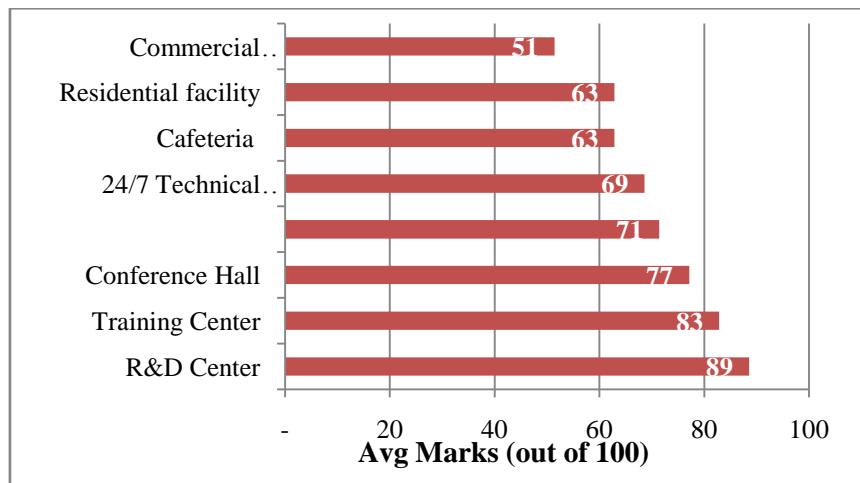
Above figure shows that R&D Center stands out as the most important facility with availability of training center following next. Availability of conference hall is the third important factor for the Dhaka based companies. Single window service and 24/7 technical support are the other important factors with cafeteria and residential facility having similar importance. Availability of commercial complex is the least important factor for Dhaka based companies.

5.3.2 Findings from Freelances Surveyed

a. Monthly Income through Freelancing

The following diagram show the monthly income range of freelancers surveyed.
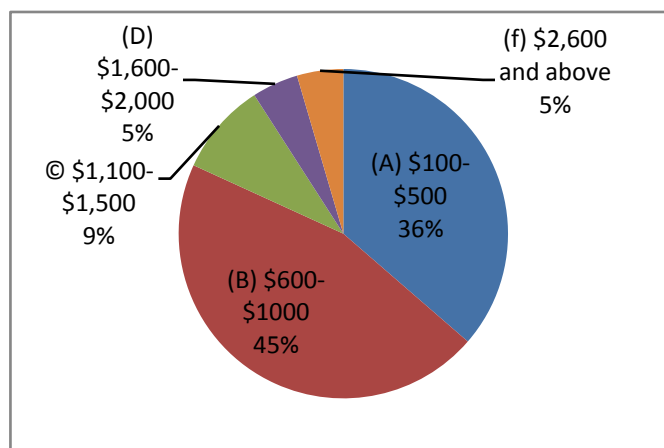
The above figure shows that the largest proportion (45%) of freelancers surveyed fall within the income range of $600 - $1,000 per month. The second largest proportion (36%) of freelancers surveyed fall within the income range of $100 - $500 per month. of Very few freelancers (5%) fall within the income range of $1,600-$2,000 and $2600 and above.
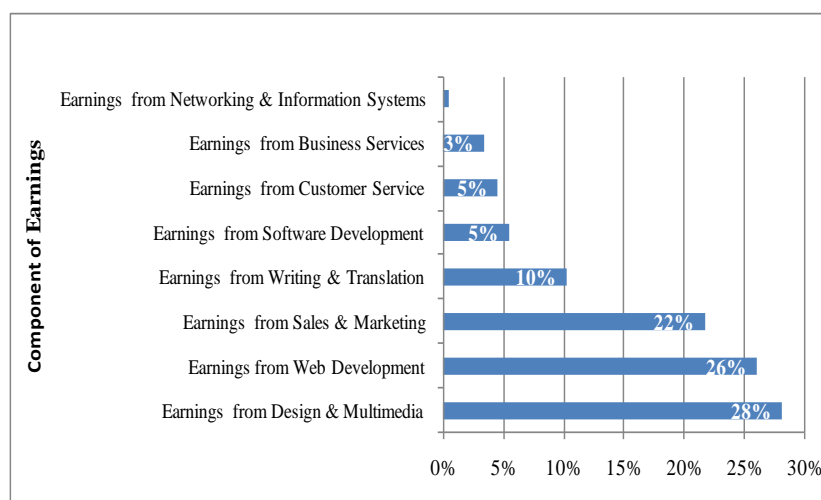
It is found that most of the freelancers responded that the main components of their earnings are design and multimedia, web development, sales and marketing etc. The other components of earnings like writing and translation, software development, customer services, business services etc have very little impact on their income.

b.   Utility Expenses

The average utility expenses of the 22 freelancers are shown in the following table:

Table 5.6 : Utility Expenses

	Bandwidth Requirement (Mbps)	Bandwidth Cost (Tk. /month)
Avg. value	1.4	3,432
No. of Freelancers	22 (all)	

From the table, it is evident that bandwidth cost per month is high for freelancers due to requirement of high bandwidth speed.

c.   Willingness to work on the proposed ICT Village

Very few freelancers have shown their interest to work on the proposed ICT village at Rajshahi was seen when a question on this issue was asked to the free lancers. The following figure shows the results of the responses.

Figure 5.9: Interest to work on the ICT Village
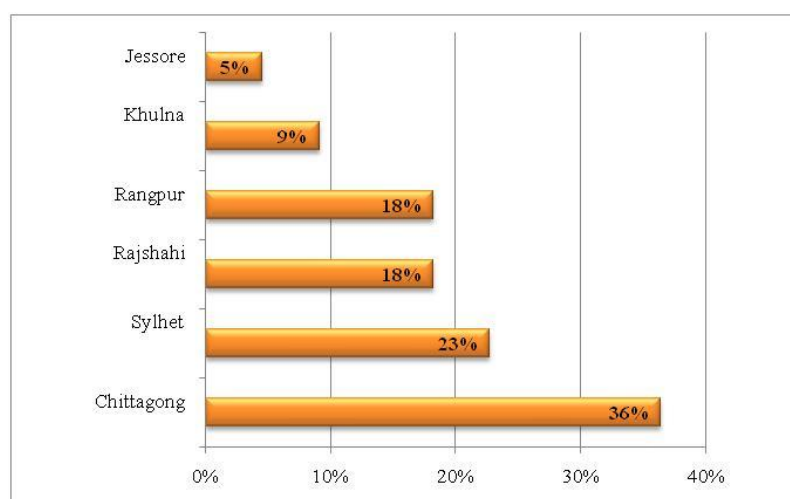
During the survey of freelancers, it was also noticed that 18% (4 out of 22) freelancers have shown their interest to work on the Rajshahi ICT village.

d.   Facilities Needed in the Village

The following figure ranks the importance of different facilities that are needed to set up business at ICT Village.

Figure 5.10: Importance of Different Facilities in the Village
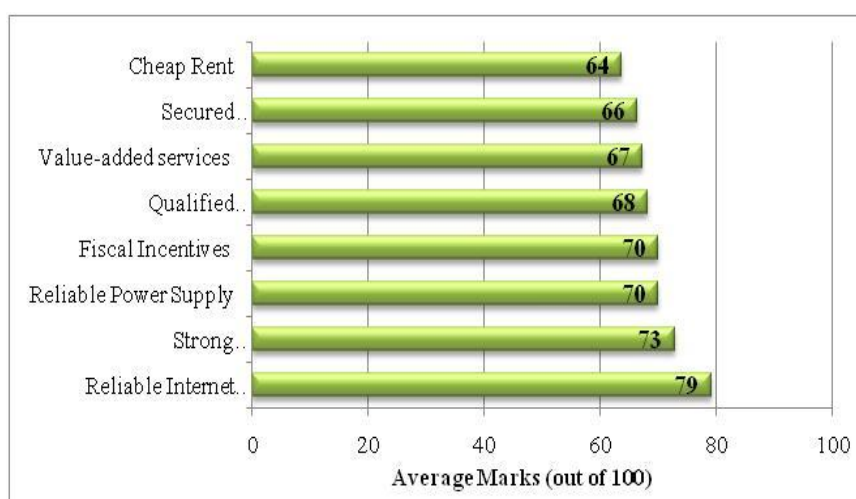
From the above figure, it can be concluded that reliable internet connectivity is the most priority need of freelancers. The next items include strong customer base, reliable power supply and fiscal incentives. Cheap rent/ cost of land, secured business environment, value-added services (Market access, business planning and operational support, or resource mobilization) and qualified professionals/ graduates in the park also get the lowest rankings.

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e. Expected Ancillary Facilities in the Village

The following figure ranks the importance of different ancillary facilities that are needed in the ICT Village.
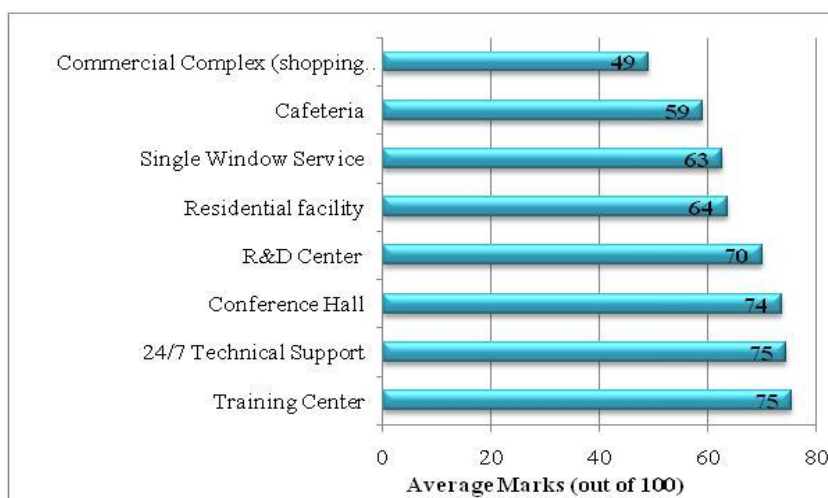
It appears that availability of training center is the most important factor among the ancillary services according to the above figure. Having 24/7 technical support, conference hall, and R&D Center are the next priorities. Residential facilities, Single Window Service are the other factors with later two factors having similar importance. Commercial Complex (shopping mall etc) in the park and Cafeteria get the lowest rankings.

5.4   Profile of Industrial Enterprises

The salient features from the findings relevant to the ICT villages are presented in the following sections:

5.4.1   Type of Services

According to the survey, most of the ICT companies in Rajshahi have the following type of business i,e (1) software development and services (2) Business Process Outsourcing, (3) Training, (4) hardware sales and services and (5) Other. But in Rajshahi most of the companies are hardware based. Very few Companies have software business, which includes inventory, automation, enterprise resource planning, billing software, online and offline security software development.

The following table shows the survey findings with respect to type of services vs average bandwidth Speed (Mbps) and average space requirement (sft).

Table 5.7: Type of Services Vs Bandwidth and Space

Type of Services	Average Space Requirement (sft)	Average Bandwidth Requirement (Mbps)
1. Software Development and Services	600	1.07
2. Business Process Outsourcing	300	1.00
3. ICT Training	500	0.58
4. Hardware Sales and Services	800	0.66
5. Other	300	0.50

5.4.2 Number of Employees

It is found from the survey, that the average no of employee of the ICT companies at Rajshahi are 20. Number of employee with respect to type of services is shown in the following table:

Table 5.8: No of Employees

Type of Services	ICT Engineering Graduates (hardware)	Graduates/ Diploma in Software	General Science Graduates	Other Graduates	Total
Software Development and Services	3	4	4	8	**18**
ICT Training		1	1		**2**
Hardware Sales and Service		1	2	5	**9**
Total	**3**	**6**	**7**	**13**	**29**

5.4.3 Average Salary of Professional

Average monthly salaries of professionals with 2 – 5 years of experience are shown in the following table:

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Table 5.9: Average Monthly Salary of Professional

Occupation Title/Skill level	Monthly Salary (Tk.)
Software Quality Assurance; Software Engineer	10,000
Database Administrator	10,000
System Administrator; Internet Programmer; Database Designer; Technical Writer; Web Site Designer; Software Quality Controller; Application; Telecommunication Engineering	10,000
Multimedia Specialist; Network Engineering; Web Site Developer	7,000
Management Employees (HR, Admin, Accounts, Marketing)	8,000

5.5 Measures for Enhancing Competitiveness of the Park

To make the services provided in the ICT village cost competitive, the following measures need to be taken in the manner suggested.

5.5.1 Reliable Power Supply

One of the major factors of competitiveness is the continuous availability of adequate electrical power. ICT villages require reliable power supply. Power interruption increases the cost of services due to wastage of time and frequent problem with hardware.

5.5.2 Cheap Rent

Cheap rent/cost of land was one of the factors that was given a high importance by the respondents. Usually this is the single most expensive factor that increases the total investment in a new venture.

5.5.3 Reliable Internet Connectivity

Market survey indicates that, reliable internet connectivity increases the competitiveness of the park. ICT villages require reliable internet connectivity to ensure efficiency and quality of service..

5.5.4 Fiscal Incentives

According to the market survey, capital is a constraint for all the ICT companies. ICT companies want support from the Government. Therefore, fiscal incentives like tax holiday, low interest rate loan etc were also one of the factors, which increase the competitiveness of the park.

5.5.5 Measures for improving quality, R&D, training and information

There is a need for improving the quality of services provided by the ICT companies. Particularly in software development and services most of the professionals need training to improve their skills. A few training programmes

offered by some local and international bodies have helped some of the professionals in improving the quality of service significantly.

Most of the professionals now realise that they need R&D to improve and diversify their services. However, they do not have any idea how to go about this. Sometimes they get some help from technological universities in the country, but some of them tend to be very expensive for the ICT companies to afford. Therefore, if the ICT village could organise a central R&D centre offering service at a reasonable cost, this could have a significant impact on the quality improvement and diversification of the ICT villages in Bangladesh.

Regular training of professionals could also be taken up through such a centralised facility. Financing of such centralised facilities could be done through a co-operative of the ICT companies housed in the village.

There is a need for specialization and interaction among ICT companies which helps in improving quality, and in making the services cost-effective. Since most of the companies were scattered so far, they did not have much opportunity to explore this option.

Again, the ICT village will offer them collective bargaining strength to rectify many of the policies of the government which hindered the growth of ICT industries of Bangladesh. The anticipated changes will not only help those in the village, but also benefit the country as a whole.

Therefore, the proposed ICT village will definitely offer opportunities for bringing a significant qualitative change to the Bangladesh ICT Industry and would be a pioneer in its own right.

6

Demand Forecast

6   DEMAND FORECAST

Demand forecast is a key element of the feasibility study, which determines the development potential of the site. In this demand forecast, the team identified: i) different category of businesses of ICT industry that are most likely to be located in the village, ii) the number of tenants to be proposed, and iii) the space and infrastructure requirements of units proposed for the ICT village over a 30-year period.

With this information, assumptions were made and three demand scenarios (base case, optimistic case and conservative case) were produced. These scenarios were then used to obtain a realistic view of the requirements for demand condition, development need and timeframe of the project.

6.1   Purpose of Demand Forecast

The demand forecast has been made broadly for the following purposes:

a) **Determine the ideal size of space.** The demand forecast informs about the size of space necessary to accommodate the projected demand in the ICT village in a given location.

b) **Estimate the cost of ICT Village development and operation.** The larger the demand, the more space must be developed and the more services required to operate in the village.

c) **Estimate ICT Village revenues.** The revenues of the village will be directly proportional to the demand for space in the village.

d) **Determine economic benefits**. The demand forecast provides information such as the number of tenants and number of employees per tenant.

6.2   Standardisation of Industry Sub-categories

The core leasable area of the ICT Village includes the following two constructions and development:

1. Multi Tenant Building

This is a 10 storied steel structure commercial building of 20,000 sft. MTB will have total leasable space for office of total 115,200 sft.

2. Vacant Industrial Plots

The Vacant Industrial Plots are to be developed by individual lease holder companies. There are seven (7) industrial plots of 2.50 acre each, with boundary walls and approach roads.

Based on the findings and experience gathered from the survey, a standardisation of the industry sub-categories were made based on the services they provide. The demand for space and other utilities have also

been forecasted based on the requirements of these sub-categories. The standardised values are presented in Table 6.1 for MTB:

Table 6.1: Standardization of Sub-categories of Industries for MTB

	Sub-category	Suggested Number of units	Space Requirement (sft/tenant)	Number of Employees/tenant	Bandwidth Requirement (Mbps/tenant)
1.	Software Development and Services	53	1,500	19	1
2.	BPO	14	1,500	60	1.5
3.	Training	5	1,500	25	0.6
4.	Other	14	500	11	0.1
	Total no of Units	**86**			

6.3   Demand Forecast Methodology

The ICT industry in Rajshahi is only beginning to grow. There are few software companies in Rajshahi; most ICT companies in the area supply computers or operate cyber cafes. Hence, it is not practical to directly evaluate local demand for facilities offered by the Rajshahi ICT Park. Because the ICT industry in Bangladesh is only beginning to develop, most ICT related firms are concentrated in Dhaka. Hence a survey on 71 ICT firms was conducted through questionnaire; this survey took place in Dhaka and Rajshahi.

With inputs from market survey, the demand forecast of Rajshahi ICT village has been carried out. Based on historical data of sample industry volume and their trend of growth rate, the forecast growth rates are determined for a period of thirty years. From the surveyed data, the three different factors are generated:

1.   Factor for Space Requirement per person (SRP) - (sft/person)

2.   Revenue Earning Factor (REF) - (Tk. m/person)

3.   Bandwidth Capacity Factor (BCF) - (Mbps/person)

Based on these factors, the demand for space requirement (sft/Tk m), employment generation (person/Tk. m) and bandwidth requirement (Mbps/Tk. m) of Bangladesh ICT Industry for a period of thirty years are determined. The ICT sector mainly concentrates in Dhaka, the capital city of Bangladesh. According to a survey conducted by BASIS, the total market size of Bangladesh ICT Industry is USD 800 million.

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Figure 6.1: Demand Assessment Methodology for Rajshahi ICT Village

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┌─────────────────────────────────────────────┐
│ Projection of Bangladesh ICT Industry Volume │
│ based on Sample Industry Volume and their    │
│ trend of growth rate                         │
└─────────────────────────────────────────────┘
                      ↓
┌─────────────────────────────────────────────┐
│ Projection of Bangladesh ICT Industry Volume │
│ under different growth scenarios             │
└─────────────────────────────────────────────┘
                      ↓
┌─────────────────────────────────────────────┐
│ Determination of space for Bangladesh ICT    │
│ Industry based on sft per Tk. m benchmarks   │
└─────────────────────────────────────────────┘
                      ↓
┌─────────────────────────────────────────────┐
│ Conversion of volume into employment         │
│ generation based on person per Tk. m         │
│ benchmarks                                   │
└─────────────────────────────────────────────┘
                      ↓
┌─────────────────────────────────────────────┐
│ Assessment of demand of Rajshahi ICT Industry│
│ based on proportionate share of Rajshahi ICT │
│ Industry on Bangladesh ICT Industry          │
└─────────────────────────────────────────────┘
                      ↓
┌─────────────────────────────────────────────┐
│ Allocation of demand for Rajshahi ICT Village│
└─────────────────────────────────────────────┘
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Determine the volume of Rajshahi ICT Industry based on total market size of Bangladesh ICT Industry and determine the volume of Rajshahi ICT Village based on volume of Rajshahi ICT Industry.

The ICT graduates of Rajshahi are approximately 621. This is slightly more than 2% of Bangladesh's ICT graduates. Considering the competitive status of Rajshahi, its share of employment generation in Bangladesh's IT/ITES industry was considered as 3% provided that the growth in Bangladesh's IT/ITES industry was evenly spread in terms of ICT graduates (other demographic considerations such as share of working age, population, excluded). However, there are still further improvements that can be made in equipping the labour force in Rajshahi for large-scale operations in IT/ITES; there is a need for formal and informal apprenticeship programs to equip local youth in Rajshahi. There is also a need for a marketing campaign in Rajshahi to increase awareness about opportunities in IT/ITES to the local population.

Therefore, the volume for Rajshahi ICT Industry is considered as 2% of total Bangladesh ICT Industry. The volume for Rajshahi ICT Village is considered as

85% of total Rajshahi ICT Industry. Industry volume of Rajshahi ICT Village is derived for a period of thirty year based on the forecast growth rates. Based on the industry volume, the space requirement, bandwidth requirement and employment generation of Rajshahi ICT Village is also generated.

6.4   Sample Industry Volume

The last five years data of sample industry volume (Tk. m) with respect to type of services; Software development, BPO, Training, Other and Whole Industry are shown in the following figure:

Figure 6.4: Sample Industry Volume (Category Wise)
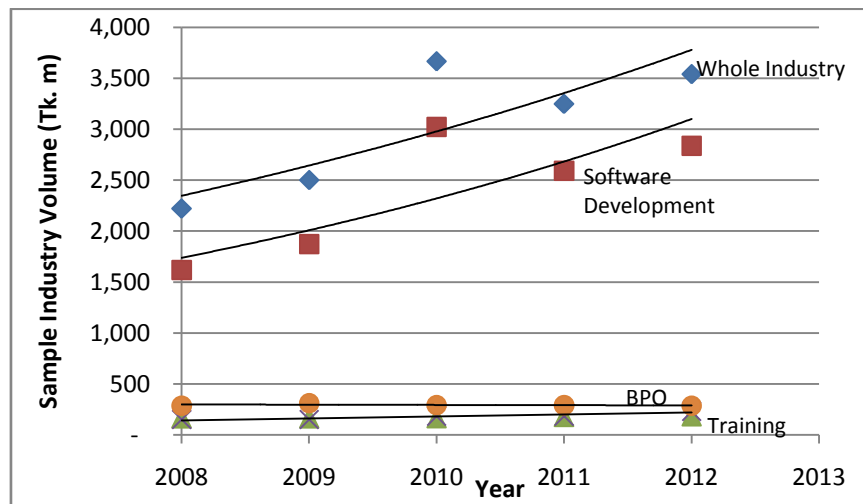
It can be concluded from the above figure that the industry for software development are growing rapidly with respect to time. For this reason, the curve shows an increasing trend. However, the curves for BPO, Training and Other remain constant for the last five years. The growth rate of other categories of services (such as Business Process Outsourcing, Training and Other) is very low compared to software development.

6.5   Space Requirement of Bangladesh ICT Industry

For determining space requirement (sft/Tk m) of Bangladesh ICT Industry, the following two factors have been used:

a) Factor for Space Requirement per Person (SRP) - (sft/person)

b) Revenue Earning Factor (REF) - (Tk. m/person)

$$\text{Space Requirement (sft/Tk.m)} = \frac{\text{SRP (sft/person)}}{\text{REF (Tk. m/person)}}$$

6.5.1   Space Requirement Factor (SRP) - (sft/person)

The data for space requirement (sft) vs no of employee and revenue (Tk.m) vs no of employee of sample ICT companies for the four different categories

were plotted on XY charts. The <u>SRF (sft/person)</u> for determining space of ICT industry have been derived based on the following best-fit lines.
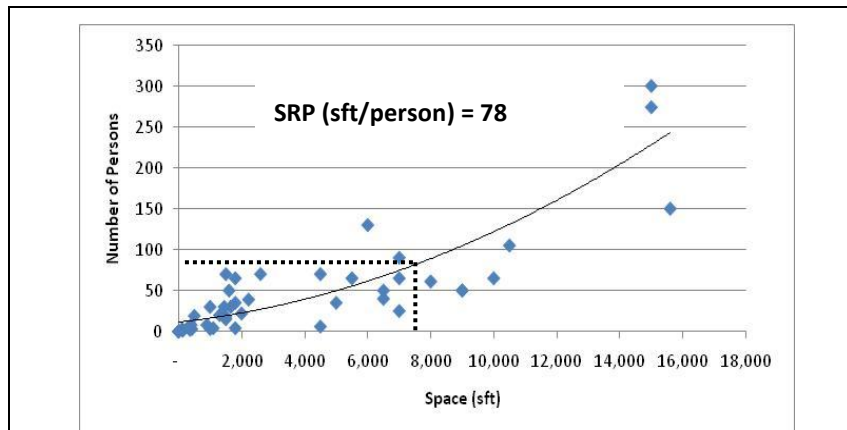
Figure 1: SRP (sft/person) for Software Development
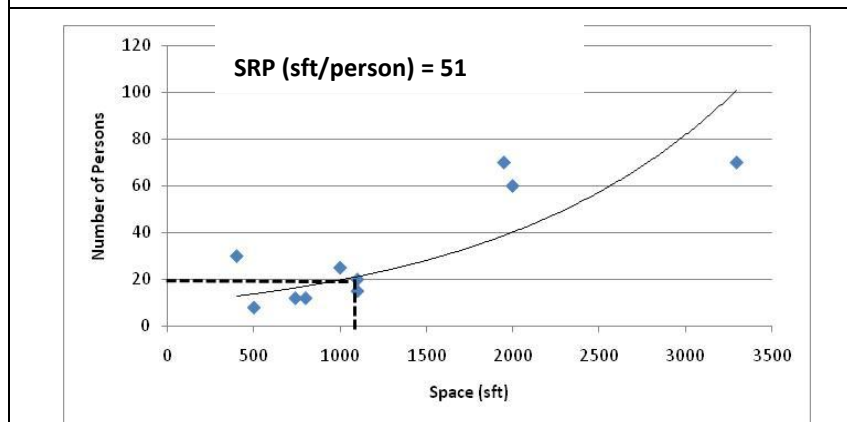
Figure 2: SRP (sft/person) for BPO
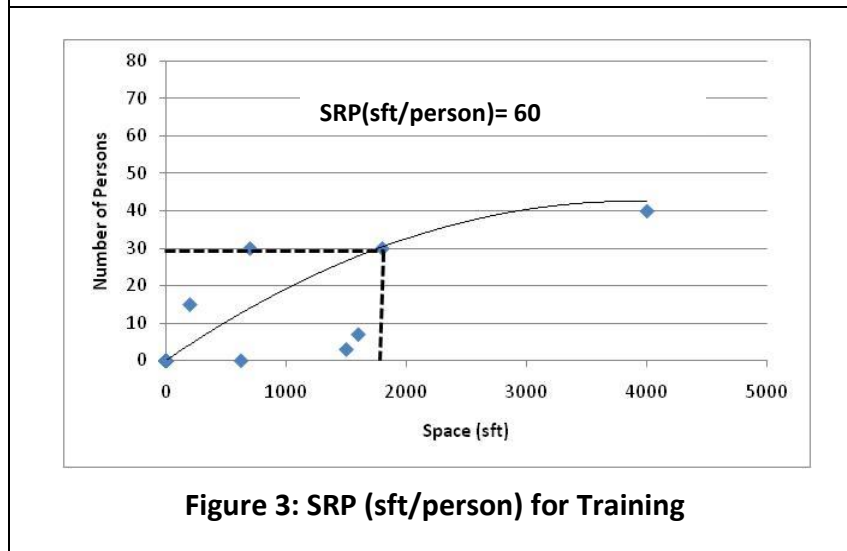
Figure 3: SRP (sft/person) for Training

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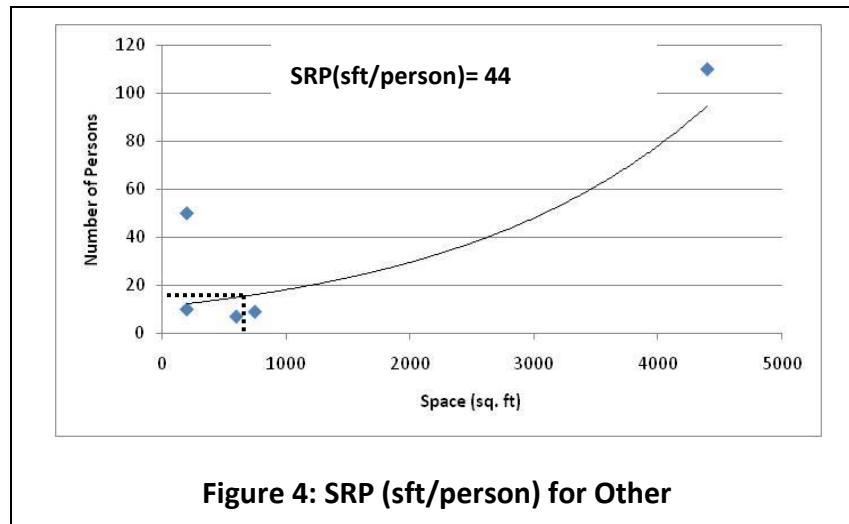
Figure 4: SRP (sft/person) for Other

The factor <u>SRP (sft/person)</u> for the above different categories of businesses has been derived from the dotted lines that represent the most representative points. It can be concluded from the above figures that number of persons and space moves in close pace with each other. There is a positive relationship between each other.

In software development companies, space requirement (sft) depends on the number of employees working in a company. There is a positive relationship between space required and number of persons. Space requirement for software development tends to go up with the number of persons working in a company.

For business process outsourcing, space (sft) requirement depends on the number of persons working in companies. There is a positive relationship between space required and number of persons. Space requirement tends to go up with the number of persons.

The space required for training program depends on the number of participants. The amount of space required tends to go up with number of persons. The relationship between the number of persons and space is positive.

The space required for others (customized software, web development, and database support) depends on the number of persons. The amount of space required tends to go up with number of persons. The relationship between the number of persons and space is positive.

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6.5.2 Revenue Earning Factor (REF) (Tk. m/person)

The <u>REF (Tk. m/person)</u> for determining space requirements have been derived based on the following best-fit lines.
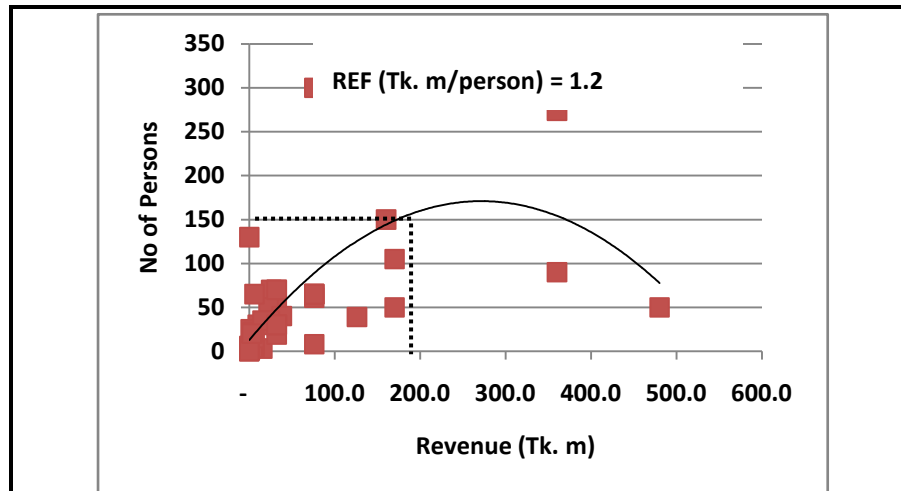
Figure 1: REF (Tk. m/person) for Software Development
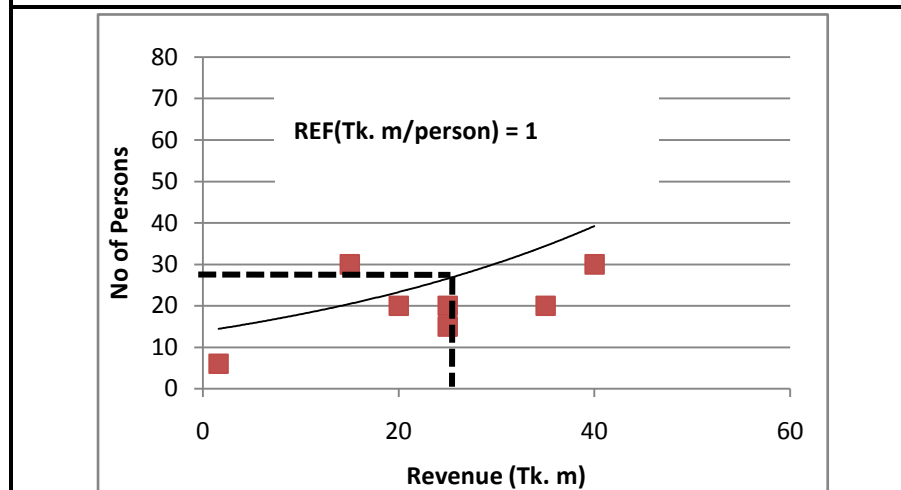
Figure 2: REF (Tk. m/person) for BPO
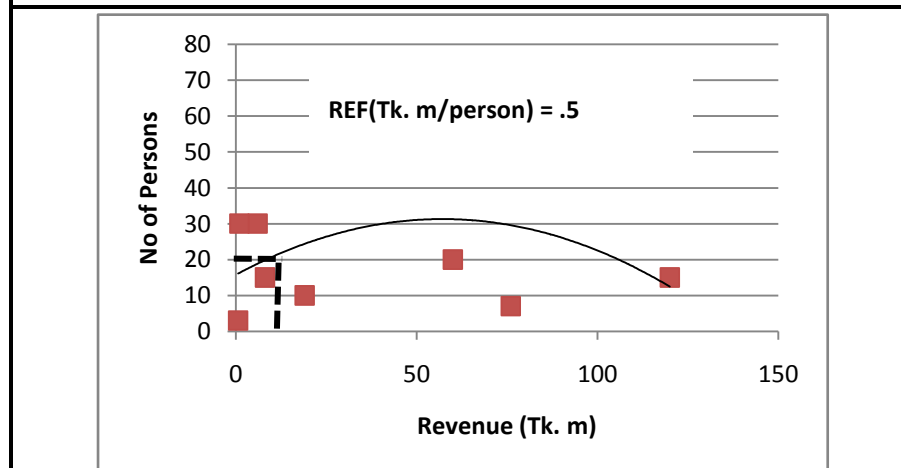
Figure 3: REF (Tk. m/person) for Training

Figure 4: REF (Tk. m/person) for Other
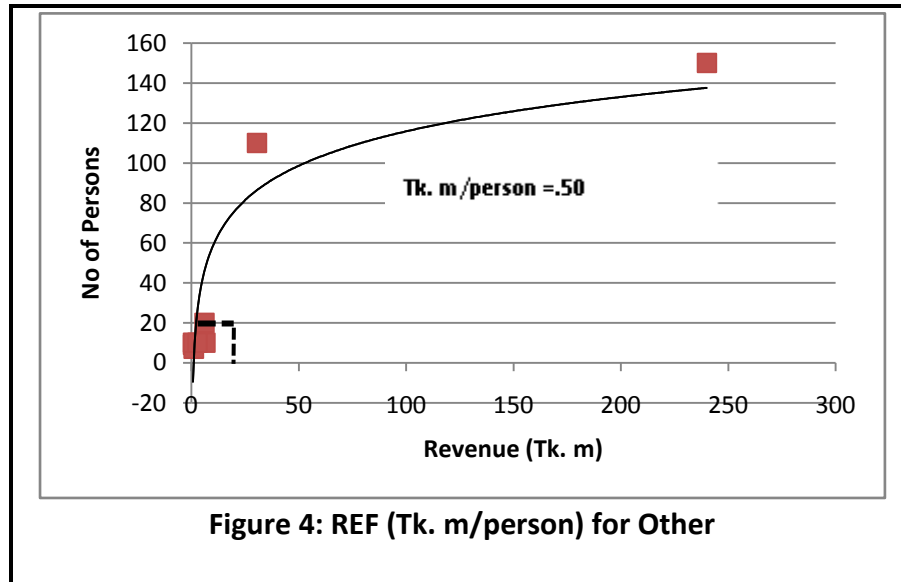
The factor REF (Tk.m/person) for the four different categories of businesses has been derived from the dotted lines that represent the most representative points.

For software development, the relationship between revenue and number of persons are not dependent on each other. Revenue depends on the nature of the business. It is found that the relationship between number of persons and revenue is negative.

For business process outsourcing, revenue depends on the number of persons working in companies. The relationship between number of persons and revenue is positive.

For training program the relationship between revenue and number of persons is positive. Revenue earned from the training programme is depended on number persons.

For others (customized software, web development, and database support) the relationship between number of persons and revenue is negative.

Therefore the space requirements (sft /Tk m) of Bangladesh ICT Industry are as follows:

Table 6.2: Space Requirement of Bangladesh ICT Industry

Category of Services	SRP (sft/person)	REF (Tk. m/person)	Space Requirement (sft /Tk m)
1. Software Development	78	1.27	61
2. BPO	51	1.00	57
3. Training	60	0.50	120
4. Others	44	0.50	89

6.6 Employment Generation of Bangladesh ICT Industry

The employment generation of ICT industry has been derived from the following two factors:

a) Factor for Space Requirement per Person (SRP) - (sft/person)

b) Factor for Space Requirement per Tk. m (SRT) - (sft/Tk m)

$$\text{Employment generation (person/Tk.m)} = \frac{\text{SRP (sft/person)}}{\text{SRT (sft/Tk m)}}$$

Therefore, the employment generation (person/Tk. m) of different category of services of Bangladesh ICT industry is as follows:

Table 6.3: Employment Generation of Bangladesh ICT Industry

	Category of Services	SRP (sft/person)	SRT (sft /Tk m)	Employment Generation (person/Tk m)
1.	Software Development	78	61	0.79
2.	BPO	51	57	1.12
3.	ICT Training	60	120	2.00
4.	Others	44	89	2.00

6.7 Bandwidth requirement of Bangladesh ICT Industry

For determining bandwidth requirement (Mbps /Tk m) of Bangladesh ICT Industry, the following two factors have been used:

a) Bandwidth Capacity Factor (BCF) - (Mbps/person)

b) Revenue Earning Factor (REF) - (Tk. m/person)

$$\text{Bandwidth Requirement (Mbps/Tk.m)} = \frac{\text{BCF (Mbps/person)}}{\text{REF (Tk. m/person)}}$$

6.7.1 Bandwidth Capacity Factor (BCF) - (Mbps/person)

The data for bandwidth (Mbps) vs number of persons of sample ICT companies for the four different categories were plotted on XY charts. BCF (Mbps/person) for determining Bandwidth requirement have been derived based on the following best-fit lines.

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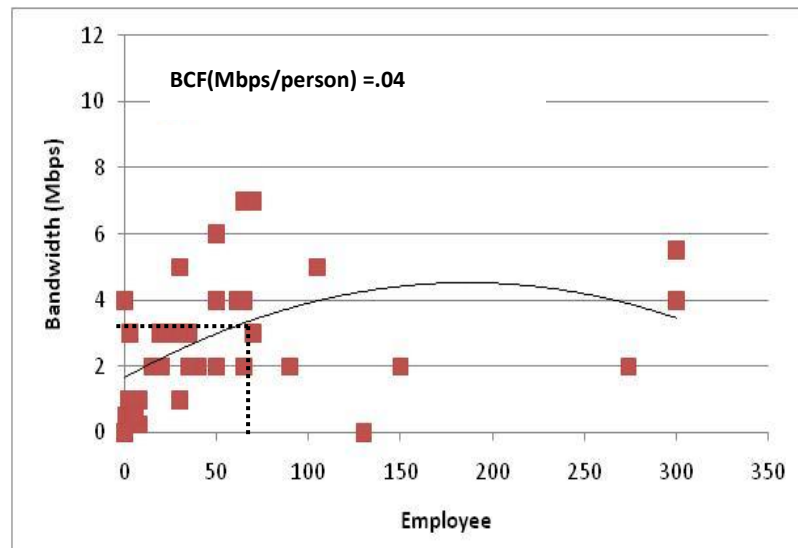
Figure 1: BCF(Mbps/person) for Software Development

Figure 2: BCF(Mbps/person) for BPO

Figure 3: BCF(Mbps/person) for Training

Figure 4: BCF(Mbps/person) for Other
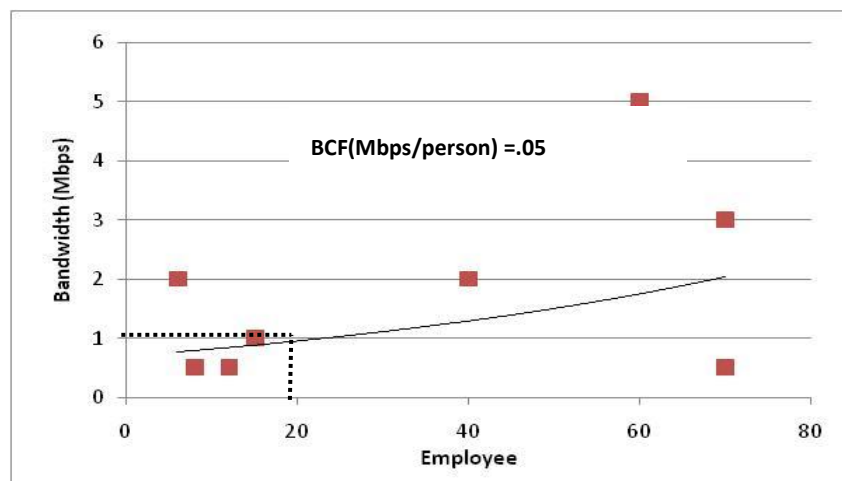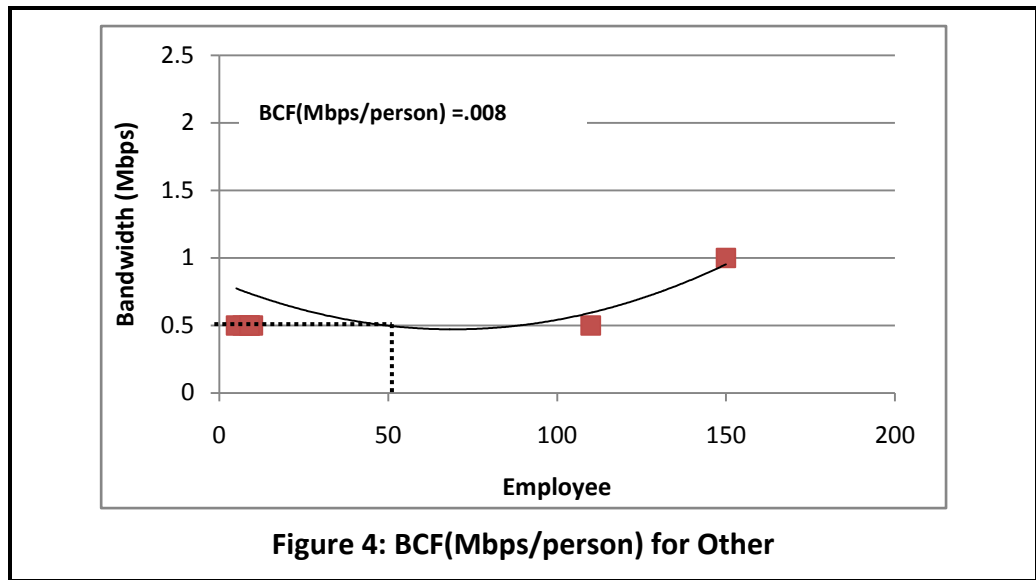
The factor <u>BCF (Mbps/person)</u> for the above different categories of businesses has been derived from the dotted lines that represent the most representative points.

For software development, bandwidth needed depends on number of employees in a company. The relationship between employees and bandwidth is positive. The requirement of bandwidth tends to move up with number of employees.

For Business Process Outsourcing required bandwidth depends on the number of employees. The relationship between bandwidth and employees is positive. Bandwidth tends to move up along with the number of employees.

For training programme required bandwidth depends on the number of employees. The relationship between employees and bandwidth is positive. Bandwidth tends to move up along with the number of both employees and trainees.

For other businesses (customized software, web development, and database support) the required bandwidth depends on the number of employees. The relationship between employees and bandwidth is positive. Bandwidth tends to move up along with the number of employees.

Therefore the bandwidth requirements (Mbps/Tk m) of different category of services of Bangladesh ICT industry are as follows:

Table 6.4: Bandwidth Requirement of Bangladesh ICT Industry

	Category of Services	BCF (Mbps/ person)	REF (Tk. m /person)	Bandwidth (Mbps/ Tk m)
1.	Software Development	.04	1.27	0.03
2.	BPO	.05	1.00	0.06
3.	Training	.02	0.50	0.04
4.	Others	.008	0.50	0.02

6.8   Projection of Growth Rates of Bangladesh ICT Industry

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 sectors as well as improving governance and facilitating inclusion. From the last four years historical data, average growth rate of different category of business are determined. The growth rate of different category of businesses will be forecasted based on their respective average growth rates.

6.8.1   Growth Projection of Software Development

Software development has become a growing industry in Bangladesh over the last two decades. The industry has become dynamic with a significant number of energetic entrepreneurs making their mark. The software industry in this country has started rapidly growing in recent years. This optimistic growth is supported by good software export trends and large demand for automation of manual processes in domestic market.

Figure 6.2: Projection of Growth Rate of Software Development
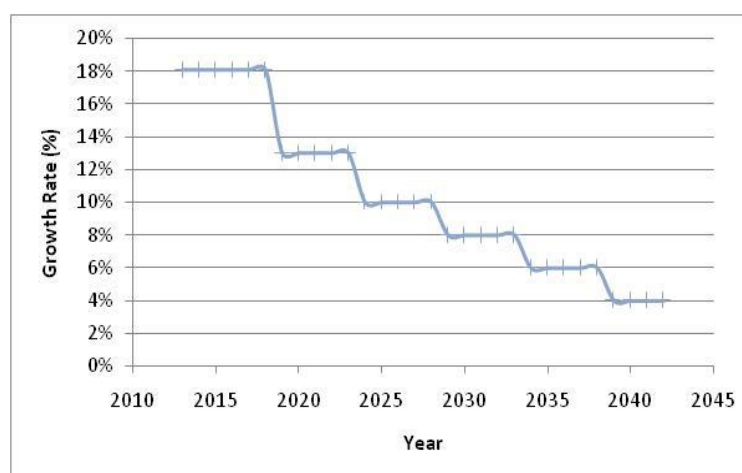
Average growth rate of software development is determined as 18% from the sample industry (68 surveyed companies). It is assumed that the rate will remain constant for the first five years block. For the 2nd five year block,

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it will slightly decreases to 13%. For 3rd block, the growth rate will be 10%. For last 3 blocks, the growth rate will be 8%, 6% and 5% in software industry.

6.8.2 Growth Projection of Business Process Outsourcing

Business Process Outsourcing (BPO) is a form of outsourcing that involves the contracting of the operations and responsibilities of a specific business functions (or processes) to a third-party service provider. In recent years there has been a move towards Business Process Outsourcing also – a trend which will further strengthen with enhanced connectivity and bandwidth.

Figure 6.3: Projection of Growth Rate of BPO
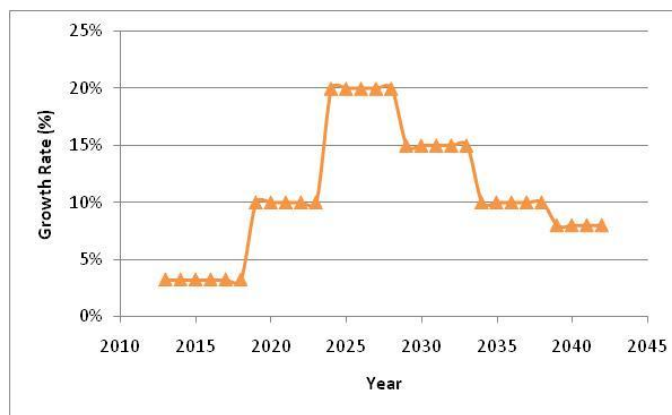
Average growth rate of C2 is determined as 3% from the sample industry. Initially the growth rate is low because this category of business is new for the ICT industry. The market for the BPO industry has started booming. Therefore, the demand for BPO will increase over a period of time.

6.8.3 Growth Projection of Training

The training institutes are concentrating their efforts on software development and providing training on basic and advanced computing skills. In recent times, with the growth of the ICT training sector, availability of skilled people has been enhanced.

Figure 6.4: Projection of Growth Rate of Training
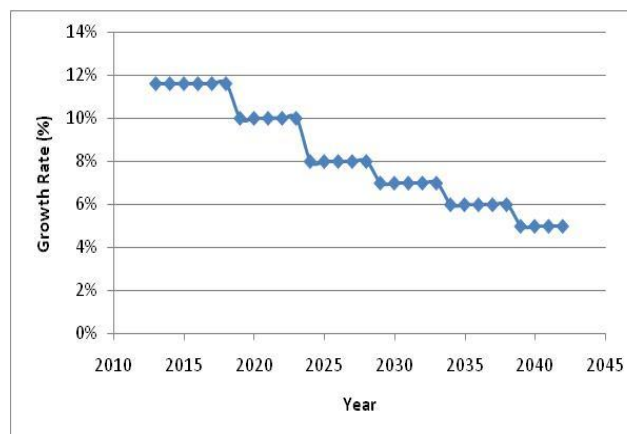
Average growth rate of Training is determined as 12% from the sample industry. It is assumed that the rate will remain constant for the first five years. For 2nd five year block, it will slightly decrease to 10%. For last four blocks, the growth rate will gradually decrease to 8%, 7%, 6% and 5% respectively.

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Table 6.5 : Growth Projection of Bangladesh ICT Industry

Category of Services	Growth Rate (%)					
	0-5 yrs	6-10 yrs	11-15 yrs	16-20 yrs	21-25 yrs	26-30 yrs
1. Software Development	18%	13%	10%	8%	6%	4%
2. BPO	3%	10%	20%	15%	10%	8%
3. Training	12%	10%	8%	7%	6%	5%
4. Others	0.10%	5%	10%	8%	7%	6%

6.8.4 Growth Projection of Other

In ICT industry apart from software, BPO and training, there are some other
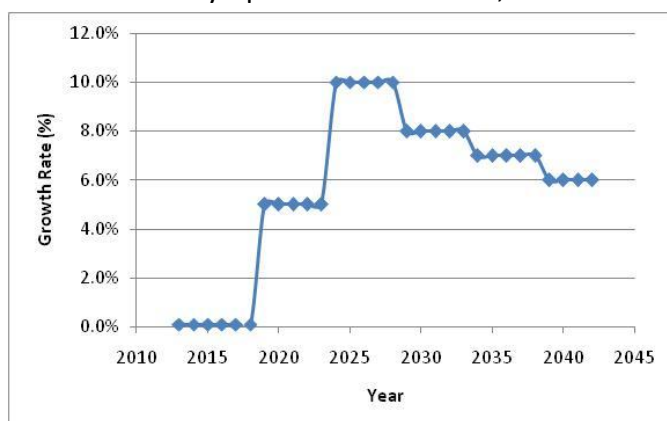
businesses which include web development, customized software, support service (Oracle Database Support), hardware assembly etc. Though this category of businesses started from a very low base, they will be growing rapidly in future. Average growth rate of the last type business is determined as .10% from the sample industry. It is assumed that for the second and third blocks, the growth rate will gradually increase to 5% and 10% respectively. For the last three blocks, the growth rate will decrease to 8%, 7% and 6%.

6.9 General Assumption

The following broad assumptions were made in the study:

(1) The proposed ICT village will be located at Rajshahi

(2) Four different category of businesses are carried out on the proposed ICT village; (a) Software Development and Services, (b) BPO, (c) Training, (d) Other

(3) Average growth rate of the above four categories are considered as 18%, 3%, 12% and 0.1% respectively. The average growth rates are calculated based on sample companies in ICT industry.

(4) The market size of Bangladesh ICT Industry is USD 800 million. (BASIS survey).

(5) Demand for Rajshahi ICT industry is considered as 8% of Bangladesh ICT Industry.

(6) Allocation of demand for Rajshahi ICT village is considered as 85% of Rajshahi ICT Industry.

(7) Percentage of space requirement for different category of businesses are as follows:

(a)Software Development	(b) BPO	(c) Training	(d) Other
69%	19%	6%	6%

(8) Consider the three forecast scenarios; base case, optimistic case and conservative case

(9) Determine the forecast growth rates for different scenarios

(10) Generate the demand for space requirement, bandwidth requirement and employment generation of Rajshahi ICT village under three forecast scenarios for a period of thirty years.

6.10 Forecast Scenarios

The demand forecast was developed under the following three scenarios with the following levels of occupancies.

The base case scenario reflects the most likely business conditions. It presumes the general assumptions outlined in the previous sections. In optimistic case, a more favorable growth rates are assumed for industry volume of ICT village. The demand projection of Rajshahi ICT village under base case, optimistic case and conservative case are attached in Annex H.

The total leasable area of Rajshahi ICT village is 115,200 sft for MTB. Based on the demand forecast in different scenarios, the occupancy rates in different scenarios will be assumed.

Table 6.6: Demand Projection for MTB in Different Scenarios

Scenarios	Space Requirement (sft) of Rajshahi ICT Village for MTB									
	Y1	Y2	Y3	Y4	Y5	Y6	Y7	Y8	Y9	Y10
Base Case MTB	57,618	65,796	75,376	84,491	94,734	106,246	119,187	133,737	148,685	165,461
Optimistic Case MTB	63,939	74,906	88,025	101,297	116,601	134,251	154,610	178,098	203,392	232,490
Conservative Case MTB	52,756	58,821	65,758	71,281	77,326	83,943	91,188	99,123	105,736	112,795

The above table shows that, the demand for space of 115,200 sft will be filled up within 7 years in base case, 5 years in optimistic case and 10 years in conservative case.

Overall rate of occupation within Rajshahi, where the ICT village have been opened, and developed in an orderly/timely fashion seems to indicate that 100% take up appears to be achieved within five (5) years. Given the overall demand, a seven (7) year take-up would seem to be realistic.

The survey indicates that the ICT village will be fully taken up within longest ten (10) years from start of operation in the conservative case, while it is most likely to be filled up within seven (7) years in the base case. The new occupancy rates assumed in three cases are provided in the following table:

Table 6.7: Occupancy Rates in Different Scenarios

	New Occupancies		
	Base Case	Optimistic Case	Conservative Case
yr1	15%	20%	10%
yr2	15%	20%	10%
yr3	15%	20%	10%
yr4	15%	20%	10%
yr5	15%	15%	10%
yr6	15%	-	10%
yr7	5%	-	10%
yr8	-	-	10%
yr9	-	-	10%
yr10	-	-	5%
Total	**95%**	**95%**	**95%**

It is assumed that balance 5% of the space will not be occupied most of the time due to changing tenants.

Forecasts were made for different scenarios to estimate the number of tenants of MTB in each sub-category. The number of tenants in each sub-category that was forecasted was then summed up.

The following figure illustrates the number of tenants likely to be located in the ICT village in the three scenarios.

Figure 6.5: Potential Number of Tenants of MTB in Different Scenarios
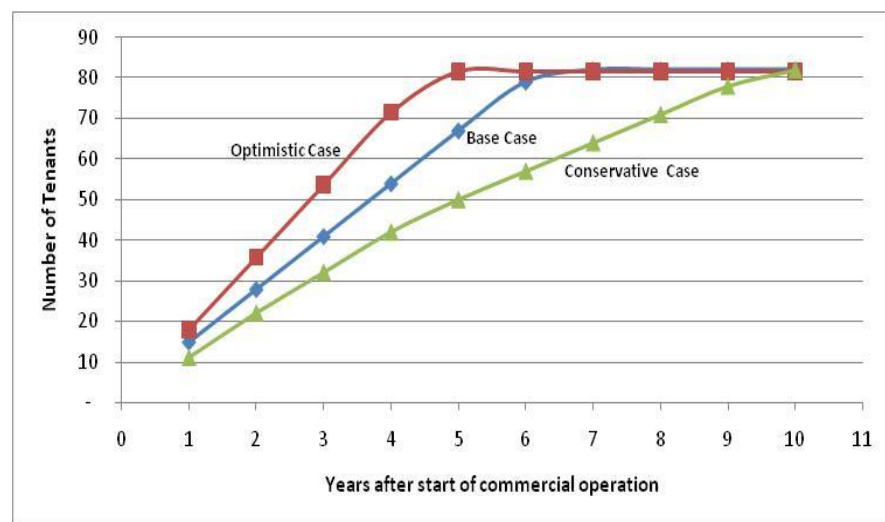
The following table provides a forecast of number of tenants expected in the village over the years, in base case. The demand forecast of other two scenarios has been laid out in Annex H.

Chapter 6: Demand Forecast

Table 6.8: Demand Forecast (Base Case)

Annual Number of Units taken up in MTB

Category of Services	Standard Space Requirement	Y1	Y2	Y3	Y4	Y5	Y6	Y7	Y8	Y9	Y10	Y11	Y12	Y13	Y14	Y15	Y16	Y17	Y18	Y19	Y20	Y21	Y22	Y23	Y24	Y25	Y26	Y27	Y28	Y29	Y30	Cumulative Total
Software Development	1,500	8	8	8	8	8	8	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	49
BPO	1,500	3	2	2	2	2	2	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	14
Training	1,500	1	1	1	1	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	5
Other	500	3	2	2	2	2	2	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	14
Total Forecasted New Tenants		15	13	13	13	13	12	3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	**82**
Cumulative Total Forecasted New Tenants		15	28	41	54	67	79	82	82	82	82	82	82	82	82	82	82	82	82	82	82	82	82	82	82	82	82	82	82	82	82	**82**

On the other hand, ICT village will have seven (7) industrial plots of 2.50 acre each. Based on the demand forecast in different scenarios, the occupancy rates in different scenarios will be assumed.

Table 6.9: Industrial Plot Area Take Up in Different Scenarios

Scenarios	Industrial Plot Area Take Up									
	Y1	Y2	Y3	Y4	Y5	Y6	Y7	Y8	Y9	Y10
Base Case *Industrial Plots*	2.5	5.0	7.5	10.0	12.5	15.0	17.5			
Optimistic Case *Industrial Plots*	2.5	5.0	7.5	12.5	17.5					
Conservative Case *Industrial Plots*	-	2.5	2.5	5.0	5.0	7.5	10.0	12.5	15.0	17.5

The above table shows that, the demand for industrial plots of 17.5 acre will be filled up within 7 years in base case, 5 years in optimistic case and 10 years in conservative case.

The new occupancy rates assumed in three cases are provided in the following table:

Table 6.10: Occupancy Rates in Different Scenarios

	New Occupancies		
	Base Case	Optimistic Case	Conservative Case
yr1	14.3%	14.3%	0.0%
yr2	14.3%	14.3%	14.3%
yr3	14.3%	14.3%	0.0%
yr4	14.3%	28.6%	14.3%
yr5	14.3%	28.6%	0.0%
yr6	14.3%	-	14.3%
yr7	14.3%	-	14.3%
yr8	-	-	14.3%
yr9	-	-	14.3%
yr10	-	-	14.3%
Total	**100%**	**100%**	**100%**

The following figure illustrates the number of industrial plots likely to be taken up in the ICT village in the three scenarios.

Figure 6.6: Number of Industrial Plots in Different Scenarios
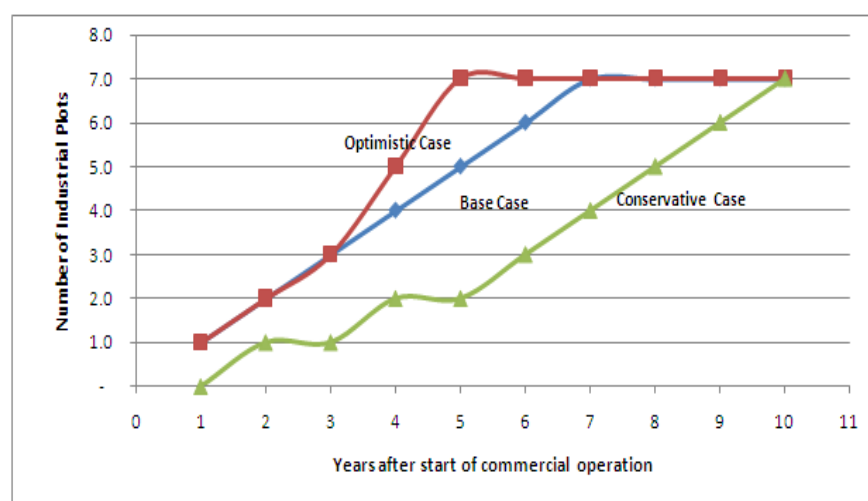
The following table provides a forecast of number of industrial plots expected in the village over the years, in all three cases has been laid out in the following table:

Table 6.11: **Demand Forecast (All Cases)**

Annual Number of Industrial Plots taken up

Base Case

Year	Y1	Y2	Y3	Y4	Y5	Y6	Y7	Y8	Y9	Y10	Y11	Y12	Y13	Y14	Y15	Y16	Y17	Y18	Y19	Y20	Y21	Y22	Y23	Y24	Y25	Y26	Y27	Y28	Y29	Y30	Cumulative Total
Forecasted Industial Plots	1	1	1	1	1	1	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	7
Cumulative total Forecasted Industial Plots	1	2	3	4	5	6	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7

Optimistic Case

Year	Y1	Y2	Y3	Y4	Y5	Y6	Y7	Y8	Y9	Y10	Y11	Y12	Y13	Y14	Y15	Y16	Y17	Y18	Y19	Y20	Y21	Y22	Y23	Y24	Y25	Y26	Y27	Y28	Y29	Y30	Cumulative Total
Forecasted Industial Plots	1	1	1	2	2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	7
Cumulative total Forecasted Industial Plots	1	2	3	5	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7

Conservative Case

Year	Y1	Y2	Y3	Y4	Y5	Y6	Y7	Y8	Y9	Y10	Y11	Y12	Y13	Y14	Y15	Y16	Y17	Y18	Y19	Y20	Y21	Y22	Y23	Y24	Y25	Y26	Y27	Y28	Y29	Y30	Cumulative Total
Forecasted Industial Plots		1		1	-	1	1	1	1	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	7
Cumulative total Forecasted Industial Plots	-	1	1	2	2	3	4	5	6	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7

The ICT village will generate significant employment for Rajshahi district. Some employment would not have been generated had there been no ICT village in Rajshahi. Most of the new employment will arise from investments that would not have otherwise been made without the existence of the village. The following figure provides a profile of potential employment generation.

Figure 6.7: Potential Employment Generation
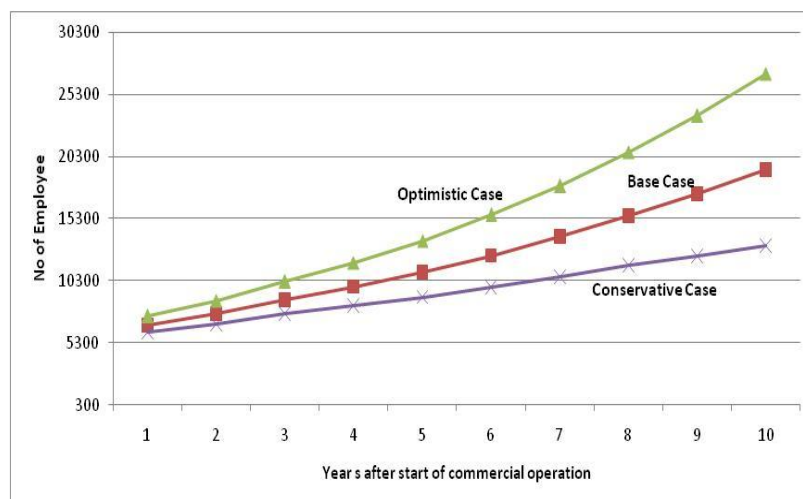
In base case, employment for 13,000 individuals has exceeded in 7th year of operation; in optimistic case this has been realized in 5th year; and in conservative case this has been realized in 10th year. Of the three cases considered, base case is the most likely scenario. Considering these three scenarios, there is a demand for approximately 13,000 individuals in Rajshahi ICT village.

6.11   Utility Forecast

The ICT village will be designed to provide necessary utilities for the tenants without interruptions in services. This means that every tenant will have access to good and uninterrupted internet connectivity. In the absence of functioning utilities, the demand forecast presented in this report may not work at all.

The following table provides estimated bandwidth requirement in the village in different scenarios:

Chapter 6: Demand Forecast

Table 6.12: Yearly Bandwidth Requirement

Bandwidth Requirement (Mbps)										
Scenarios	Y1	Y2	Y3	Y4	Y5	Y6	Y7	Y8	Y9	Y10
Base Case	163	186	214	239	268	301	338	379	421	469
Optimistic Case	181	212	249	287	330	380	438	504	576	659
Conservative Case	149	167	186	202	219	238	258	281	299	319

7

Technical Planning and Design

7 TECHNICAL PLANNING AND DESIGN

7.1 General

The ICT Village in Rajshahi will encourage development of Software technology industry in the region in particular and in Bangladesh in general. This will be done primarily by the private sector entrepreneurs. The software entrepreneurs in Bangladesh are still in the embryonic state. While its adherents do not lack talent, there is deficit in training, skills, marketing and especially a lack of capital to start.

The role of the public sector (government) is primarily to act as the catalyst and facilitator by providing physical facilities to the private sector small and medium entrepreneurs in software development technology. Thus the Govt. provides the support for the development and marketing and sales of software, through facilitating development of basic infrastructure for the industry.

Therefore in this project space and facilities for software development takes the highest priority. Most other spaces are there to support this activity. For the program purposes there will be a Multi Tenant Building (MTB) in the ICT village, where majority of floor area is provided for lease to private sector software development companies and other ICT related entrepreneurs.

7.2 Project Site Location

Brief description of the project Site is given below.

Location	The land is located in Binodpur mouza of Paba upazial in Rajshahi district. It is bounded by the DC Office and District Judge Court on the east, Bhatar Pukur on the west, Rajshahi - Chapai-nawabganj old road (N6) on the north and the Padma River on the south.
Total Area	Total 38.78 acres (approximately), in 2 pieces
Nearest Town	The site is very close to the centre of divisional city of Rajshahi
Connectivity	The Rajshahi city is abou 160 Km from national capital Dhaka, on N6 highway. The site is about 13 km away from Shahmakhdum airport of Rajshahi and about 7 km from the Rajshahi railway station
Nearby University/ educational	University of Rajshahi is approx. 10 km away. Other educational institutions are University of Rajshahi, RUET, Pabna University of Science and Technology

institutions	There are 7 Govt. and 62 private Polytechnic Institutes; (having yearly enrolment of 4,863 in IT disciplines in 2012-13)
Seismic Zone	located in zone III with less seismic coefficient (0.04 g)

A Google map of the site and surroundings is shown above.

Figure 7.1: Google Map of ICT Village Site in Rajshahi

The proposed site for the development of Rajshahi ICT Village is located in the Nabinagar Mouza in Paba Upazila in Rajshahi district. It is situated just behind the DC Office and the District Judge Court at Rajshahi and is situated beside the Rajshahi-Chapai-nawabganj Old road (N6). An embankment passes through the site from the highway at north and ends at the River Padma in the south side of the site.

The land is bounded by the DC Office and District Judge Court on the east, Bhatar Pukur on the west, Rajshahi – Chapainawabganj old road on the north and the Padma River on the south. The site is a non-arable flat land with a shallow ditch in the middle and north side. Unauthorised dwellings are on the land with two pacca mosque, pacca sanitary latrines and a pacca internal road. The local households are situated around the periphery of the proposed site.

7.3 The Project Land and Development Plan

Total project site area is 38.78 acres (approximately), in two adjoining areas.

Area-1 Approximately 3.17 acre of land, beside the Rajshahi-Chapai highway, old C&B land. This land is kept for future expansion of ICT village and other ancillary utility buildings, such as Residential hotel building, Club house, etc.

Area-2 Approximately 35.61 acre of old WDB land, accessible through I-bund embankment, on the side of river Padma.

The total 38.78 acres land used to belong to different government agencies like Public Works Department (PWD), Communication and Building (C&B), later Roads & Highways (R&D) Department and Water Development Board (WDB). Presently the land is transferred to ICT ministry.

The Mouza map of the project area is given here.

Figure 7.2: Mouza Map of the ICT Village Site area
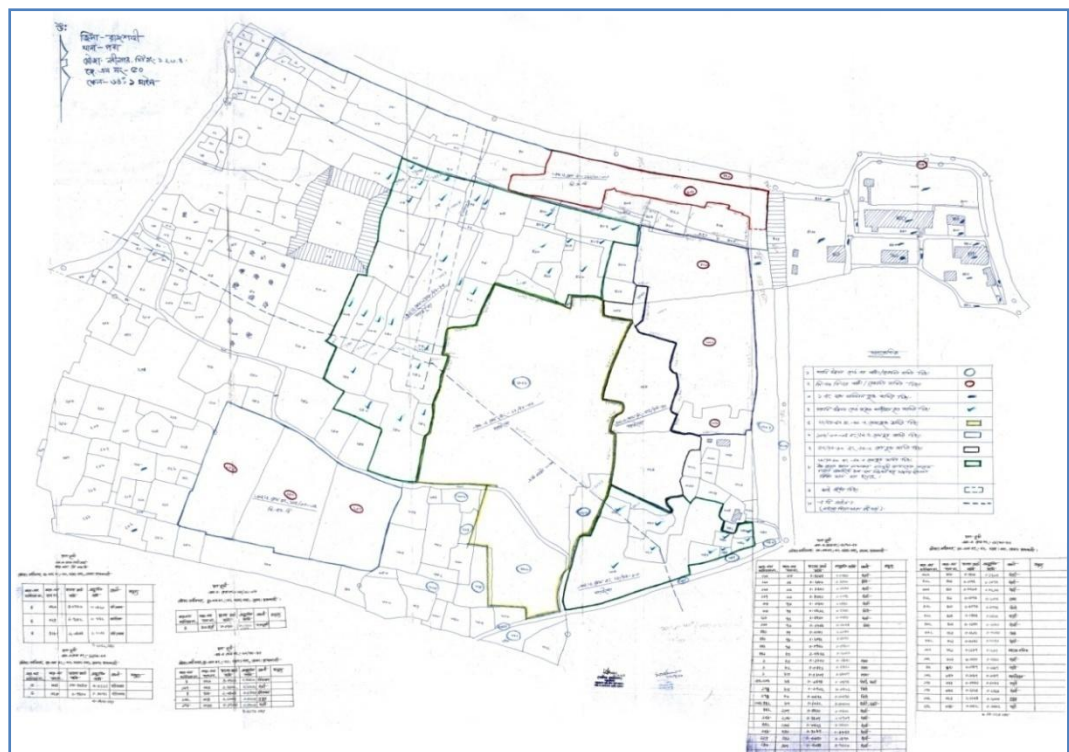
This land has been used for development of the Rajshahi ICT Village, with different constructions and developments.

The Area 1 adjacent to the highway and is high. There is a possibility of expansion of existing highway and losing some of this part. Therefore no major development is suggested here. This part may be kept for leasing out for other utility and common service buildings such as Residential Hotel, Clubs and accommodation a Mosque.

The Area 2 has a small joining line with Area 1. Its main entrance is through the existing I-bund embankment road up to river Padma. This I-bund has bifurcated this piece of land in two parts. The western part of Area-2 is a smaller strip and higher in elevation. This will require about 6 feet earth filling. The eastern side of I-bund is a big chunk of land. But it is relatively low in elevation and will require about 10 feet earth filling of site development.

The western part of I bund is presently vacant. The main development of the MTB and Dormitory has been suggested in this area. The land on the eastern side of I-bund is a big chunk of land. But it is partly occupied by unauthorized dwellers and will requiring more land filling for development. This part has been planned for development of bare land for industrial plots.

The residential buildings have been provided in corner of the eastern side of I-bund, with a separate entry.

Figure 7.3: Some Pictures of the Project Site

Existing I bund embankment on the north, Entry to ICT project site

River Padma, from I-bund, on the south end of project site

Ponds and structures on west of I-bund

Vacant high land on the east of I-bund

Chapter 7: Technical Planning and Design

7.4 River Bank Situation at Site

The river Padma flows on the south end of the project site. In fact, some of the land in this area has been washed away by erosion of the river in last year. The local Water Development Board officials were consulted for the present situation. It is learnt that due to construction of 2 spurs in the upstream, there has been erosion at this site.

Presently, the bank is stable. And the BWDB has no project or plan to provide bank protection at this site. However, if there is any emergency situation, the BWDB takes up remedial measures, such as placement of sand bags, concrete blocks etc.

The river bank protection is usually done by constructing earthen embankments with mild slope on the river side, turf laying and providing cornet block on the river side, if the wave action is severe. Rough estimates say that earthen embankment costs about Tk. 1 crore per km and additional river-bank protection by concrete block costs about 25 lakhs per foot.

It is learnt that the existing project site is above normal flood level in the area.

7.5 Functional Buildings and Spaces

Brief descriptions of the developments occupations are given below.

1. **Multi Tenant Building, MTB** (The Silicon Tower)

This is a 10 storied steel structure commercial building of 20,000 sft. foot print, having 3 Blocks. Blocks A and B are office spaces, connected by a third Block-C, which contains utility installations, such as reception, foyer, lobby, lift, stairs, escalator, washrooms and toilets, large open area for display and exhibition, etc.

This building will have a total floor area of 200,000 sft in 10 floors.

The MTB will accommodate the following facilities:

  i.   Reception, Lobby Foyer Areas
  ii.   Administration Area
  iii.   Commercial Banks
  iv.   Food Courts and Food Vender stalls
  v.   Software Development Area
  vi.   Research & Development (R & D) Area
  vii.   Call Centers
  viii.   Training Area
  ix.   Meeting rooms
  x.   Conference and workshops and seminar hall
  xi.   Mechanical Services Area

xii.   Core Service Areas (including 2 Lifts, 2 Fire stairs, washrooms, Fire exits, etc)

2.   The Dormitory Building

This is an 8 storied steel structure dormitory building, of 3-star standard. This will have a total floor area of 80,000 sft. In 8 floors) and will provide suitable accommodation for the workforce of ICT village.

The building will accommodate the following facilities:

  i.   Reception, Foyer, lounge, lobby
 ii.   Administration etc
iii.   Bedroom or Hostel suits
 iv.   Kitchen
  v.   Dinning
 vi.   Gymnasium
vii.   Other Utilities

3.   The Residential Buildings

This is an 8 storied steel structure residential building. Four (4) interconnected buildings of 100' x 25' plinth area are provided. These buildings will give a total floor area of 80,000 sft. In 8 floors and will provide family accommodation for ICT officials.

4.   Other Utility Buildings and Installations

Other constructions in the project area are:

  i.   Substation and Generator building
 ii.   Gymnasium and Playgrounds
iii.   Internal roads
 iv.   Internal drains
  v.   Boundary walls
 vi.   Entry Gate and the gatehouse
vii.   Deep Tube-wells, pumps and Water Reservoirs
viii. Recreational area and Club House
 ix.   Parks and Green areas
  x.   Security Guard's Barrack

5.   Vacant Industrial Plots

There is provision of Industrial Plots (Bare Land) in the ICT village. There are 7 green-field industrial plots of 2.5 acre each, which are to be developed by individual lease holder companies.

6.   Future Expansion Possibilities

In the available land, there will be reserve space for future extension of MTB and ICT facilities.

In addition to the above land, the Ministry of ICT has sought for additional lands on the eastern side of the project site, which are presently empty, for project expansion purpose. This will cater for more industrial Plots.

7.6   Space Allocation of Functional Areas

The following Table gives a tentative floor area distribution of the Multi-tenant Building.

Table 7.1: MTB Floors Distribution Table

Floors	Block " A" (7,200 sft)	Block " B" (7,200 sft)	Block " C" (5,600 sft)
Ground Floor	Banks	R&D Center, Food Court	Reception, Foyer, Lobby, Toilets, Escalator, Lift, Stairs, Display space, Open-to-sky space
1st Floor	Admin. Offices Conference Hall Meeting Rooms	Data Center	- Do. -
2nd Floor	BPO (Call Centers)	BPO (Call Centers)	- Do -
3rd Floor	BPO (Call Centers)	Other ICT Units	- Do -
4th Floor	Software Dev. Area	Training Center	- Do -
5th Floor	Software Dev. Area	Software Dev. Area	- Do -
6th Floor	Software Dev. Area	Software Dev. Area	- Do -
7th Floor	Software Dev. Area	Software Dev. Area	- Do -
8th Floor	Software Dev. Area	Software Dev. Area	- Do -
9th Floor	Software Dev.	Software Dev. Area	- Do -

Floors	Block " A"	Block " B"	Block " C"
	(7,200 sft)	(7,200 sft)	(5,600 sft)
Area			
Total sft.	72,000	72,000	56,000

7.7   Rentable Areas

A. MULTI-TENANT BUILDING

Tentative Space Allocation for the MTB Building is calculated as follows.

Block-A	Rentable Office Area	72,000 sft.
Block-B	Rentable Office Area	72,000 sft.
Block-C	Utility Area	56,000 sft.
Total area:		200,000 sft

Table 7.2: Space Allocation of Rentable area in MTB floors

Space name	Location		Floor area (sft)	Remarks
	Block	**On Floors**		
Core Business				57.6%
BPO (Call Centers)	A & B	2nd and 3rd(part)	21,600	
Other ICT Units	B	3rd (part)	7,200	
Training Centers	B	4th (part)	7,200	
Software Development Area	A & B	4th (part), 5th, 6th, 7th, 8th and 8th	79,200	
		Sub total	**115,200**	
Non-Core Business				9.6%
Banks	A	Gr.	7,200	
Data Centre	B	1st	7,200	
Conference Hall	A	1st	2,400	
Food Court	B	Gr.	2,400	
Sub total			**19,200**	
Others				4.8%
Admin. Offices (for ICT Park)	A	1st	3,600	
Meeting Rooms	A	1st	1,200	
Research (R& D) Area	B	Gr.	4,800	
		Sub total	**9,600**	
Common space/ utility areas				**28%**
Reception, Foyer, Lobby, Toilets Washrooms, Escalator, Lift, Stairs, Display space, Open-to-sky space	C	All floors	56,000	
		Sub total	**56,000**	
Total Area			**200,000**	100%

B. LEASEABLE INDUSTRIAL PLOTS, WITHIN THE ICT VILLAGE

7 Plots of 2.50 acre each, with approach roads.

7.8 Master Planning

A Master Plan for the proposed ICT Village at Rajshahi has been prepared with the given functional programs to accommodate:

1. A MTB (Multi Tenant Building, primarily for Software development) with Conference / seminar / food Courts etc.

2. Future Expansion of the Software development possibilities

3. A Dormitory/ Hostel and a Gymnasium Building with bedroom and related facilities etc.

4. Ancillary Building with Substations, Generators, and miscellaneous storage space etc

5. Recreational spaces

6. Adequate parking (as per code) on site

7.9 ICT Buildings and Civil Structures

ICT Village in Rajshahi is one of the significant endeavors of Government of People's Republic of Bangladesh (GOB) to expedite the deployment of digital technology and software development it is primarily geared to the digital technology by the private sector with active assistance of the Public Sector (GOB). The GOB is determined to expand the horizons of the country's digital and software technology market. The ICT Village in Rajshahi thus should be comprised of forward looking and future technology buildings. The functions and images should reflect this.

The main buildings of the ICT Village will be structural steel structures. The columns and beams will be of prefabricated structural steels. This will aid in quick erection and implantation of the building. In fact the erection of the steel structure can be made in a matter of four to six months as against fifteen to eighteen months for a RCC (Reinforced Cement Concrete) structures.

7.10 Designs and Floor Plans

Building Design

The design of the ICT Village is expressed in a building design philosophy. In building design, the main facilities ,i.e., the Multi Tenant Building (MTB) and the Facilities Building (Retail Sales, Conferences, Seminars, Food facilities) etc. is proposed to be designed as a Smart Building with steel structures for quick implementation as well with e-glass (solar radiation limited glass) for energy conservation.

The design philosophy of the project and the site involved creating an atmosphere of tranquillity, a good environment, and the optimal use of area on site for present functionality and future expansion.

The soil conditions on the site is to be tested before construction work starts and the recommendations of the soil test results are to be used for foundation design.

Some Design salient features are mentioned below:

Structural Steel Building:

The MTB Building has been designed with Structural Steel Frame and flooring system. This means that the whole building frame and structure is built with structural columns and beams. The floors are made of metal deck on open web steel joists (OWSJ). This is topped with 3' of poured concrete deck with a wire mesh system. Under this system , the erection of the building, particularly the building structural can be done in less than a third of the time as it take s for conventional RCC structure building.

Energy Efficiency with E-Glass cladding:

The main STP buildings will be clad mostly with thermal E- Glass which cuts down heat gains by 50% as opposed to normal curtain wall glass. Further, to minimize the heat gain and to reduce the cooling load and thus energy requirements further, double sunscreens at 9' and 12' levels will be will be incorporated. It is estimated that multiple design elements will reduce the heat gain load thus energy requirements by 40% to 50% of normal glass clad office buildings.

RCC Service Core:

To give structural stability and particularly against earth quakes, the MTB building are designed with a RCC core. Secondly, it has provided fire escape provision to its users by providing two fire rated RCC stairs as insulators against for the users of the building. Service Core provides two sets of washrooms (male and female) for its users. The service core will provide vertical shafts (Risers) for fire water lines, electrical risers and bus ways, and for Fiber Optics cables.

Ceilings and Floors:

The ceilings and floors will provisions for cooling ducts and electrical and power services. The ceilings should e equipped sprinkler systems for localized fire suppression, before it will have opportunity for fire spreading. The Floors will have an elevated system, capable of carrying all the cables and fiber optics and future requirement of any part of the floors.

Mechanical and Service space:

Behind the Service Core, across a corridor, is a designated space for mechanical equipments including compressors for cooling of each floor.

Instead of a centralized cooling system with cooling towers and chilling system, the system proposed is one with a localized A/C.

7.11   On-Site Infrastructure

On-Site infrastructure includes Power, Water Supply, Internal Roads, Internal Drains, on-site sewerage treatment Septic Tanks, Fiber Optics facilities and other utility services and facilities are provided as required.

8

Cost Estimates

8   COST ESTIMATES

8.1   Approach

The Approach to cost estimate at this stage, without a detailed design is to use unit cost per item. This means that a unit cost of such items as Road surfacing, Foundation or architectural elements and finishes are assumed. Then that assumed is multiplied with the total area or volume (as may be the case). The multiplied number is then used a cost of the element. When all items are accounted for, then on adding the sub numbers the grand total cost is determined. Depending on final designs and programs, the final costs after detailed design and quantity based estimates may vary up to 20% from the original unit based costs.

8.2   Project Cost Summary

This project has been designed as PPP project with participation of both public and private sector. The land belongs to the government and it will allow a preferred private sector entity to construct the infrastructure and operate those under a contract.

The public sector will construct the Dormitory and Residential buildings and hand them over to the Park operator. Private parties may be involved, by being given the responsibility of constructing of the main infrastructure of the ICT Park.

The cost summary of different items of the project development is given in the Table below.

Table 8.1: **Project Cost Estimate Summary**

	PROJECT COST IN PRIVATE SECTOR	**Total Cost (Tk million)**	**Equivalent in USD million**
			(@ 1 US$ =Tk. 85)
I	Development of MTB, Land & Utility	**689**	**8**
II	Development of Vacant Industrial Plots	**157**	**2**
	Total Cost in Private Sector	**846**	**10**
	PROJECT COST IN GOVT. SECTOR	**Total Cost (Tk million)**	**Equivalent in USD million**
I	Dormitory Building	208	2.45
II	Vacant Industrial Plots	206	2.42

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PROJECT COST IN PRIVATE SECTOR	Total Cost (Tk million)	Equivalent in USD million
Total Cost in Govt. Sector	**414**	**5**

8.3 Site Development and on Site Infrastructure Construction Cost

The detail cost estimates for site development and infrastructure construction of different types in the master plan are given in different Tables in next pages.

Table 8.2: Project Cost Estimates of Rajshahi ICT Village

Item	Area (sft)	Height (ft)	Quantity	Unit	Unit Cost (Tk/unit)	Sub-total Cost (Tk million)	Total Cost (Tk million)
I) DEVELOPMENT OF MTB, DORMITORY AND RECREATION PARK AREA							
A) Site Development (Basic)							
1. Land improvement /earth filling in MTB area	178,500	6	1,071,000	cft	6	6.43	
2. Embankment Road	44,000	-	44,000	sft	250	11.00	
3. Internal Road (MTB)	3,000	-	11,000	sft	600	6.60	
4. Parking Area	14,000	-	14,000	sft	600	8.40	
5. Internal drains	-	-	4000	rft	250	1.00	
6. Boundary wall	-	-	7,000	rft	3,500	24.50	
7. Gate House	-	-	1	LS	500,000	0.50	
8. Landscaping	-	-	1	LS	500,000	0.50	
9. Recreation Park Development	-	-	1	LS	300,000	0.30	
Sub-total: Site Dev. Cost							**59.23**
B) Multi Tenant Building (20,000 sft x 10 floors)							
Civil Costs							
1. Foundation	20,000	-	20,000	sft	1,000	20	
2. Steel Frame Structure	200,000	-	200,000	sft	800	160	
3. RCC floors, walls and other structural	200,000	-	200,000	sft	800	160	

Item	Area (sft)	Height (ft)	Quantity	Unit	Unit Cost (Tk/unit)	Sub-total Cost (Tk million)	Total Cost (Tk million)
elements							
4. Architectural Elements i/c doors and windows	200,000	-	200,000	sft	600	120	
					Sub-total	**460**	
MTB - Utility Costs							
5. Electrical System and Lighting	-	-	5% of civil costs		-	23	
6. Sanitary and Plumbing Facilities	-	-	5% of civil costs		-	23	
7. Ventilation and Air Cooling	-	-	10% of civil costs		-	46	
8. Mechanical Equipment, Lift, etc.	-	-	2% of civil costs			9.2	
9. Fire Fighting system	-	-	1% of civil costs			4.6	
					Sub-total	**105.8**	
					Sub Total: MTB Cost		**565.8**
C) **Common Facilities (Utility)**							
1 Electrical Sub-station/ Transformer (1000 kva)	-	-	4	LS	10,000,000	40	
2 Power House/ Standby Generators	-	-	2	LS	7,500,000	15	
3 Deep Tube Well, Pump-house, pumps, UG water reservoir with distribution pipe network	-	-	1	LS	4,000,000	4	
4 On-site Sewage	-	-	1	LS	2,000,0	2	

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	Item	Area (sft)	Height (ft)	Quantity	Unit	Unit Cost (Tk/unit)	Sub-total Cost (Tk million)	Total Cost (Tk million)
	System (Septic tanks)					00		
5	Fiber Optics connections	-	-		LS	2,500,000	2.5	
						Sub-total: Utility Cost		**63.5**
						Total Cost of MTB with Land Dev and Utility		**688.53**
II)	**DEVELOPMENT OF VACANT INDUSTRIAL PLOTS (BARE LAND)**							
1	Land improvement /earth filling	882,300	10	8,823,000	cft	6	52.94	
2	Internal Roads	120,000	-	120,000	sft	600	72.00	
3	Internal drains			4,000	rft	250	1.00	
4	Electrical Sub-station/ Transformer (1000 kva)	-	-	2	LS	10,000,000	20.00	
5	Power House/ Standby Generators	-	-	1	LS	7,500,000	7.50	
6	Deep Tube Well, Pump-house, pumps, UG water reservoir, etc.	-	-	1	LS	4,000,000	4.00	
						Total Cost of Vacant Industrial Plots Development		**157.44**
	TOTAL PROJECT COST IN PRIVATE SECTOR							
I	**MTB, Land Development and Utility**							689
II	**Vacant Industrial Plots Development**							157
						Total Project Cost		**846**
	PROJECTS IN GOVERNMENT SECTOR							
III)	**Dormitory Building 10,000 sft x 8 floors**							

	Item	Area (sft)	Height (ft)	Quantity	Unit	Unit Cost (Tk/unit)	Sub-total Cost (Tk million)	Total Cost (Tk million)
1	Foundation	10,000	-	10,000	sft	800	8	
2	Steel Frame Structure	80,000	-	80,000	sft	800	64	
3	RCC floors, walls and other structural elements	80,000	-	80,000	sft	800	64	
4	Architectural Elements i/c doors and windows	80,000	-	80,000	sft	600	48	
						Sub-total	184	
5	Electrical System and Lighting	-	-	5% of civil costs		-	9.2	
6	Sanitary and Plumbing Facilities	-	-	5% of civil costs		-	9.2	
7	Mechanical Equipment, Lift, etc.	-	-	2% of civil costs			3.68	
8	Fire Fighting system	-	-	1% of civil costs			1.84	
						Sub-total	23.92	
						Total Cost: Dormitory Building		208
	IV) Residential Buildings 10,000 sft x 8 floors							
1	Foundation	10,000	-	10,000	sft	800	8	
2	Steel Frame Structure	80,000	-	80,000	sft	800	64	
3	RCC floors, walls and other structural elements	80,000	-	80,000	sft	800	64	
4	Architectural Elements i/c doors and windows	80,000		80,000	sft	600	48	
						Sub-total	184	

Chapter 8: Cost Estimates

	Item	Area (sft)	Height (ft)	Quantity	Unit	Unit Cost (Tk/unit)	Sub-total Cost (Tk million)	Total Cost (Tk million)
5	Electrical System and Lighting	-	-	5% of civil costs		-	9.2	
6	Sanitary and Plumbing Facilities	-	-	5% of civil costs		-	9.2	
7	Mechanical Equipment, Lift, etc.			2% of civil costs			3.68	
8	Fire Fighting system	-	-	1% of civil costs			1.84	
						Sub-total	22.08	
						Total Cost: Residential Building		**206**
TOTAL PROJECT COST IN GOVERNMENT SECTOR								
III) Dormitory Building								208
IV) Residential Buildings								206
Total Cost in Govt. Sector								**414**

9

Implementation Option for The ICT Village

9   IMPLEMENTATION OPTIONS FOR THE ICT VILLAGE

The Rajshahi IT Village is part of the Government of Bangladesh's "Digital Bangladesh" initiative. It is one of seven such sites being planned across the country. The government wants to develop and strengthen the country's ICT sector, and establish Bangladesh as a top destination for international firms in the field. IT villages like the one in Rajshahi, are an integral part of this development plan. IT Villages are areas dedicated to the development of a country's software and IT industry. They provide a variety of services including High Speed Data Communication, Incubation facilities, Consultancy, Network Monitoring, Data Centers and Data Hosting to name a few.

The project site in Rajshahi will be home to various IT related businesses, such as software developers and BPOs from both home and abroad. The core business of the site will be a Multi-Tenant Building (MTB) that will house various firms from the industry. Additionally, there will be non-core business buildings, including dormitory and residential facilities. The MTB will be leased or rented out to tenants by the ICT Village operating authority. BHTPA will be responsible for acquiring the land for the site, off site infrastructure development. The operating authority will be responsible for financing and construction and as well as operations and maintenance of the village.

Due to the close proximity of the site to the River Padma, the site also requires protection from flooding. While there is no imminent danger of this happening, due to Rajshahi city's effective anti-flooding system, it would be prudent to take some precautionary measures. The responsibility of river training works will be assumed by BHTPA. BHTPA will bear the river erosion risk through Ministry of Water Resources.

This project requires heavy investment, and its long term success and sustainability depends on efficient operations and maintenance (O&M). In this regard, a Public-Private Participation approach would be feasible. Public-Private participation refers to the deals where a Government Executing Agency provides a right to a private investor to provide services to multiple entities or common users with an infrastructure or asset. Such services are usually monopolistic in nature, or are close to being a monopoly. Under PPP arrangement, the Executing Agencies have to undertake a monitoring role over the service delivery, for ensuring quality and availability of service or in some cases, for regulating the tariffs for the services.

The critical factor in choosing an institutional option lies with the mode and financing of acquisition or purchase of land for developing the village. The institutional option varies with different levels of participation from government and private sector.

9.1   Model A: Government Led Model

In this model, BHTPA will be responsible for land development, off-site development, on-site development, financing, and O&M of the village.

Chapter 9: Implementation Option for the ICT Village

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BHTPA will request government to acquire the land with own fund, donor fund or from government budget allocation. After financing is secured, land development will be undertaken by BHTPA. BHTPA will also develop on-site infrastructure such as roads, electricity connections, sewerage etc. They will also be responsible for the construction of both core business building – the Multi Tenant Building, as well as non-core facilities; the residential and dormitory buildings. Furthermore, the BHTPA will also be in charge of ensuring "River Training" by adapting measures to protect the site from potential flood damage.

After completion of construction of village, BHTPA will lease out plots to tenants and receive lease payments in return. BHTPA will also be responsible for O&M of the village. The overall structure is presented in Figure 9.1.

Figure 9.1: Model A
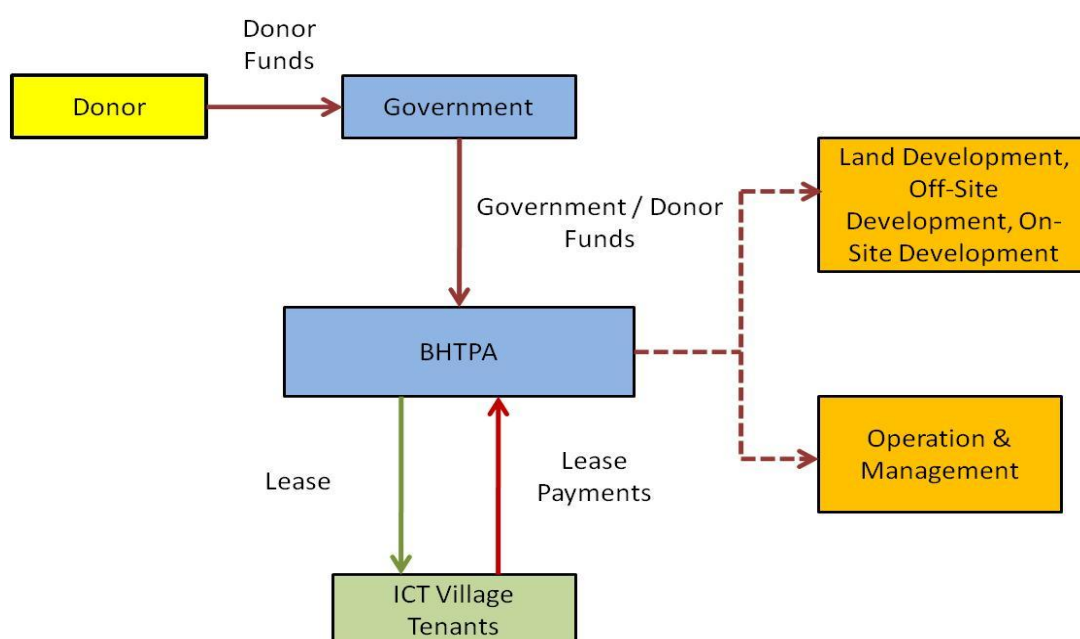
This option needs BHTPA to have mandate (in its Memorandum and Articles of Association), as well as capacity, to spend funds to carry out such business of an ICT village owner, developer and operator.

The advantages of this model are as follows:

- Lease rate of space is likely to be low compared to other models.
- IDA funding can be made available.

The disadvantages of this model are as follows:

- Private sector efficiency in operating and maintaining the village is not achieved.
- Government will need to make substantial investment to make the village operational.

- No executing agency capable of operating and maintaining the village has been identified.
- No clear source of government funding for making such a substantial investment has been identified.

9.2 Model B: O&M Outsourcing Model

In this model, land development, off-site development, on-site development, financing and construction of the village will be carried out by BHTPA. A private operator will be responsible for O&M of the village. This model is a PPP for O&M of the village.

BHTPA will request government to acquire the land with own fund, donor fund or from government budget allocation. After financing is secured, land development will be undertaken by BHTPA. BHTPA will also develop on-site infrastructure such as roads, electricity connections, sewerage etc. They will also construct the Multi Tenant Building, as well as dormitory and residential facilities. Additionally, they will be responsible for "River Training", by taking measures to protect the site from flooding. In parallel, BHTPA will invite tender from potential private developers to operate and maintain the village.

The private operator, after being selected and awarded the project, obtains a lease over the land for the concession period, through a Concession Agreement and a lease agreement signed by BHTPA and the private operator SPV. The private operator SPV will be financed by the private operator's own equity and loans from commercial lenders.

The private operator will pay royalty to government over the concession period and sub-lease out space to tenants based on certain criteria set by the government. The tenants will pay lease rentals to the operator. The overall structure is presented in Figure 9.2.

Figure 9.2: Model B
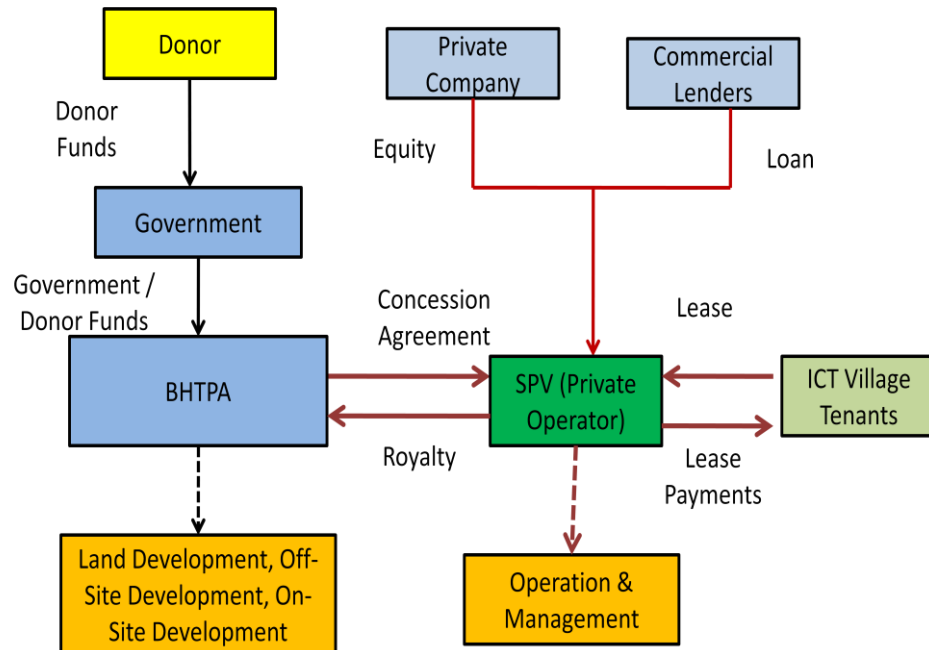
The advantages of this model are as follows:

- Private sector efficiency is achieved but only for the operation and management of the ICT Village
- Shorter Concession period
- Low lease rate of space is likely
- Government will receive higher royalty

The disadvantages of this model are as follows:

- Government is responsible for all capital investment of village.
- No clear source of government funding for making such a substantial investment has been identified yet.

9.3 Model C: Concession PPP Model (BOT)

PPP is the partnership where the public sector agency, after upfront development of the village, provides the responsibility of downstream development and operation to the private sector. The scope of upfront development and downstream development and operation is discussed below.

i) Upfront Development

Upfront development may be defined as preparatory activities like project identification and preparation, preparation and development of interior master plan etc.

ii) Downstream Development and Operation

After the upfront development, private operators will be invited to conduct downstream development and operation of the village. Downstream development and operation includes land development, internal village developments, as well as delineating and standardizing space for the tenants. The private developer is not only responsible for the operation and maintenance of the site, but also for attracting tenants to set up their business within the village.

iii) Delineation of Responsibilities in Entire Village PPP

The share of responsibilities between the public and private sector in an entire village PPP are usually delineated along the lines provided in the following table:

Table 9.1: Delineation of Responsibilities in Entire Village PPP

Public Sector	Private Sector
a) Developing the Master Plan of the village	a) Land development
b) Guideline for developing the village	b) Developing space as per the Master Plan and the guidelines provided by Government Authority
c) Defining terms and conditions defining the interrelationship between private and the public sector	c) Internal development of roads, drainage and standardized floor spaces.
d) Preparation of information memorandum on the village and the market	d) Marketing to the potential entrepreneurs for setting units in the villages
e) Development of off-site infrastructure	e) Environmental and social impact mitigation
f) Environmental clearance of the village from DOE and from donors (if required)	f) Reporting to the appropriate authority
g) Regulation of the village activities	g) Payment of royalties and license fees to the government, if any
h) Receiving license for developing the village	

In this model, land development will be carried out by private investor. The private investor will be responsible for on-site development and O&M of the village. Financing for both land and on-site development will be handled by the private investor. On-site development in this case refers to the construction and development of the core business facility, the Multi-Tenant Building. The construction of non-core business buildings with low investment returns like the dormitory and residential buildings will be undertaken by BHTPA.

Under this approach, BHTPA will only be responsible for land acquisition and off-site development. BHTPA will request government to acquire the land with own fund, donor fund or from government budget allocation. From this point forward, private investor will assume all responsibility including financing and land/on-site development as well as long term O&M. In regards to the issue of "River Training", the BHTPA as the relevant government body will assume the responsibility of designing measures to protect the site from flooding.

The private investor obtains a lease over the land for the concession period, through a Concession Agreement and a lease agreement signed by BHTPA and the private investor SPV. The private investor SPV will be financed by the private investor's own equity and loans from commercial lenders. The private investor will pay royalty to government over the concession period and sub-lease out space to tenants after development of on-site infrastructure such as roads, electricity connections, sewerage etc.

The tenants will pay lease rentals to the investor. After completion of the Concession period, the private investor will hand over O&M of the village to BHTPA. The overall structure is presented in Figure 9.3.

Figure 9.3: Model C
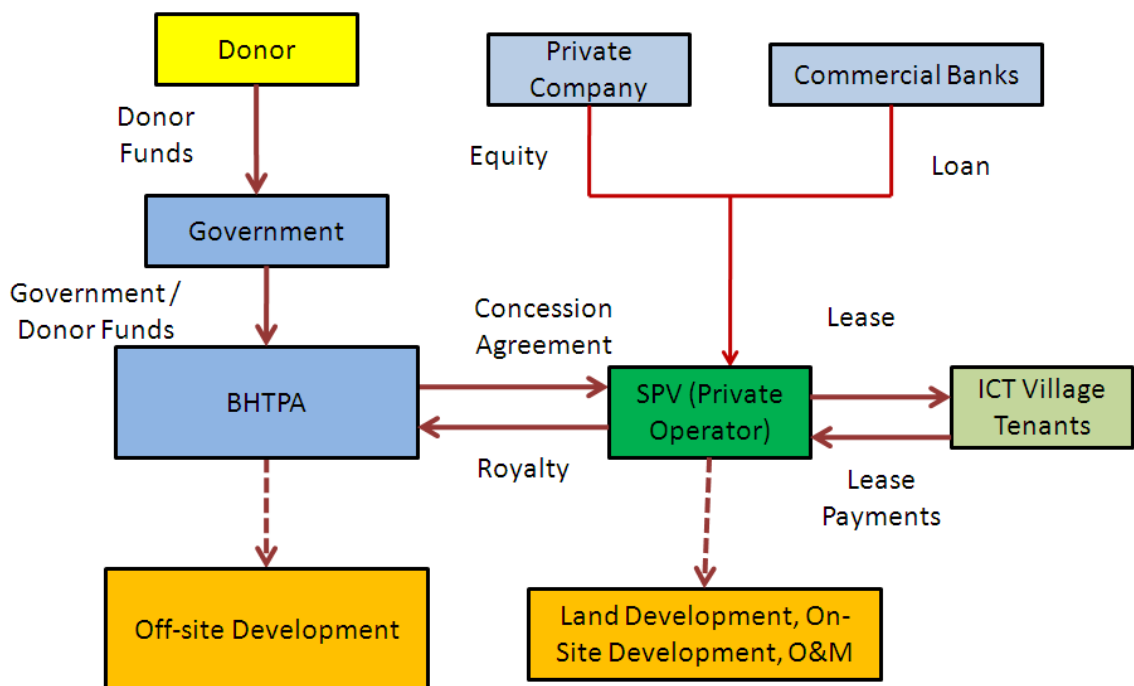
The advantages of this model are as follows:

- Private sector efficiency in operating and maintaining the village is achieved.

- Government needs substantially less investment in village compared to Options A and B as the major investment is undertaken by the private operator.

- Government has strong control through Concession Agreement on regulation of the village.

The disadvantages of this model are as follows:

- No clear source of government funding for making investment in the village has been identified yet.

- Private operator interest in operating and managing the village is uncertain at this point of time and has to be tested in the market following the completion of the feasibility study.

9.4   Model D: Leasehold Transfer Model

In this model, land acquisition and off-site development will be carried out by BHTPA. A private investor will be responsible for financing, land/on-site development and O&M of the park. This includes the construction of the Multi Tenant Building. The construction of non-core business buildings such as the dormitory and residential buildings will be undertaken by the BHTPA.

Financing for on-site development will be handled by the private investor. BHTPA will request government to acquire the land. After acquired land is handed over to the private investor, the investor will be responsible for on-site development and O&M of the park. As is the case with the previous options, the BHTPA will be responsible for designing and implementing anti flood damage measures for the site.

The private investor SPV will be financed by private investor's own equity and loans from commercial lenders. The private investor will transfer the lease holdings of the built-up commercial space to ICT Village tenants for long-term (99 year) leases. The tenants will pay a one-time leasehold transfer amount to private investor in addition to monthly service charges. Private investor will be given a short term contract (5-10 years) during which it will have to construct the ICT Village and transfer the lease holdings. The overall structure is presented in Figure 9.4.

Chapter 9: Implementation Option for the ICT Village

Figure 9.4: Model D
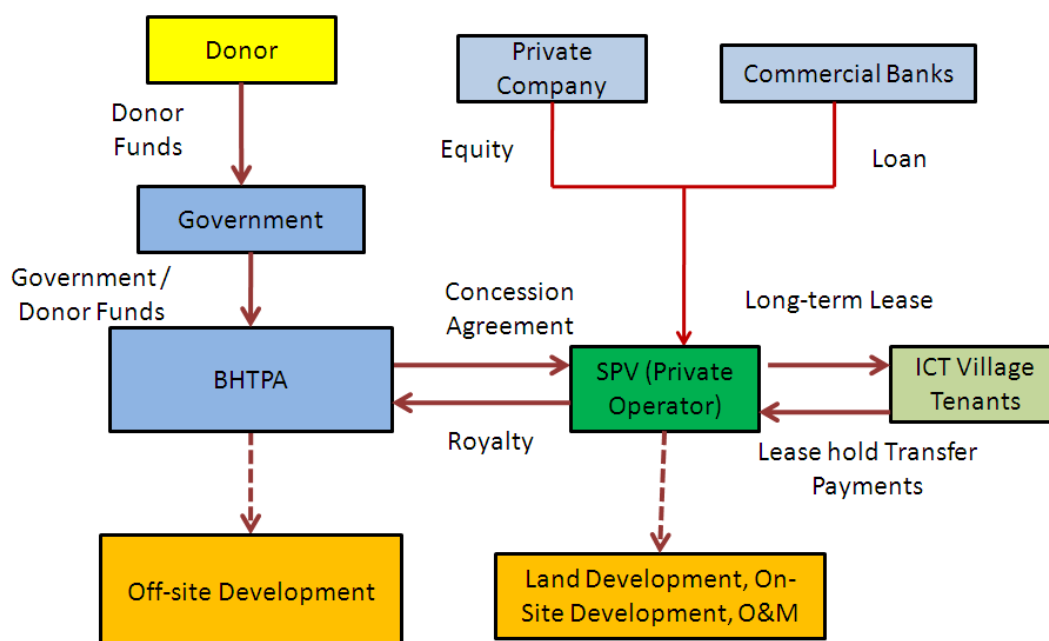
During its Contract Term, private operator will also be responsible for operation and maintenance of the ICT Village. At the end of the Term, operations and maintenance of the ICT Village will be handed back to BHTPA which may decide to form a committee for operations, with the leaseholders of the ICT Village.

9.5 Comparison of Options

The options involve varying levels of public private participation and varying roles of each. The following table provides a comparison of options in terms of land development, financing, on-site development and O&M of the village:

Table 9.2: Comparison of Options

Criteria for Comparison	Model A	Model B	Model C	Model D
Land Acquisition	BHTPA	BHTPA	BHTPA	BHTPA
Off-site Development	BHTPA	BHTPA	BHTPA	BHTPA
Land Development	BHTPA	BHTPA	Private Investor	Private Investor
Overall Layout (Preliminary)	BHTPA	BHTPA	BHTPA	BHTPA

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Criteria for Comparison	Model A	Model B	Model C	Model D
Overall Layout (Final)	BHTPA	BHTPA	Private Investor	Private Investor
Financing and Construction	BHTPA	BHTPA	Private Investor	Private Investor
O&M	BHTPA	Private Investor	Private Investor	Private Investor
River Training Works	BHTPA	BHTPA	BHTPA	BHTPA

10

Major Terms and Conditions

10   MAJOR TERMS AND CONDITIONS

10.1   Contract with the Investor

The contractual relationship between the Private Investor and BHTPA shall be established through the PPP Agreement. The PPP Agreement shall specify the provision of granting the project to the Private Investor, construction, operation and maintenance of the facilities, collection of charges by the Private Investor, rights and responsibilities of Private Investor and BHTPA, events of default for Private Investor and BHTPA and remedies and penalties, dispute resolution mechanism, force majeure event and its consequence and liabilities, communication, other miscellaneous matters and schedules.

PPP law and regulations in the country state that PPP projects should be financed managed and implemented under an enforceable project agreement between the contracting authority and a Special Purpose Vehicle established by the successful private party with a sole purpose of executing the project. The following table describes the guidelines for the contractual agreement:

The project agreement will set forth clear guidance on the following key issues where applicable:
The term of the project agreement, timing of implementation and the process by which the project will be deemed to meet contractual specifications during its commissioning tests;   **A management plan that sets forth how the project will be operated and managed during the project agreement term;**   **Penalties for failure to meet schedule and/or specifications at commissioning or failure to adhere to best practice standards during operations;**   **Stepping in rights of lenders;**   **Responsibilities related to environment mitigation;**   **A clear mechanism as to how tariffs, or user charges, will be set;**   **A clear payment mechanism;**   **Allocation of risks to the party best able to manage them;**   **Process by which the project will be monitored by Government for adherence to the project agreement;**   **Events of default, remedies, timing;**   **Provisions related to the transfer of the asset at the conclusion of the project agreement;**   **Dispute resolution process;**   **Governing law and jurisdiction of the contract; and**   **Any other provisions**

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10.2 Term of Contract

The term of the contract may be set at **30 years for Concession PPP Model** or **10 years for Leasehold Transfer Model** for construction and lease of built up space from the Contract Effective Date. The Contract Effective Date will occur subject to fulfilment of Conditions Precedent. The Term of the PPP Contract will include financing, construction and O&M period.

10.3 Financing and Construction Period

The financing would be in the range of 6 months and construction period would be in the range of **3 years** which will start after the Contract Effective Date.

10.4 Tariff Structure

The tariff structure shall be as discussed in Chapter 12.

10.5 Rights of BHTPA

BHTPA shall have the following rights: (i) right to introduce competition, (ii) right to monitor site.

10.6 Major Obligations of BHTPA

The major obligations of BHTPA are:

(i)   enable access to the site

(ii)   carry out all associated/linked projects on a timely basis, this includes access road and boundary wall construction, flood protection, and incubator provision

(iii) assist the Private Investor in obtaining the required permits and approvals

(iv)   assist the Private Investor in importing equipment and materials.

(v)   BHTPA will construct the non-core business buildings; the dormitory and the residential facilities

10.7 Rights of Private Investor

The Private Investor shall have exclusive control over the design, financing, construction and operation of ICT Village, including the collection of lease payments from the tenants.

10.8 Major Obligations of the Private Investor

The major obligations of the Private Investor are:

(i)   to complete the construction of the Multi Tenant Building, and bring it into operation by the Commercial Operations Date,

(ii)   Rollout obligations – the private investor will make further investment in facilities, subject to future demand,

(iii)   to place a construction Performance Guarantee within due time,

(iv)   to comply with reporting requirements,

(v)   to maintain appropriate books of accounts according to the Generally Accepted Accounting Principles (GAAP) and records of costs and revenues,

(vi)   to ensure proper safety and security, and fire protection,

(vii)   to abide by all applicable laws,

(viii) to abide by all relevant civil construction codes during construction.

10.9   Penalty Provisions for the Private Investors

Non achievement of construction completion milestone

The main obligation of the private investor is the on-site development - the construction of the Multi-Tenant Building (MTB). Penalty will be applicable to the Private Investor for not achieving the construction completion milestone within three years from contract effectiveness.

Lack of Demand due to Lack of Marketing or other reasons

The private investor will absorb the demand risk and will automatically incur a loss to the private investor. Therefore, it is not prudent to impose penalties for lack of demand.

10.10   Bid Security

A Bid Security will be applicable for the project, as a certain percentage of the estimated project cost.

10.11   COD Performance Guarantees

The project company shall submit a construction performance guarantee as security at the time of signing the PPP contract to ensure that the obligations for constructing the core business facilities are carried out. The guarantee will be released once the construction is completed.

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11

Investor Selection Process and Criteria

11   INVESTOR SELECTION PROCESS AND CRITERIA

Engaging a private operator is typically a step-by-step process. The steps involved are described in the following paragraphs:

11.1   Planning for Engaging Private operator

The plan should cover the optimum strategies and options for private sector participation. It discusses the design of interrelationship between BHTPA and the private operator, the strategy for good publicity and advertisement of the deal (*i.e.* communication plan), the method of sale, the steps required to reach sale and a timeline.

A well-thought communication plan is required, so that sufficient transparency exists in the process and information is disseminated to all relevant stakeholders and the decision makers. It will prevent the risk of the program being stuck in the middle due to difficulty in making decisions.

The plan should also include the tendering method. This should contain the steps and timeline of tendering, responsibilities of government officials and advisers, production of sale documents (for example, information memorandums prospectuses), legal tasks and timeline.

11.2   Obtaining Approvals

The plan needs to be approved by the authority appropriate for BHTPA and PPP policy guideline of the country, so that later the progress is not restricted due to lack of decisions. Such approval is needed before notice of invitation for tender is advertised.

11.3   Qualification

The Private Operator selection process will start with Request for Qualification (RFQ) by BHTPA. After feasibility study is finalized, BHTPA will issue a public notice for inviting qualification statements for participating in the investment. A short list of the qualified Private Operators will be made, based on evaluation of the statements.

The offer for participating in the project will be open to all eligible private operators from all countries which Bangladesh has diplomatic relationship with. The successful Private Operator will be decided based on evaluation of the proposals and subsequent approval of the relevant authorities. The Private Operators may be prequalified based on the following criteria:

a) Legal Status

b) Technical and Managerial Capability

c) Financial Capability

d) Project Operating Experience

e) Current Ownership in Similar faculties

11.4   Tendering or RFP

After the approval of the short list of Private Operators is obtained, the tendering process will start with issuance for Request for Proposal (RFP). The process of engaging private operator is illustrated below:

RFP will be issued to the pre-qualified Private Operators for selecting the suitable private operator and rank them. The selected private operator will enter into an agreement with BHTPA. BHTPA will provide layout, conceptual design of the facilities and land designation to the private operator

Figure 11.1: Private Operator Selection Process
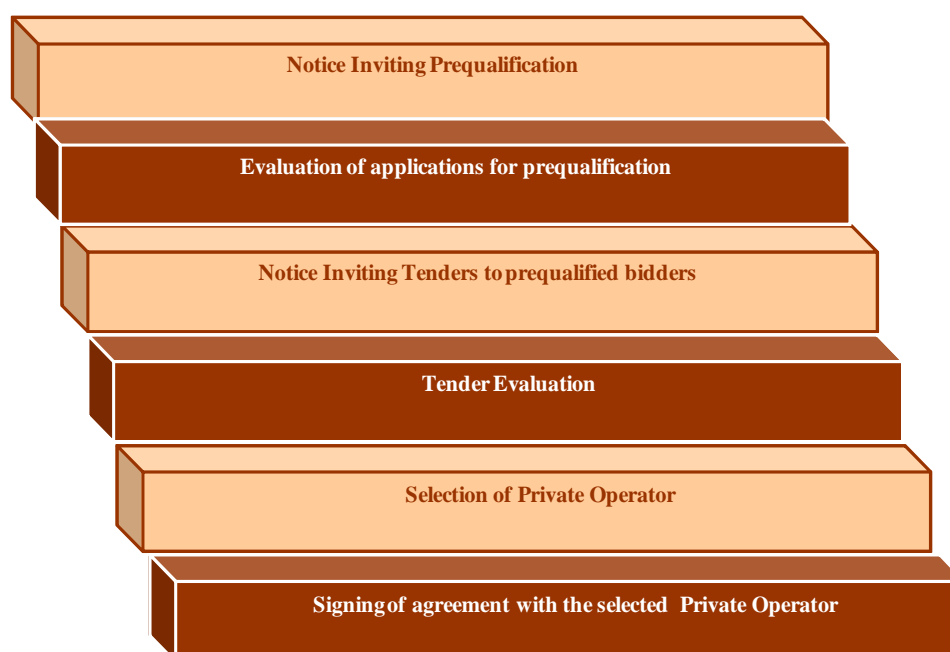
11.5   Communication Plan

IIFC will assist BHTPA in publishing the notice in national and international publication media inviting interested and potential Private Operators to participate in the tender process. In national publication media, the notice shall be published over a period of three weeks in at least four newspapers (English and Bengali). The notice may also be published in the BHTPA's and IIFC's website.

11.6   O&M Contractor Selection Criteria

The offer for participating in the project will be open to all eligible private operators[1] from all countries which Bangladesh has diplomatic relationship

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[1] An eligible participant:

    (a)   should be a physical or juridical individual, company, association or any combination of them under agreement in the form of an intended or existing joint venture, consortium or association;

with. The successful investor will be decided based on evaluation of the proposals and subsequent approval of the relevant authorities. The following sections describe the general qualifications desired from the potential private operator. The evaluation process with steps and evaluation criteria are also presented in detail:

11.7   General Qualifications

The potential Private operator is expected to have the following competences and abilities:

f. Good knowledge of operation and maintenance of hotel or tourism facilities.

g. Ownership and operation experience of companies operating facilities of similar size

h. Knowledge of laws, rules, and regulations governing O&M of such facilities.

i. Working knowledge of the operation and maintenance of commercial complexes.

j. Ability to prepare forms and narrative inspection reports.

11.8   Evaluation Process

The potential private operators will be evaluated based on the following minimum qualification test criteria. The tests will be performed in two parts:

a) Part I Evaluation – Qualification Test
b) Part II Evaluation – Financial Ranking

(b) should have legal capacity to enter into contract with BHTPA and other persons;

(c) should not engage any consultant or person who were involved in the construction, design, procurement and supply of equipment of BHTPA and in the preparation of tender documents and other activities for engaging private investor for BHTPA facilities;

(d) should not be under a declaration of ineligibility for corrupt, fraudulent, collusive or coercive practices in Bangladesh or any other countries.

(e) should not be declared as insolvent or bankrupt or being wound up, its business activities shall not be suspended and it shall not be the subject of legal proceeding for any of the foregoing.

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11.9 Part I Evaluation: Technical Responsiveness Test

11.9.1 Legal Status

The participant must be a legal entity with all documentary evidence[2] in support of its legal status in the country of its incorporation and business. A separate form will be designed to receive information on legal status.

11.9.2 Relevant Experience

The potential private operator's relevant experience will need to be tested in Ownership and Operation experience of similar facility. The specific requirements with respect to relevant experience will be designed at the time of preparing bidding document in consultation with BHTPA.

11.9.3 Financial Capability

The private operator should demonstrate that it is in a sound financial position to provide sufficient working capital for carrying out the obligations of the Private operator. The participant will be asked to provide audited balance sheet to understand the net-worth of the enterprise. The prescribed net-worth will be mentioned in the tender document.

11.9.4 Operation and Maintenance Plan

The potential private operator will have to submit an operation and maintenance plan. The plan should mention the organization plan for running and selling the built up spaces, number of employees needed along with a broad hierarchy, hazard management techniques (fire-fighting, safety measures etc) during operation, procedure of future refurbishment/replacement of existing facilities.

Separate forms will be developed for assessing the investors against all the above criteria. A participant shall have to pass in Part I evaluation.

11.10 Part II Evaluation: Financial Score

Tenders who pass Part I evaluation, will be evaluated for financial score, based on financial figures quoted. The financial figure or the parameter that may be required to be quoted depends upon the model of engaging the

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[2] The documentary evidence shall include but not limited to:

(a) certificate of incorporation (if applicable);

(b) company legal documents such as registration under local authority, partnership deed, memorandum and articles of association, joint venture agreement etc.;

(c) tax certificate from the relevant governmental authority;

(d) notary certificate that there is no bar on the participant to execute the contract; and

(e) a declaration that the participant is capable of and legal capacity to enter into this contract.

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private operator and discussed in the relevant section. The following are the financial parameters, any one or combination of them may be used.

a) Minimum fee to be charged to BHTPA
b) Maximum royalty to be provided to BHTPA
c) Any other parameter that may be decided by BHTPA

11.11 Ranking

The bids will be ranked based on the financial score or a combination of the technical score and financial score, which will be designed in the RFP stage.

12

Financial Analysis

12 FINANCIAL ANALYSIS

This section presents the assumptions and results of the financial analysis of the Development of an ICT Village at Rajshahi conducted by the Consultant as part of the Feasibility Study. The financial analysis is conducted from the perspective of the Private Investor, modeling his business during the PPP Agreement Term.

Following a brief introduction, the methodology, business model and assumptions of the financial analysis are discussed in detail and the findings and results of the analysis are presented.

12.1 Introduction

The objective of the Rajshahi ICT Village is to establish knowledge based industries in Rajshahi, particularly related to Software and IT Enabled Services, and thus contribute to the national economy and achieve the goals of Vision 2021: Digital Bangladesh. Government has allocated 38.78 acres of land at Binodpur mouza of Paba upazila, Rajshahi to establish the ICT Village. The ICT Village is proposed to consist of a Multi Tenant Building (MTB) which will accommodate ICT industry offices, indistrial plots for lease to ICT companies and also include key ancillary facilities and support services.

The principal goals of the ICT Village are broadly be as follows:

- Technology development and diffusion
- Employment generation
- Stimulate the formation of new technology-based firms and the growth of existing technology-based firms
- Facilitating the growth of ICT SMEs
- Competence development – enhancing the competitiveness of existing as well as new units in the region
- Regional development and regeneration
- Attracting large national and international companies, thereby attracting inward investment by creating world-class, world-scale physical facilities and proactive support services
- Fostering spin-off firms started by academics thereby helping commercialise academic researches and strengthen local university association with the ICT Village

In addition to office space for ICT firms, the ICT Village will have bare land that will be available for lease to ICT companies as industrial plots.

The ICT village will also accommodate a range of ancillary facilities such as cafeteria, data center, banks, gymnasiums, conference hall, dormitory, residential building etc.

The financial analysis is based on information gathered from BHTPA, market and industry survey, consultation with relevant stakeholders and free lancer survey.

The Financial Model prepared for financial analysis uses information and analysis presented in the previous chapters. The following information has been used in preparing the financial model:

- Demand Forecast for the ICT Village– presented in Chapter 6
- Conceptual master plan of the site – presented in Chapter 7
- Proposed design and floor plans of the ICT Village – presented in Chapter 7
- Estimated development costs – presented in Chapter 8
- Investment model – presented in Chapter 9

Estimations of operational costs, cost escalations and financing structure have been made for the financial analysis.

12.2   Objectives and Methodology of Financial Analysis and Financial Model

The key objectives of preparing a financial model for financial analysis are as follows:

a. to demonstrate the financial viability of development of the ICT Village based upon demand forecast, expected lease rates, cost estimates, planning parameters and other information.

b. to illustrate the sensitivity of the financial and commercial viability to key parameters and to identify the areas which could be adjusted (lease rates and other issues) to influence the profitability of the project.

c. to determine the requirement of initial support and later on to implement project on a commercial footing.

The main approach was to determine the financial viability of the project on the basis of an assessment of demand forecast for office space for ICT firms, and for industrial plots, revenue collection from commercial areas, capital cost estimate for the project, revenue projection and financing structure (**Error! Reference source not found.**).

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Figure 12.1: Determining the Financial Viability

Financial analysis of the project took into consideration, such factors as:

- ✓ Short and long-term financial obligations; projected revenue stream, projected costs (fixed and variable), depreciation schedule and asset construction schedule;

- ✓ Demand forecast for leasable area of the ICT Village;

- ✓ Lease rate structure and the impact of amendments in that structure;

- ✓ Sources and cost of capital

The financial model covered the following:

a. Determination of the revenue projection, projection income statements and cash flow statements over the life of the project.

b. Calculate various matrices such as IRR, payback periods and debt-service coverage ratio for assessment of project viability.

c. Sensitivity analysis on the major parameters including capital cost, O&M cost, lease rate etc. in order to explore its sustainability under different changing situations.

d. Financial analysis on options for cost recovery of capital investments and recurrent costs under different demand forecast scenarios.

The result of combining cost and revenue projections were presented as output indicators. The financial model, comprising projected revenue, income statement and cash flow projections, was prepared in order to assess the impact of the proposed project on financial performance and viability.

12.3   Structure of the Financial Model

The financial analysis for the project was conducted using a spread sheet based model providing:

(1) a projection of each component of cost and expenses on the basis of a consistent set of background financial/economic assumptions; and,

(2) the revenue generated by a given structure of revenue sources. The results of combining cost and revenue projection was presented as output indicators as shown in Figure 12.2.

Figure 12.2: Flow Chart of the Financial Model
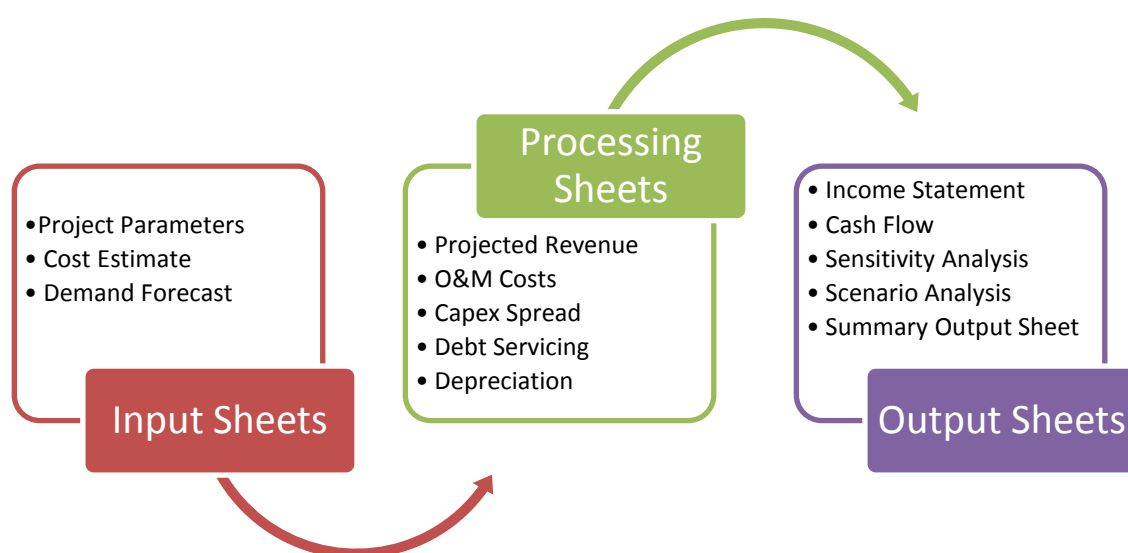
The model contains interlinked sheets keeping in view of the available data and information. The sheets of the model are as follows:

Input Sheets	1) Project Parameters
	2) Cost Estimate
	3) Demand Forecast
Processing Sheets	4) Debt Servicing
	5) Projected Revenue
	6) Depreciation
	7) Projected O&M Costs
	8) Asset Schedule

Result Sheets	9) Income Statement
	10) Cash Flow
	11) Sensitivity Analysis
	12) Scenario Analysis
	13) Summary Output Sheet

The input and input support sheets accommodate all the basic inputs of the project required for the financial model. These inputs have connection with other sheets (processing/intermediate calculation) where specific calculations are made. Then the outcomes of the individual sheets were connected to the result sheets to obtain the final results. Sensitivity analysis is also included in the model to test its sensitiveness on change of different important parameters.

The interlinked sheets as used in the financial model are briefly described below.

12.3.1 Input and Input Support Sheets

The input sheets include (1) project parameters sheet (2) project cost sheet, and (3) demand forecast sheet (Figure 12.3).

Figure 12.3: Input Sheets in the Model

Projected Revenue and Net Income

Project Parameters Sheet

This sheet contains all the major parameters of the project wihich will act as inputs to the model. The parameters include: (1) construction period, (2) leasable commercial area (3) financing structure (3) cost escalation factors etc.

Capital Cost Sheet

Capital cost sheet includes hard costs and soft costs of the project. Hard costs are composed mainly of civil construction costs. Soft costs include the project management costs, working capital, interest during construction (IDC) etc.

This worksheet provides a summary of the project costs for the ICT Village develpoment business. This worksheet has an onward relationship with depreciation sheet, capex spread sheet and cash flow sheet.

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Demand Forecast Sheet

Demand Forecast for leasable space is summarized in this sheet. The sheet provides different demand projections based on different space takup scenarios. The projected demand is used for determining the projected revenue and projected variable costs for the project.

This sheet has an onward relationship with the Revenue and O&M sheets.

12.3.2 Processing Sheets

The processing sheets compute and process data as provided in the project parameters and capital cost sheets. The processing sheets are follows:

(1) debt servicing (2) revenue, (3) depreciation, (5) O&M Costs and (6) capex spread.

Debt Servicing Sheet

This worksheet sets out a consolidated summary of debt service stating separately the yearly amount of debt service of principal and interest in Bangladesh Taka. The computation of yearly principal, interest and total debt service is derived from capital cost, debt equity ratio and interest rate in each category loan. The debt service (interest + principal) of this sheet has link to the cash flow sheet and interest from this sheet is used as an input in the income statement sheet.

Revenue Sheet

This worksheet calculates the projected revenue of the Private Investor from sources such as:

a. Rent from Industrial Plots

b. Rent from ICT units (office space)

c. Rent from commercial facilities such as Data Center, Banks, Food Court and Conference Hall

d. Service charge from tenants

Revenue is calculated based on the demand forecast and the lease rates. The output of the revenue sheet is processed in the income statement sheet to calculate the projected net income of the Private Investor.

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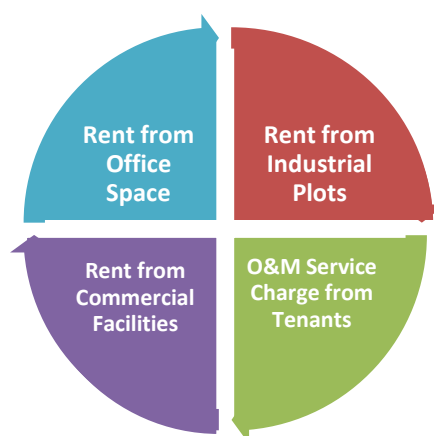
Depreciation Sheet

Depreciation sheet calculates the depreciation value of the assets yearly. The sheet takes data from project cost sheet and after computation, the depreciation expense from this sheet goes to the income statement.

O&M Costs Sheet

This sheet receives data from the input sheet and input support sheets regarding operation cost, maintenance cost and fixed costs of the project. The output of the O&M costs sheet is used in the income statement sheet to calculate the projected net profit of the business.

Capex Spread Sheet

The capex spread sheet is used for incorporating capital cost phasing of the project. Phasing of construction cost during construction is also projected in this sheet.

12.3.3 Financial Statements

Results of operating performance and financial position at periodic intervals are the essence of financial statements. The financial model provides projected financial statements such as, income statements and cash flow statements depicting profitability, liquidity and overall financial health of the entity. The result sheets include (1) Income Statement and (2) Cash Flow Analysis.

Income Statement

The financial model provides income statements for each year for 30 years. The revenue stream over the years from commercial operations date is shown in the income statement. The statement also shows the operating expenses (fixed and variable), financing expenses and depreciation expenses as deductions from the revenues to obtain net income before tax. After deducting applicable tax, the net income for the equity holder is derived.

Cash Flow Analysis

Cash flow statement is an important financial output in the model, especially to arrive at the appropriate cash requirements of the project. The financial model incorporates the cash flow analysis for the project and determines the Project and Equity IRR and the DSCR for long-term liabilities. It will determine residual cash flow to equity after meeting all the expenses to determine return on equity, as residual surplus.

12.3.4 Result (Financial Indicator) Sheets

Summary Output Sheet

The key requirement for financial viability is that the business is able to earn profit and keep up sufficient cash flow that is sufficient to finance all necessary future investments.

Figure 12.4: Key Financial Indicators

This sheet gives the results of the model run in summarized form. The key results indicators are:

1. Internal Rate of Return (IRR) on capital employed in the total project and on equity. This is the ultimate parameter to determine the viability of the project.

2. Debt Service Coverage Ratio (DSCR)

   a. Maximum

   b. Average

   c. Minimum

3. Total Capital Payback Period

4. Equity Payback Period

Sensitivity Analysis Sheet

Sensitivity analysis is used to test the robustness of the results to variation in key inputs and project parameters. Cash flow as well as financial indicators depend on the interplay of several factors including capital cost, O&M cost and revenue and charges it earns from different category of services. It can be used to identify the values, if any, at which, preference for one option is switched to preference for another. Considering these variations of parameters, change of output /results is found through this analysis.

Scenario Analysis Sheet

The model incorporates different demand forecast scenarios. This sheet analyses the results of these scenarios in different combinations.

12.4   Base Case Business Model used in Financial Model

Different types of investment models for the project have been discussed in Chapter 9. The financial model has been prepared based on **Model C:**

Concession PPP Model (BOT). This PPP option is considered as the Base Case model for Financial Analysis.

Under this model, the Private Investor will sign a PPP Contract with BHTPA, under which it will be responsible for land development of the entire area, including site filling and construction of internal infrastructure such as internal roads, drains etc. Private investor will also be responsible for construction of the Multi Tenant Building (MTB). After construction completion, Private Investor will lease out office space in the MTB to ICT units and collect rent from them. Private Investor will also lease out the industrial plots and collect rent. In return for the right to use BHTPA's land the private investor will pay Royalty to BHTPA, which will consist of a lumpsum upfront payment and variable royalty based on gross earnings.

Private Investor will also be responsible for operation and maintenance of the ICT village including the MTB and Industrial plots throughout its PPP Contract Term. After end of Term, the O&M of the ICT Village will be handed back to BHTPA.

BHTPA will be responsible for construction of the Dormitory and the Residential Buildings with its own fund or with support from donor agencies. BHTPA will also be responsible for regulation of the ICT village (Figure 12.5).

Figure 12.5: Model C: Concession PPP Model
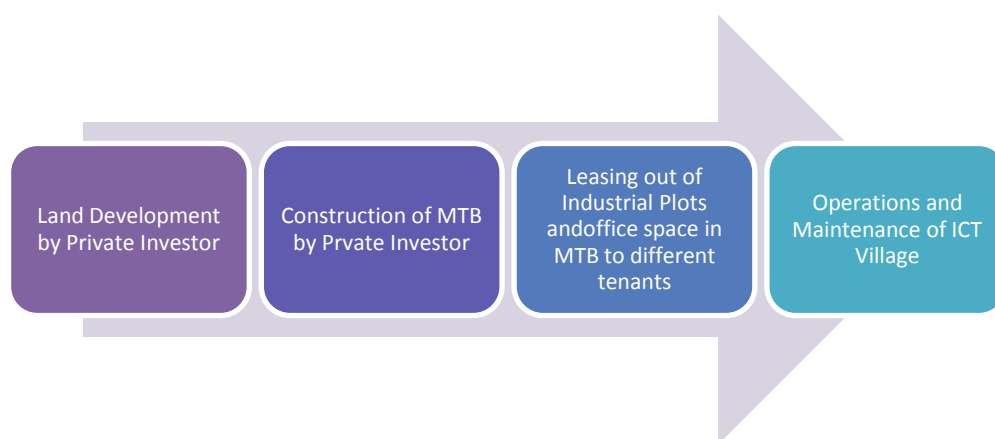
In addition to the core business of leasing out office space and industrial plots, Private Investor will also earn revenue from the following commercial facilities in the ICT Village:

- Banks
- Food Court
- Data Center
- Conference Hall

In addition to the commercial facilities, the following facilities will also be present in the ICT Village:

- Dormitory
- Residential Buildings
- Administration office of ICT Village
- Research (R&D) area
- Gymnasium
- Meeting rooms

Operator of the ICT Village will also be responsible for maintenance of the Park including security. Operator will collect a monthly O&M charge from the tenants to this end, in addition to the lease charges.

12.5   Model Scenarios

12.5.1 Demand Scenarios

The model has been used to assess the viability of developing the ICT Village using three different demand forecast scenarios.

The three different scenarios analyzed are as follows:

Base Case: In the base case scenario, it is estimated that it will take **7 years** from commercial operations for all the available leasable area in the ICT Village to be taken up by tenants.

Optimistic Case: In the optimistic case scenario, it is estimated that it will take **5 years** from commercial operations for all the available leasable area in the ICT Village to be taken up by tenants.

Conservative Case: In the conservative case scenario, it is estimated that it will take **10 years** from commercial operation for all the available leasable area in the ICT Village to be taken up by tenants.

For each scenario, the financial analysis indicates the internal rate of return (IRR) of the project and allows for sensitivity analysis on costs and other factors to see their effect on the IRR.

12.6   Key Model Parameters

Key parameters for the base case scenario are presented in Table 12.1 and discussed in more detail in this chapter.

Table 12.1: Overview of Key Parameters in Base Case

Category	Parameter
Investment Model	**Option C: Concession PPP Model**

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Category	Parameter
Term	30 years from start of construction
Construction Start	2015 (January)
Construction Completion	2017 (December)
Commercial Operation Date	2018 (January)
Land Area	38.78 acres
Leasable Area	
Industrial Plots	17.5 acres
MTB Core Business	115,200 sft
MTB - Non Core Business	19,200 sft
Number of ICT Units at the Village	86
Type of ICT units to be located at the ICT Village	• Software Development and Services • Business Process Outsourcing • Training Center • Other ICT services
Size of Industrial Plots for lease	2.5 acres
Size of MTB office spaces for lease	500 sft and 1,500 sft
Lease Rates	
Industrial Plots	Tk 10/sft/year
MTB Spaces	
ICT Office Space, BPO offices and Training Centres	Tk 40 /sft/mon
Data Center, Cafeteria, Bank,	Tk 50 /sft/mon
Conference Hall	Tk 20,000 / day
Lease Rate Escalation	12% per year
O&M Service Charge	Tk 2.50 /sft/month
Debt/ Equity Ratio	75:25
Loan Component	80% IPFF Loan, 20% PFI loan (commercial banks)
Loan Term	
IPFF	20 years
PFI (Commercial Banks)	7 years
Grace Period for Loan Repayment	
IPFF	7 years
PFI (Commercial Banks)	3 years

Category	Parameter
Interest Rate	
IPFF	9.45%
PFI (Commercial Banks)	14.45%

12.6.1 Business Period

Financial analysis of the development of the ICT Village has been carried out for a period of **30 years** from start of construction of the Park.

12.6.2 Project Timeline Estimates

Estimates in the model with regards to the timeline of implementation of the project are given in Table 12.2.

Table 12.2: Project Timeline Estimates

Project Timeline	Lease Model	
Term	30	years
Construction Period	3	years
Contract Signing Date	2015	January
Construction Start	2015	January
Commercial Operations	2018	January

In the base case model, Private Investor will be financing and developing the project. The investor selection process is estimated to take at least 6 months. In addition, it will require at least 6 months for the private investor to secure loans for construction and for achieving financial closure. As such, it is estimated that the construction of the ICT Village may be started by early 2015. A construction period of 3 years has been assumed. Commercial operations of the ICT Village is expected to be from early 2018 (Figure 12.6).

Figure 12.6: Project Timeline
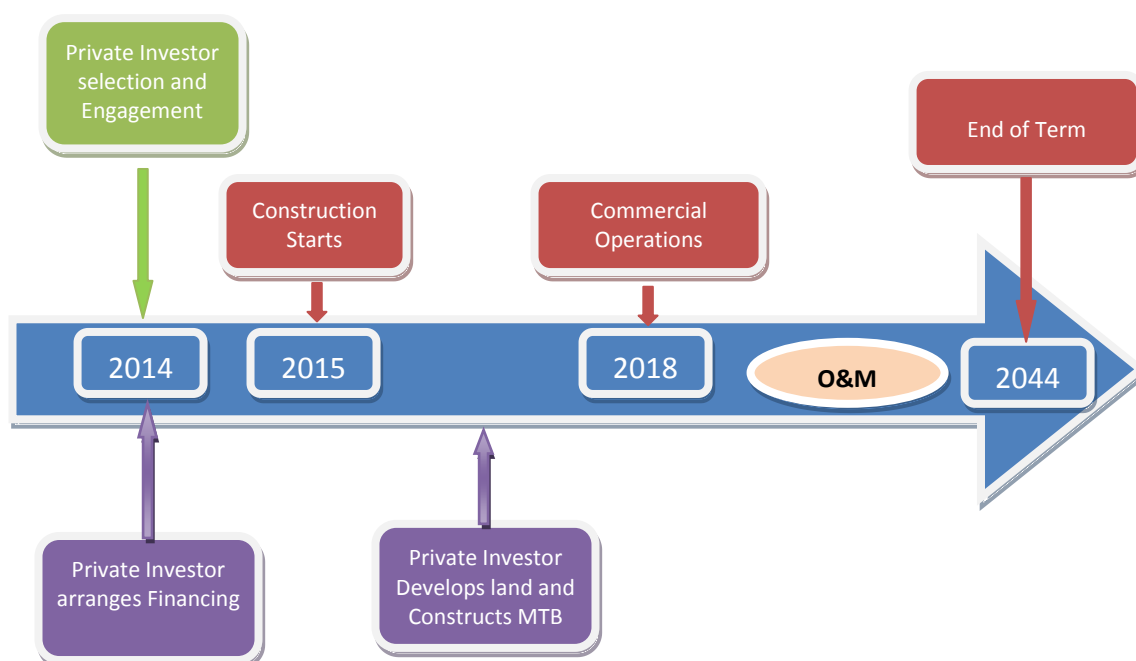
12.6.3 Land Allocation

Assumptions made in regards to allocation of land in the ICT Village are shown in Table 12.3. In addition to the Multi Tenant Building, Residential Buildings and Dormitory, the ICT Village will also have provisions for Industrial Plots, internal roads, parking area and green field and space.

Table 12.3: Land Allocation

Land Allocation		Acres	1,000 sft	% of Total
Industrial Plots Area				
Industrial Plots		17.50	762	45%
Internal Roads (Plot Area)		2.75	120	7%
	Total	20.25	882.300	
MTB Area				
Multi Tenant Building		0.46	20	1%
Dormitory Building		0.23	10	1%
Internal Road (MTB Area)		0.25	11	1%
Parking Area		0.32	14	1%
Green Area		2.84	124	7%
	Total	4.10	179	
Other Areas				
Embankment Road		1.01	44	3%
Residential Building Area		0.55	24	1%
Green Field		1.92	84	5%
Future Expansion Area		10.94	477	28%
	Total	14.43	628	
Total Land Area		**38.78**	**1,689**	*100%*

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Approximately 20 acres is allocated for industrial plots and roads inside the industrial plots area. The MTB area consisting of the MTB, Dormitory and Parking area accounts for 4 acres of the total site while approximately 11 acres is open land for future expansion.

Breakdown of land for different uses is shown in Figure 12.7.

Figure 12.7: Land Allocation in ICT Village
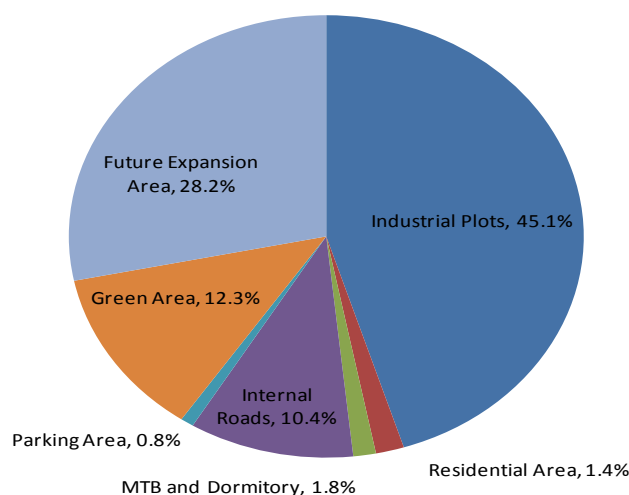
12.6.4 Cost Escalation Estimates

Yearly cost escalation values for all items are also shown in Table 12.4.

Table 12.4: Cost Escalation Estimates

Escalation Factors		
Lease Rate Escalation	12%	per year
Capital Cost Escalation	7%	"
O&M Cost Escalation	8%	"
Salary Escalation	10%	"

Capital cost escalations have been estimated based on raw material cost increases in the last 10 years. Salary cost escalation has been based on inflation figures of the country over the last 10 years. Lease rate escalations have been estimated based on increase of living costs in cities over the last several years.

12.7   Source of Finance

The total capital cost has been assumed to be financed by a debt to equity ratio of 75:25. The debt component may be funded by the Investment Promotion Financing Facility (IPFF) which is the specialised funding mechanism for long term infrastructure PPP projects.

IPFF loan is available for a maximum of 80% of the debt portion of the project cost. The remaining 20% of the loan may be financed through commercial banks (PFIs).

A 20 years repayment period is assumed in the model for the IPFF loan and a 7 year repayment period for the commercial loan. It is also assumed that the IPFF loan will allow a grace period of 7 years and the PFI loan will allow a 3 years grace period.

Table 12.5: Loan Assumptions

Financial Assumptions			
Debt	75%	*of Capital Cost*	
Equity	25%	"	
Company Income Tax Rate	37.5%		
Minimum Tax Rate	0.5%		
Loan			
IPFF		80%	
Loan term		20	*years*
Grace period		7	*years*
Yield of 364-day Treasure Bills		9.15%	
Interest Rate		9.45%	*(T-Bill rate + 30 basis points)*
PFI (Commercial Bank)		20%	
Loan term		7	*years*
Grace period		3	*years*
Margin of PFI		5%	
Interest Rate		14.45%	

IPFF guidelines stipulate a lending rate of the summation of Government 364 days T-Bill yield rate and 30 basis points. Government T-Bill rate is currently 9.15%. Interest rate for the IPFF loan will therefore be: 9.15% + .03% = **9.45%**

Margin of PFI has been assumed to be 5%. Interest rate on the PFI loan is therefore estimated to be: 9.45% + 5.0% = **14.45%**

12.7.1 Corporate Tax Rate

Private Investor will have to pay income taxes on 'Income from Business or Profession' as per the Income Tax Ordinance, 1984. The ordinance allows deductions from total income or revenue for cash and non-cash expenses (*i.e.* depreciation and amortization), to arrive at Net Income before Tax (NIBT). The applicable corporate tax rate is then applied to NIBT to derive income tax to be paid. As per Finance Act 2009 (anuchched Kha), Income Tax rate for the companies, which are not publicly traded, is **37.5%.** This rate has been used in the financial model for calculating the income tax payable to NBR.

12.8 Depreciation

Depreciation is a non-cash expense. Though it does not directly influence cash flow, it influences tax obligations from income of the business, by

offering tax savings adding to depreciation. Depreciation like interest is a tax deductible item considered by the tax authorities.

12.8.1 Basis of Depreciation

The Income Tax Ordinance, 1984 allows deduction of depreciation of assets from the income of the particular year to determine the taxable income for that period. Section 29(1) (VII) and (IX) of the Income Tax Ordinance provides provisions for the following methods of depreciation:

(a) Normal Depreciation

(b) Accelerated Depreciation

The ordinance also provides prescribed rates of depreciation irrespective of actual life of the assets. Normal Depreciation method is used in the model. It is briefly described in the following section.

12.8.2 Normal Depreciation

The Income Tax Ordinance 1984[3], prescribes the following depreciation schedule. The following table provides the prescribed rates for normal depreciation.

Table 12.6: Depreciation Schedule

Types of Assets	Depreciable amount as Percentage of written down value
Building (general)	10%
Factory building	20%
Furniture and fixture	10%
Machinery and plant (general rate)	20%

Each year, depreciation will be charged by the above prescribed percentage on the written down value *i.e.* the value of asset less accumulated depreciation in the previous years. In accounting concept, it is referred to as declining balance method. Depreciation each year will be reduced as the same percentage as applied on a declining balance. This method of depreciation has been used in the financial model as the base case, as the depreciation is mainly calculated for determining taxable income and thereby tax to be paid.

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[3] Third Schedule, revised in 1998

	Depreciation Rates[4]
Building and Civil Construction	10%
Machinery and Equipment	20%

In the depreciation schedule, the above depreciable assets have been considered for tax purpose.

12.9 Demand Forecast

Demand Forecast in different scenarios has been covered in detail in Chapter 6. Table 12.7 illustrates the demand forecasts used in the model.

Table 12.7: Demand Forecast Scenarios

	Space offtake period (yrs)	1st yr	2nd yr	3rd yr	4th yr	5th yr	6th yr	7th yr	8th yr	9th yr	10th yr	11th yr	12th yr	13th yr
Base Case	7	0%	0%	0%	15%	15%	15%	15%	15%	15%	5%	0%	0%	0%
Optimistic Case	5	0%	0%	0%	20%	20%	20%	20%	15%	0%	0%	0%	0%	0%
Conservative Case	10	0%	0%	0%	10%	10%	10%	10%	10%	10%	10%	10%	10%	5%

12.9.1 Multi Tenant Building

It is estimated that a total of **86 ICT units** can be accomodated in the MTB. It will take 7 years for all leasable space in the MTB to be filled by ICT units in the base case demand scenario. In the optimistic and conservative demand scenarios, it will take 5 years and 10 years respectively. Number of tenants in the MTB for the different scenarios is shown in Figure 12.8.

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[4] Normal depreciation rates as per Income Tax Ordinance 1984, Third Schedule, revised in 1998

Figure 12.8: Number of Tenants in Different Scenarios
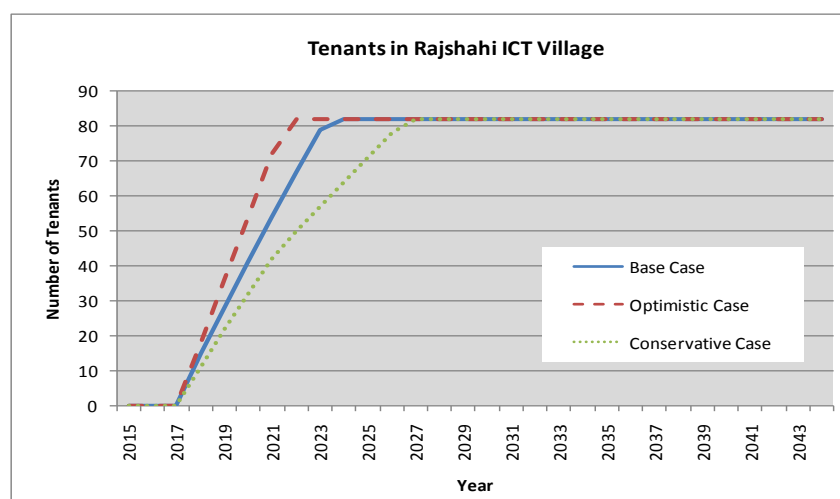
Demand forecast has indicated that four major types of ICT units will be located in the MTB. They are:

- Software Development and Services units,
- Business Process Outsourcing units,
- Training centers , and
- other ICT units.

Breakdown of the different types of units in the MTB in the base case scenario is shown in Figure 12.9.

Figure 12.9: Number of Units by Type in the Base Case Scenario
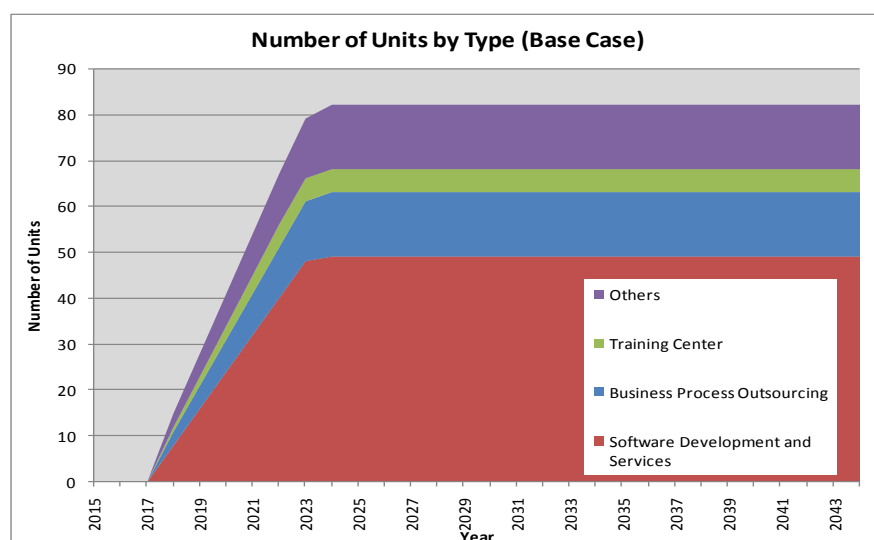
Breakdown of ICT units, by services, in the MTB in the base case scenario is shown in Table 12.8. Demand forecast indicates that Software Development and Services units, BPO units and Training centers will require 1,500 sft of office space each and other ICT units will require 500 sft spaces.

Chapter 12: Financial Analysis

Table 12.8: Breakdown of ICT units by Type in Base Case Scenario

Type	Shop Size Requirements (sft)	Max. No. of units	Number of 500 sft offices	Number of 1,500 sft offices
Software Development and Services	1,500	**53**	0	53
Business Process Outsourcing	1,500	**14**	0	14
Training Center	1,500	**5**	0	5
Others	500	**14**	14	0
		86 Units	**14**	**72**

Figure 12.10: MTB Space Takeup by Type
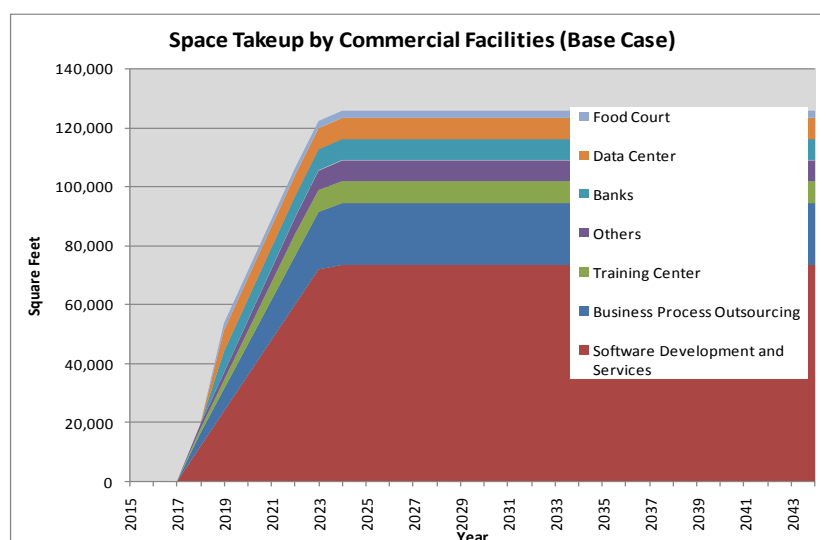
In addition to the office space demand, commercial facilities will also be commercially leased out after commercial operations. Space takeup of the MTB by different commercial facilities is shown in Figure 12.10.

Table 12.9 shows the land and space allocation for both core and non core businesses in the ICT Village.

Table 12.9: Space allocation in MTBs

Floor Areas		
Multi Tenant Building (Blocks A, B and C)		
No. of Floors	10	
Area per floor	20,000	sft
Total Area	**200,000**	"
Software Development Area	79,200	sft
BPO offices (call centers)	21,600	"
Training Center	7,200	"
Other ICT Units	7,200	"
Data Center	7,200	"
Banks	7,200	"
Conference Hall	2,400	"
Food Court	2,400	"
Administration Offices	3,600	"
Meeting Rooms	1,200	"
Research (R&D) Area	4,800	"
Common Space/ Utility Areas	56,000	"
Dormitory Building		
No. of Floors	8	
Area per floor	10,000	sft
Total Area	**80,000**	"
Residential Buildings		
No. of Floors	8	
Area per floor	10,000	sft
Total Area	**80,000**	"

12.9.2 Industrial Plots

In addition to the MTB, ICT units may also rent bare land in the ICT village. The size of the plots that may be rented are 2.5 acres and there will be 7 plots available for rent before development of future expansion area. Assumptions in the model with regards to Industrial Plots are shown in Table 12.10.

Table 12.10: Industrial Plots in the ICT Village

Industrial Plots		
Number of Plots	7	
	acres	*sft*
Size of Indusrial Plots	2.5	108,900
Total Area	**17.5**	**762,300**

IIFC

The ICT village also has land earmarked for future expansion. Once the seven plots are leased out the remaining land may be developed and delineated into more plots for lease. Demand forecast for takeup of Industrial plots is shown in Figure 12.11.

Figure 12.11: Industrial Plot Area Takeup
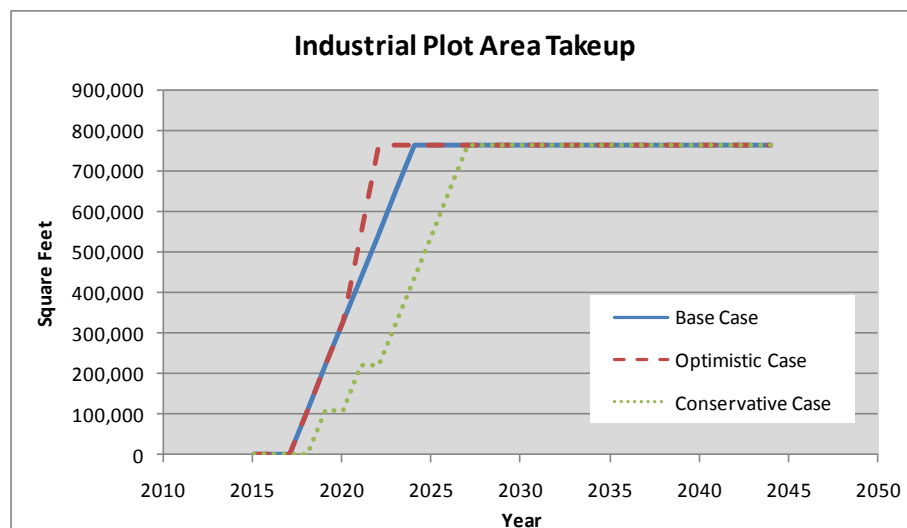
12.10 Capital Cost Estimate

Capital Cost estimate has been covered in detail in Chapter 8. The following tables illustrate the capital cost estimate used in the model in the base case. All cost estimates are in 2013 values.

Table 12.11: Hard Cost Estimate

Hard Cost				
	Area/Volume	Unit	Unit Cost (Tk/unit)	Total Cost (m Tk)
Development of MTB Area				
A Site Development and Internal Infrastructure				
1 Earth Filling	1,070,000	cft	6	6.42
2 Internal Road	11,000	sft	600	6.60
3 Embankment Road	44,000	"	250	11.00
4 Parking Area	14,000	"	600	8.40
5 Internal Drains	4,000	rft	250	1.00
6 Boundary Wall	7,000	"	3,500	24.50
7 Gate House	1	LS	500,000	0.50
8 Landscaping	1	"	500,000	0.50
9 Recreation Park Development	1	"	300,000	0.30
Subtotal Site Development and Internal Infrastructure				59.22
B MTB - Civil Costs				
1 Foundation	20,000	sft	1,000	20.00
2 Steel Frame Structure	200,000	"	800	160.00
3 RCC floors, walls and other structural elements	200,000	"	800	160.00
4 Architectural Elements i/c doors and windows	200,000	"	600	120.00
Sub-total MTB Civil Costs				460.00
C MTB - Other Facilities				
1 Electrical System and Lighting	5%	of civil costs		23.00
2 Sanitary and Plumbing Facilities	5%	"		23.00
3 Ventilation and Air Cooling	10%	"		46.00
4 Mechanical Equipment, Lift, etc.	2%	"		9.20
5 Fire Fighting system	1%	"		4.60
6 Electrical Sub-station/ Transformer (1000 kva)	4	LS	10,000,000	40.00
7 Power House/ Standby Generators	2	LS	7,500,000	15.00
8 Deep Tube Well, Pump-house, pumps, UG water resevoir with distribution pipe network	1	LS	4,000,000	4.00
9 On-site Sewage System (Septic tanks)	1	LS	2,000,000	2.00
10 Fiber Optics connections	1	LS	2,500,000	2.50
Sub-total MTB Other Facilities				169.30
Total MTB Development Cost				688.52
Development of Industrial Plots Area				
1 Land improvement /earth filling	8,823,000	cft	6	52.94
2 Internal Roads	120,000	sft	600	72.00
3 Internal drains	4,000	rft	250	1.00
4 Electrical Sub-station/ Transformer (1000 kva)	2	LS	10,000,000	20.00
5 Power House/ Standby Generators	1	LS	7,500,000	7.50
6 Deep Tube Well, Pump-house, pumps, UG water resevoir, etc.	1	LS	4,000,000	4.00
Total Industrial Plots Development Cost				157.44
Total Hard Cost				845.96

Table 12.12: Soft Cost Estimate

Soft Cost		m Tk
[1]Initial Working Capital		60.00
[2]Project Managemer	4.5%	38.07
Interest during Construction		108.00
Total Soft Cost		**206.07**

Table 12.13: Total Capital Cost Estimate

Total Capital Cost	m Tk
Hard Cost	845.96
Soft Cost	206.07
Total Capital Cost	**1,052.03**

Total capital cost is estimated to be **Tk 1,052.03 million** (2013 Tk)**.**

12.11 Spread of Capital Expenditure

The capex spread sheet incorporates the phasing of capital costs in the model. It is assumed that 30% of civil construction costs will be needed in Year 1, 50% in Year 2 and 20% in Year 3. In addition, ancillary facilities such as generators, lifts etc will be needed in Year 3 of construction while upfront costs such as land filling will be need in Year 1.

Table 12.14: Capex Spread

Calendar Year		2014	2015	2016	2017
Total Hard Costs	m Tk		262	353	359
Total Soft Costs	m Tk		86	53	78
Total Capex	m Tk		347	406	436

Summary of the capital expenditure spread in the base case option is shown in Table 12.14.

12.12 Revenue Projection

Private Investor's revenue is expected to be generated from the following sources:

- Lease Rental of Industrial Plots
- Lease rentals from ICT Units in MTB:
  - ✓ Software Development and Services units
  - ✓ BPO units
  - ✓ Training centers
  - ✓ Other ICT units

- Other Commercial Facilities in MTB:
  - ✓ Data Center
  - ✓ Banks
  - ✓ Food Court
  - ✓ Conference Hall
- O&M Service Charge from Tenants

Approximate share of revenue for each revenue source is shown in Table 12.15 and Figure 12.12.

Table 12.15: Revenue Items

Facilities	Share of Revenue
Software Development and Services units	45.0%
BPO units	13.0%
Training Center	0.5%
Other ICT units	0.4%
Data Center	11.0%
Banks	11.0%
Food Court	1.0%
Conference Hall	4.0%
O&M Service Charge from Tenants	5.0%
Industrial Plots	9.0%

Figure 12.12: Breakdown of Revenue Items
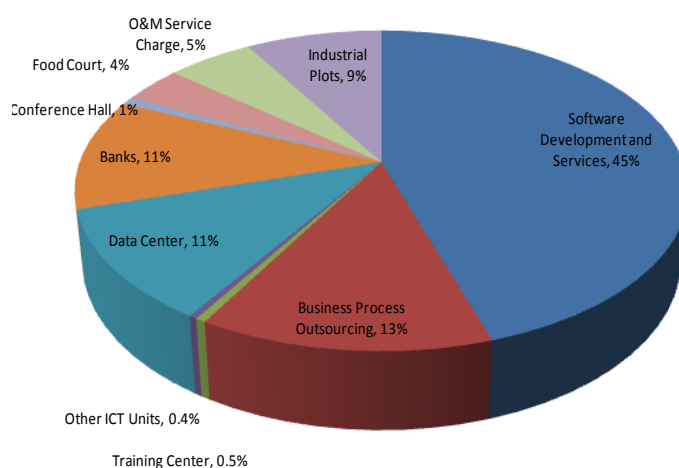
Revenue projection is derived from the demand forecast of space and land takeup in the ICT Village and the lease rates for office spaces, industrial plots and other commercial facilities. O&M service charge is estimated on a per square feet basis. Estimates for lease rates and O&M service charges are provided in the following sections.

12.12.1 Lease Rates

Private Investor of the ICT Village will lease out industrial plots and ICT office spaces and commercial spaces in the MTB of the ICT Village and receive revenue. The lease rates estimated in the model are shown in Table 12.16.

Table 12.16: Lease Rates

Lease Rates		
Transitional Occupancy level (%)		95%
	Rent levels	
	Tk/sft/mon (2013 Tk)	*Tk/sft/yr*
Industrial Plots	0.83	10.00
MTB Spaces		
Office Space	*40.00*	480.00
Training Center	*40.00*	480.00
Data Center	*50.00*	600.00
Banks	*50.00*	600.00
Food Court	*50.00*	600.00
	Tk/day	
Conference Hall	20,000	

Lease rates for the industrial plots is based on land rent value in the Rajshahi area as well as land rent in economic zones in the country.

The lease rates for the office and commercial spaces have been based on the lease rates of similar facilities in Rajshahi. Market survey for the project in Rajshahi demonstrated that ICT firms in the area currently pay approximately Tk 30/sft/month as rent for their offices. Since the ICT Village will offer world-class standard facilities including key support facilities, it is estimated that the lease rate for offices in the ICT Village will be higher than commercial office rents in Rajshahi.

It has been assumed that 95% of the leasable space will be taken up at full capacity. 5% of the leasable area is estimated to be transitional, i.e. in-between lease or unoccupied.

12.12.2 Royalty

The private investor will pay Royalty to BHTPA for the right to use BHTPA's land for his business. Royalty payment will be in two forms:

- Upfront payment of Tk 5 million at signing of PPP Contract
- Yearly payment of 2% of Gross Revenue

The upfront payment will be paid to BHTPA in 5 equal instalments during the first five years.

12.12.3 O&M Service Charge

Private Investor will charge monthly O&M Service Charge to the tenants for operations and maintenance of the facilities in the ICT Village, in addition to lease rentals for renting plots, office space and commercial space. The estimated O&M Service Charge rate is given in Table 12.17.

Table 12.17: O&M Service Charge Rate

Service Charges		
O&M Service Charge	2.50	Tk/sft/month

The O&M service charge will be collected for services such as:

- Landscaping
- Security
- Cleaning and maintenance
- Lobby and passage lighting

Private investor will be responsible for all operations and maintenance of the facilities in the ICT Village.

12.13 Operation and Maintenance Costs

Table 12.18 shows the parameters used in the model with regards to different types of operations and maintenance costs associated with the operation of the ICT Village. Maintenance of roads, sewerage system, stand-by generators, ICT infrastructure all have yearly operations and maintenance costs associated with them. Estimates on the amount of O&M cost has been made on the basis of investment. In addition to the internal infrastructure, there are also costs associated with the operations of the park such as landscaping, security etc. All such costs have been incorporated in the model.

Table 12.18: O&M Cost Items

Annual Operations and Maintenance Costs		
Roads Maintenance	% of capital cost	2.0%
Sewerage system including deep tube well	% of capital cost	4.0%
Electrical works including Transformer, street lighting and generators	% of capital cost	2.0%
MTB Building Maintenance	% of capital cost	0.2%
ICT/Telecom network	% of capital cost	5.0%
Landscaping	% of capital cost	5.0%
Security	200,000	Tk/ per month

The ICT Village will need a set of dedicated staff to see to the operations of the park. It is estimated that manpower of 10 employees will be adequate for operations. Salary for dedicated staff is also included in the total O&M cost of the ICT Village. Organogram along with estimated salary of the staff is given in Table 12.19.

Table 12.19: Management Structure

Management Structure				
Employees for running ICT Village Operation	No. of employees	Avg. Salary/month (Tk)	Avg. Salary/year (m Tk)	Total (m Tk)
Top Management	1	125,000	1.50	1.50
Middle Management	2	50,000	0.60	1.20
Lower Management	2	30,000	0.36	0.72
Secretarial	5	15,000	0.18	0.90
				4.32

12.14 Results of Financial Model in the Base Case

Key financial indicators of the project in the Base Case Scenario are presented in Table 12.20 in terms of Bangladesh Taka, including the Equity IRR of the project, the project IRR, the project and equity payback periods and the debt service coverage ratios.

Table 12.20: Key Financial Indicators in the Base Case Scenario

Output	
Equity IRR (a/t)	**13.77%**
Project IRR (b/t)	**14.84%**
Royalty Received by Government	
First 10 years (mil Tk)	**19**
Full Term of Contract (mil Tk)	**320**
DSCR	
Average	**1.53**
Maximum	3.77
Minimum	0.41
Equity Payback Period (year)	**18**
Project Payback Period (year)	**15**

BHTPA will receive Royalty from the Private Investor in the amount of Tk 19 million in the first 10 years and Tk 320 million over the 30 year term, under the base case model.

Figure 12.13 shows the projected revenue and income after tax of the ICT Village business. After an initial period of low income, the project is expected to generate profit for the Government.

Figure 12.13: Projected Revenue and Income Business
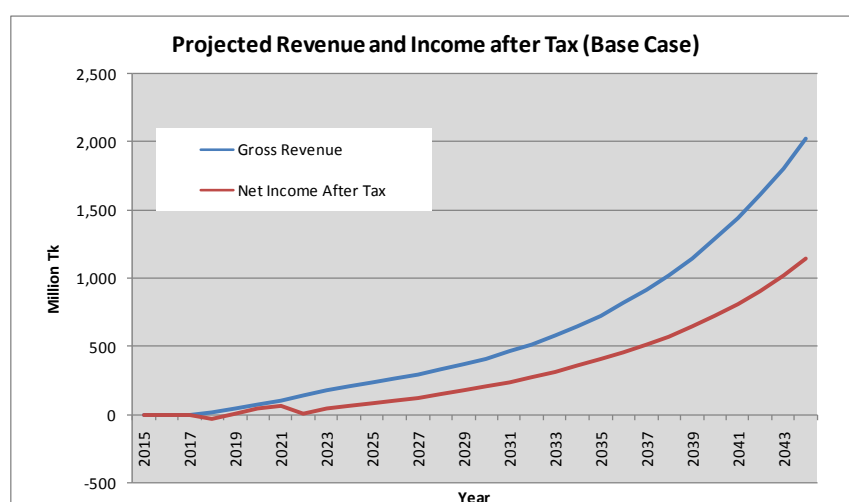
12.14.1 Return from the Project in the Base Case

The internal rate of return (IRR) on a project is the annualized effective compounded return rate or discount rate that makes the net present value of all cash flows from the project equal to zero. Internal rates of return give an indication on the desirability of investments or projects. The higher a project's IRR, the more desirable it is to undertake the project.

The equity IRR of the project is calculated from the projected cash flow to the equity holder (in this case BHTPA). Financial analysis shows that Investment in the project will provide a return of 14.84% and a return of 13.77% on equity. It will take 15 years for investment payback, with equity payback occuring in 18 years.

12.14.2 Debt Service Coverage Ratio (DSCR) in the Base Case

The debt service coverage ratio (DSCR) is the ratio of cash available for debt servicing to interest, principal and lease payments. It is used in the measurement of an entity's ability to produce enough cash to cover its debt payments. The higher this ratio is, the easier it is to obtain a loan. Typically, most commercial banks require a DSCR ratio of above 1.50 to ensure that sufficient cash flow to cover loan payments is available on an ongoing basis. A project having a debt coverage ratio of more than 1.50 indicates that the project generates enough revenue to cover annual debt payments.

Figure 12.14: DSCR of the Project in Base Case
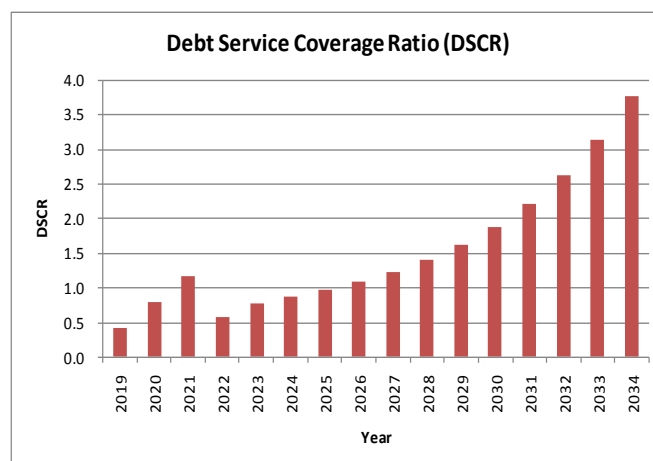
The DSCR of the project in the base case scenario is shown in Figure 12.14. The average DSCR is **1.53** which indicates that the project will generate enough revenue to cover loan payments.

12.14.3 Demand Scenario Analysis

The financial model was used to model three different scenarios, including the base case scenario, of different combinations of space demand projections. The three demand forecast scenarios are as follows:

Base Case: Space takeup in 7 years

Optimistic Case: Space takeup in 5 years

Coservative Case: Space takeup in 10 years

Results of the financial analysis of the different scenarios are given in Table 12.21.

Table 12.21: Results of Demand Scenario Analysis

Equity IRR	Option C
Base Case	**13.8%**
Optimistic Case	14.5%
Conservative Case	12.7%
Project IRR	
Base Case	**14.8%**
Optimistic Case	15.2%
Conservative Case	14.2%
Average DSCR	
Base Case	**1.53**
Optimistic Case	1.58
Conservative Case	1.43
Equity Payback Period	
Base Case	**18**
Optimistic Case	17
Conservative Case	19
Project Payback Period	
Base Case	**15**
Optimistic Case	14
Conservative Case	16

Scenario analysis of different options demonstrates that the difference in financial indicators in the base case and optimistic case is not very high. Therefore, the financial health of the project is not very highly dependent on the rate of space takeup in the ICT Village but in other factors such as lease rates, capital cost etc.

Equity IRR of 13.8% in the base case demand scenario indicates that the project may not be attractive for private investment under this PPP option. An equity IRR of at least 25% is required to attract private investors in PPP projects. The payback period for the project is also very long which will discourage private sector invesment.

12.15 Sensitivity Analysis

Various factors affect the equity IRR of the project. In order to understand the importance of each factor in determining the viability of the project, it is important to carry out a sensitivity analysis. The following factors have been analyzed for examining their impact on the internal rate of return:

- Capital Cost
- O&M Cost
- Lease Rates
- Interest Rate

Each of the above factors was varied by 10% in both directions and the effect on the equity IRR observed. The result is shown in Table 12.22 and Figure 12.15.

Table 12.22: Equity IRR Sensitivity

	-20%	-10%	0%	10%	20%
Capital Cost	16.2%	14.9%	13.8%	12.8%	11.8%
O&M Cost	14.2%	14.0%	13.8%	13.5%	13.3%
Lease Rate	11.4%	12.6%	13.8%	14.9%	15.9%
Interest Rate	14.6%	14.2%	13.8%	13.3%	12.8%

Figure 12.15: Equity IRR Sensitivity
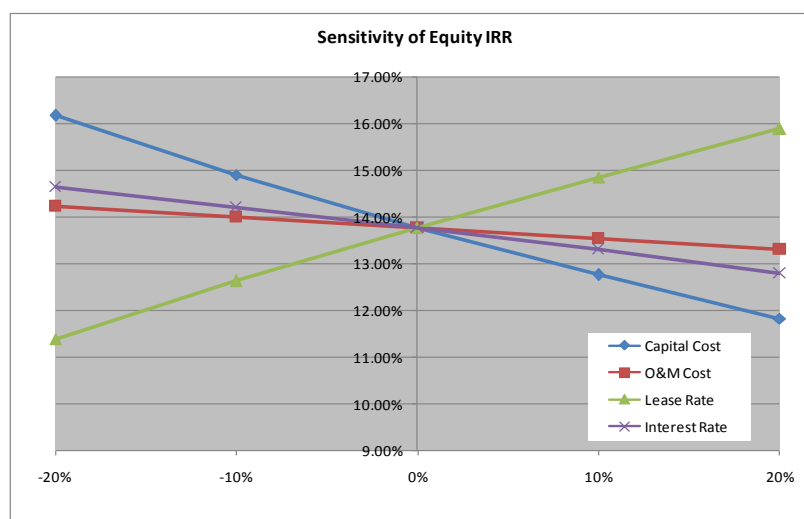
The sensitivity diagram plots the changes in equity IRR for slight changes in selected parameters. Higher the slope of line corresponding to each parameter, higher is the sensitivity of equity IRR; i.e. higher slope indicates that changes in that parameter has bigger impact on IRR.

From the above figure, it can seen that Lease Rates have the biggest impact to rate of return in the project. Higher the Lease Rates, higher is the equity IRR. However, increasing the lease rates to levels very high above the local market rates will have an impact on demand for space in the ICT Village and hence negatively affect the IRR. Therefore, lease rates for office spaces needs to fixed keeping in mind bothe the demand and financial viability.

After lease rates, Capital Cost of the project and the interest rate of loans have the biggest impacts on the return of the project. Higher the capital cost

and interest rate, lower is the return for the project. Therefore, it is important that the capital cost for the project is budgeted carefully. It is also important to ensure that construction period overruns do not take place as the longer it takes to complete construction, higher the capital cost of the project will be.

Interest rate for loans in the project also has significant impact on the finacial health of the project. Therefore, efforts may be taken by implementing agency to obtain lower rate loans and/ or loans with higher grace periods.

12.16 Analysis of Alternate PPP Option

Demand forecast and financial analysis carried out in the above sections is based on the Base Case model which is Investment Option C and a 30 year Lease Term for the Private Investor. In the Base Case model, Private Investor will be responsible for arranging financing, developing the land for the ICT Village, constructing the Multi Tenant Building, leasing out Industrial Plots and office space in the MTB and collecting rental over a period of 30 years. At the end of the Term, the Private Investor will turn over operation and management of the Multi Tenant Building to BHTPA.

Another option analyzed in Chapter 9 is Option D: Leasehold Transfer Model, where the Private Investor is allowed to transfer the leaseholdings of the built-up office spaces to individual businesses before and during construction of the MTB. In this model, the private investor will have a 10 year Term from signing of Contract and will be allowed to transfer lease holdings of the built-up space to individual businesses for long term leases (99 year leases). The businesses will pay a one-time Leasehold Transfer amount to private investor and will pay yearly service charges to the Operator of the MTB, which will be private investor during its 10 year term and afterwards will be BHTPA.

Financial analysis of Option C has been conducted and presented in the earlier sections. Financial analysis of Option D has also been made and presented in the following sections.

12.16.1   Demand Forecast for Leasehold Transfer Model

In Option D, demand for space is expected to be higher than in Option C as business owners are more comfortable with long term leases. In addition, private investor will not need to take any loans as he will receive upfront payments from customers during construction. This will save interest expenses for the investor increasing financial viability.

Three different demand scenarios were considered and the space takeup for each scenario is presented in Table 12.23.

Table 12.23: Demand Forecast for Space

	1st yr	2nd yr	3rd yr	4th yr	5th yr	6th yr	7th yr	8th yr	9th yr	10th yr
Base Case	0%	15%	15%	15%	15%	15%	15%	5%	0%	0%
Optimistic Case	0%	20%	20%	20%	20%	15%	0%	0%	0%	0%
Conservative Case	0%	20%	20%	15%	10%	5%	5%	5%	5%	5%

In the base case demand scenario, it is estimated that space takeup will start in the second year of construction and all spaces will be taken up by Year 8 of Contract signing. In the optimistic case scenario it is assumed that space takeup will start in Year 2 and all spaces will be taken up by Year 6. In the conservative case scenario it is estimated that it will take 9 years for space takeup from Year 2.

12.16.2 Leasehold Transfer Rates

The one-time payment value for transfer of leases has been estimated based on office and commercial space sale values in the Rajshahi region. The estimated values used for financial analysis is presented in Table 12.24.

Table 12.24: Leasehold Transfer Rates

Leasehold Transfer Rates (Model D)	
	Tk/sft
Office Space	*15,000*
Training Center	*15,000*
Data Center	*17,000*
Banks	*17,000*
Food Court	*15,000*
Conference Hall	*8,000*

12.16.3 O&M Service Charge

In addition to leasehold transfer amounts, tenants will also pay yearly service charges for operation and maintenance of the building. Estimate of service charge amount is presented in Table 12.25.

Table 12.25: O&M Service Charge in Leasehold Transfer Model

Service Charges		
O&M Service Charge	2.5	Tk/sft/month
	30	Tk/sft/year

It is expected that the O&M service charge in the Option D will be the same as in Option C.

12.16.4   Financing Structure

The Private Investor will be receiving upfront payments by transferring leaseholdings during the construction of the MTB. As such he will not be required to take loans, as in Option C, and will be able to cover the cost of the construction through his own equity and the money received from upfront transfers. This model allows the private investor to save on interest payments as he is not required to take large amounts of loan for construction.

12.16.5   Royalty

The private investor will pay Royalty to BHTPA for the right to use BHTPA land for his business. Royalty payment will be in two forms:

- Upfront payment of Tk 500 million at signing of PPP Contract

- Yearly payment of 5% of Gross Revenue

Royalty payment amount to BHTPA will be much higher in this model than the Option C as the private investor will be receiving large sums of money upfront by transferring the built-up shareholdings to individual tenants.

12.16.6   Financial Analysis Results of the Leasehold Transfer Model

Other parameters of the model will remain the same as in Option C. The results of the model in the base case demand scenario is presented in Table 12.26.

Table 12.26: Financial Analysis Results

Output	
Equity IRR (a/t)	31.13%
Project IRR (b/t)	90.73%
Royalty Received by Government	
First 10 years (mil Tk)	638
Full Term of Contract (mil Tk)	638
Equity Payback Period (year)	2
Project Payback Period (year)	2

Implementing the project under Option D gives a 31% return on Equity which is much higher than in Option C. Equity payback period is also only 2 years which indicates that this model of investment will be very attractive for private investors. In adition, BHTPA will be receiving Tk 500 million upfront as royalty compared to only Tk 5 million upfront-payment in Option C.

Implementing the project under Option D will also result in BHTPA receiving a total royalty of Tk 638 million within the first 10 years as compared to only Tk 19 million under Option C.

Results of the two models under different options are presented in Table 12.27.

Table 12.27: Scenario Analysis Results

Equity IRR	Option C	Option D
Base Case	**13.8%**	**31.1%**
Optimistic Case	14.5%	36.7%
Conservative Case	12.7%	26.8%
Project IRR		
Base Case	**14.8%**	**90.7%**
Optimistic Case	15.2%	90.2%
Conservative Case	14.2%	79.3%
Average DSCR		
Base Case	**1.53**	**0.00**
Optimistic Case	1.58	0.00
Conservative Case	1.43	0.00
Equity Payback Period		
Base Case	**18**	**2**
Optimistic Case	17	2
Conservative Case	19	3
Project Payback Period		
Base Case	**15**	**2**
Optimistic Case	14	2
Conservative Case	16	3

Option D is financially viable for private investment through PPP. Higher rates of return in Option D compared to Option C as well as shorter payback periods, indicate that Option D will be more attractive to private investors. BHTPA will also earn significantly higher royalty in Option D, compared to Option C.

Chapter 12: Financial Analysis

13

Environmental and Social Analysis

13   ENVIRONMENTAL AND SOCIAL ANALYSIS

Information and Communication Technologies (ICTs) are playing an increasing role in our society. From the local to the global level, ICTs have permeated all areas that pertain to socio-economic development, and are enabling the development of new skills, competitiveness and growth, particularly in developing nations. However, ICT has an environmental impacts through construction of buildings, the manufacturing, operation and disposal of devices and network equipment, but it also provides ways to mitigate the adverse effects as well as efficient energy use, for example through smart energy saving buildings and well designed telephone activities.

Environment conservation Act 1995 (ECA-95) is currently the main legislative document relating to Environmental protection in Bangladesh. Under this Act any industrial unit / project shall require clearance from the Department of Environment (DOE). A set of relevant rules to implement the ECA'95 has subsequently been promulgated in August 1997 (ECR-97).

The ECR 97 includes lists of projects, requiring varying degrees of environmental investigation. All the proposed projects under Orange (B) and Red category generally require an Initial Environmental Examination (IEE) for environmental clearance. Though this type of project is not categorized under the legislative documents of DOE, ICT Village at Rajshahi may be labelled as Orange B category due to its environmental hazards during project construction and operation period and the project is categorized as Category B as per the World Bank Operational Policies. As such, the project requires an IEE for environmental clearance.

In this respect, potential environmental, social and cultural impacts of the proposed project need to be identified in IEE report where adverse effects and mitigation measures as well as benefits would be addressed.

13.1   Objectives of IEE

The overall objective IEE is to identify major environmental impacts resulting from implementation of the project and to recommend mitigation measures to avoid or reduce adverse environmental impacts and to enhance positive impacts.

The specific objectives include:

i.   To assess the existing environmental conditions of the project site and its adjacent areas in order to establish a baseline framework against which potential environmental impacts due to implementation of the project would be compared.

ii. To identify and assess impacts resulting from the project its development or construction phase.

iii. To identify and assess environmental and social impacts resulting from the project during its operational phase.

iv. To develop a well balanced environmental management plan with recommendations for mitigating adverse impacts and enhancing positive impacts and outlining environmental monitoring requirements both during construction and operational phase of the project.

v. To identify issues that may require further studies.

13.2 IEE Study Methodology

The study methodology comprised the following activities:

1. Desktop study;

2. Field investigations

3. Socio-economic Survey (section 11.6)

13.2.1 Desktop Study

The desktop study involved:

a) Initial meetings with client, project architects and engineers to discuss the proposed project, including project activities and options under consideration;

b) Collection and review of baseline data, maps, reports and other relevant information on the existing environmental and social conditions of the project area;

c) Review of existing legislation, regulation and policies relevant to the proposed project;

d) Review of proposed project engineering designs and construction inputs, including anticipated technical processes.

13.2.2 Field investigations

Field investigations involved:

Site walks within the project area and the neighbouring areas that may be affected by the project;

a) Taking photographs of significant aspects to assist in describing the baseline environmental and social conditions of the project area;

b) Interviews with representatives of relevant key regulatory authorities within the project area and interested and affected parties mainly within the project influence zone;

c) Obtaining relevant documents from the authorities such as local government, and key authorities within the project influence zone.

The aim of the field investigations was to verify information and data collected during the desktop study and to collect any new information that may have been important in the assessment of impacts and design of mitigation measures.

On the bases of collected relevant data, identification of possible impacts has been conducted. This was followed by evaluation of likely impacts along with their origin and extensiveness.

A team of consultants from IIFC made a field investigation to the proposed site on 19 September 2013. The investigation team composition is given below:

1. Mr. Rabiul Islam, Environmental Expert, IIFC

2. Mr. Hasanuzzaman, ICT Expert, IIFC

The basic objective of the field investigation is to have a general overview of the proposed site and to understand people's views through brief consultation on development and to investigate social, technical and economic aspects of the proposed ICT. The visiting team also had discussion meetings with government agencies involved with the basic utilities services like power, water supply and others.

13.2.3 The Site

The proposed site for the development of Rajshahi ICT Village is located in the Nabinagar Mouza in Paba Upazila at Rajshahi district. It is situated just behind the DC Office and the District Judge Court at Rajshahi and beside the Rajshahi-Chapainawabganj Old road (N6). The site is almost 13 km away from Shahmakhdum airport of Rajshahi and about 7 km from the Rajshahi railway station. An embankment passes through the north to south side of the site and ended at the River Padma. The site is a non-arable flat land with a shallow ditch in the middle and north side. Unauthorised dwellings are on the land with two pacca mosque, pacca sanitary latrines and a pacca internal road. The local households are situated around the periphery of the proposed site.

Figure 13.1: Physical Environment of Project Site

13.3   Bio-Ecological and Geographic Location

Rajshahi is located in the Ganges floodplain, which is basically consisted of the active floodplain of the Ganges River and the adjoining meandering floodplains. This floodplain includes mostly greater Rajshahi, Kustia, Faridpur and Barisal districts. The floodplain comprises of ridges, basins and old channels. The Gangetic alluvium is readily distinguished from the old Brahmaputra, Jamuna and Meghna sediments by its high lime contents. Ganges channel is constantly shifting within its active floodplain, eroding and depositing large areas of new char lands in each flooding season, but it is less braided than that of the Brahmaputra- Jamuna.

The floodplain is characterized by mixed vegetation. Large number of stagnant water bodies and channels, rivers and tributaries support a habitat of rich biodiversity. Free-floating aquatic vegetation is commonly shown in most of the wetlands. Both cultivated and wild plants species are found in homesteads forest. Major groups of the oriental birds are represented in this zone by many species. A large number of migratory birds are observed in winter. Different species of tortoises and turtles are found in perennial water bodies.

13.4   Description of The Existing Background Environment

Existing background i.e., baseline condition of environment states the present status of different components of environment in absence of the project. The main objective of examining the present environment is to provide an environmental baseline against which potential impacts from construction and operational phases of any project can be compared. A second important function of establishing a baseline for parameters such as air and water quality is to ensure that any problems arising from existing sources are not erroneously attributed to the project under study. In the present study the different environmental components, examined for setting baseline conditions of the project area, are physico-chemical, biological and socio-economical. In physico-chemical component, parameters included are land, water quality, air quality, climate, and noise.

13.4.1 Physical Environment

i.   *Climate*[5]

The project area is under tropical monsoon climate with three prominent seasons - summer/pre-monsoon (March to May), rainy/monsoon season (June to October) and winter season (November to February). The rainy season is hot and humid, and characterized by heavy rainfall, tropical depression and cyclone. The winter is predominately cool and dry. The

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[5] Source: Dhaka Metrological Station

summer is hot and dry interrupted by occasional heavy rainfall. Typical parameters of the weather elements, as recorded for the period of last ten years of observations (2003-2012) at Dhaka Metrological Station are presented in the following paragraphs.

ii. Temperature

The seasonal changes in temperature are noticeable throughout the year, with the warmest months being from April to October and the coolest months being January, February, November and December.

In the year 2012, the maximum temperature was 40.8^{oC} recorded in the month of June and the minimum temperature was 6.2^{oC} recorded in the month of January. The year wise temperature range for last decade is shown in the following table.

Table 13.1: Annual Temperature Data

Year	Minimum Temperature		Maximum Temperature	
	Degree (^{o}C)	Month	Degree (^{o}C)	Month
2003	3.4	January	41.4	May
2004	7.7	December	42.2	May
2005	7.5	January	42.8	June
2006	6.5	January	39.6	March
2007	6.2	January	40.2	May
2008	6.7	February	40.0	April
2009	6.1	December	41.5	May
2010	6.5	January	42.5	April
2011	4.8	January	38.0	June
2012	6.4	January	42.0	June

The above table shows the minimum recorded temperature throughout the last decade was 4.5^{o}C in the month January 2011, while the maximum temperature recorded 40.8^{o}C in the month June 2012.

iii. Relative Humidity

As would be expected, relative humidity during the wet season is significantly higher than those occurring at other period of the year. The relative humidity, at Rajshahi during the period 2003-2012 is well depicted by the data in the following table.

Table 13.2: Relative Humidity at Rajshahi

Year	Monthly Mean Humidity (in Percentage)												
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
2003	80	76	71	69	72	82	85	84	86	87	79	78	79
2004	82	70	64	72	67	83	86	85	88	83	77	77	77
2005	79	69	70	68	75	76	86	86	84	86	80	74	77
2006	75	71	58	69	76	84	85	85	86	82	80	78	77
2007	75	78	66	68	74	84	87	85	86	84	78	77	78
2008	78	72	68	66	75	86	89	86	85	83	78	85	79
2009	83	68	63	61	76	76	85	87	85	81	77	80	76
2010	80	69	61	67	74	82	83	83	85	85	80	79	77
2011	80	73	64	72	81	84	85	88	86	82	80	83	79
2012	79	66	58	69	67	80	86	85	86	80	78	85	76
Average	79	71	64	68	74	82	86	85	86	83	79	80	78

High air temperature is observed throughout the summer season; daily air temperature variations are insignificant; air humidity is high with abounding rains. The average relative humidity recorded during the last decade is 78%.

iv.   Rainfall

Rajshahi is located in highly rainfall prone areas and the annual rainfall ranges from 1100 mm to more than 1700 mm with an average 1750 mm per annum. Almost 80% rainfall occurs in monsoon and a negligible amount in winter. During the last decade the highest and the lowest annual rainfalls recorded were 1786 mm in the year 2004 and 792 mm in the year 2010. The monthly rainfall during the last decade is depicted in the following table.

Table 13.3: Rainfall at Rajshahi (in mm)

Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
2003	3	18	64	45	84	280	230	128	262	292	0	6	1412
2004	10	0	0	61	92	507	339	275	349	153	0	0	1786
2005	14	1	104	27	108	92	492	161	131	275	0	0	1405
2006	0	0	7	36	189	188	130	247	302	36	10	0	1145
2007	0	27	59	13	260	313	364	236	309	76	1	0	1658
2008	26	0	0	30	144	247	373	245	129	121	0	0	1315
2009	1	7	28	0	131	126	183	240	282	45	0	0	1043
2010	0	2	2	37	75	211	94	101	101	127	3	39	792
2011	6	0	10	94	187	341	144	454	203	35	1	0	1475

Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
2012	6	0	6	123	17	137	314	179	178	102	101	1	1164
Average	7	6	28	47	129	244	266	227	225	126	12	5	1320

The rainfall follows the general climate pattern with the highest rainfall in the summer months (June to September) and minimum rainfall in the cooler and drier months (November to March).

v. Topography

The construction site and its vicinity are relatively plain in nature.

Cyclone

Bangladesh is subject to devastating cyclones, originating over the Bay of Bengal, in the periods of April to May and September to November. Often accompanied by surging waves, these storms can cause great damage and loss of life. The cyclone may create winds with speed of 100-150 miles per hour piling up the waters of Bay of Bengal to crests as high as 20 feet that crash with tremendous force onto the coastal areas and offshore islands. As depicted in the figure below, Rajshahi is far away from the cyclone affected area.

Figure 13.2: Cyclone Affected Area in Bangladesh
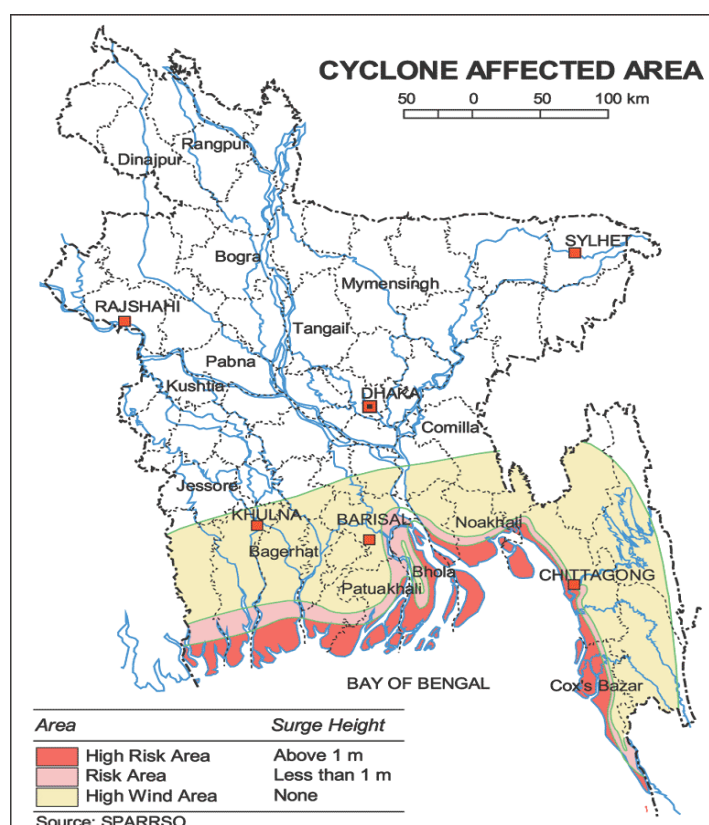
vii. Earthquake

Status of earthquakes Bangladesh is surrounded by the regions of high seismicity which include the Himalayan Arc and Shillong plateau in the north, the Burmese Arc, Arakan Yoma anticlinorium in the east and complex Naga-Disang-Jaflong thrust zones in the northeast. It is also the site of the Dauki Fault system along with numerous subsurface active faults and a flexure zone called Hinge Zone. These weak regions are believed to provide the necessary zones for movements within the basin area. Earthquake zone and seismicity with magnitude of scale are depicted in the following figure.

Figure 13.3: Earthquake Zone of Bangladesh
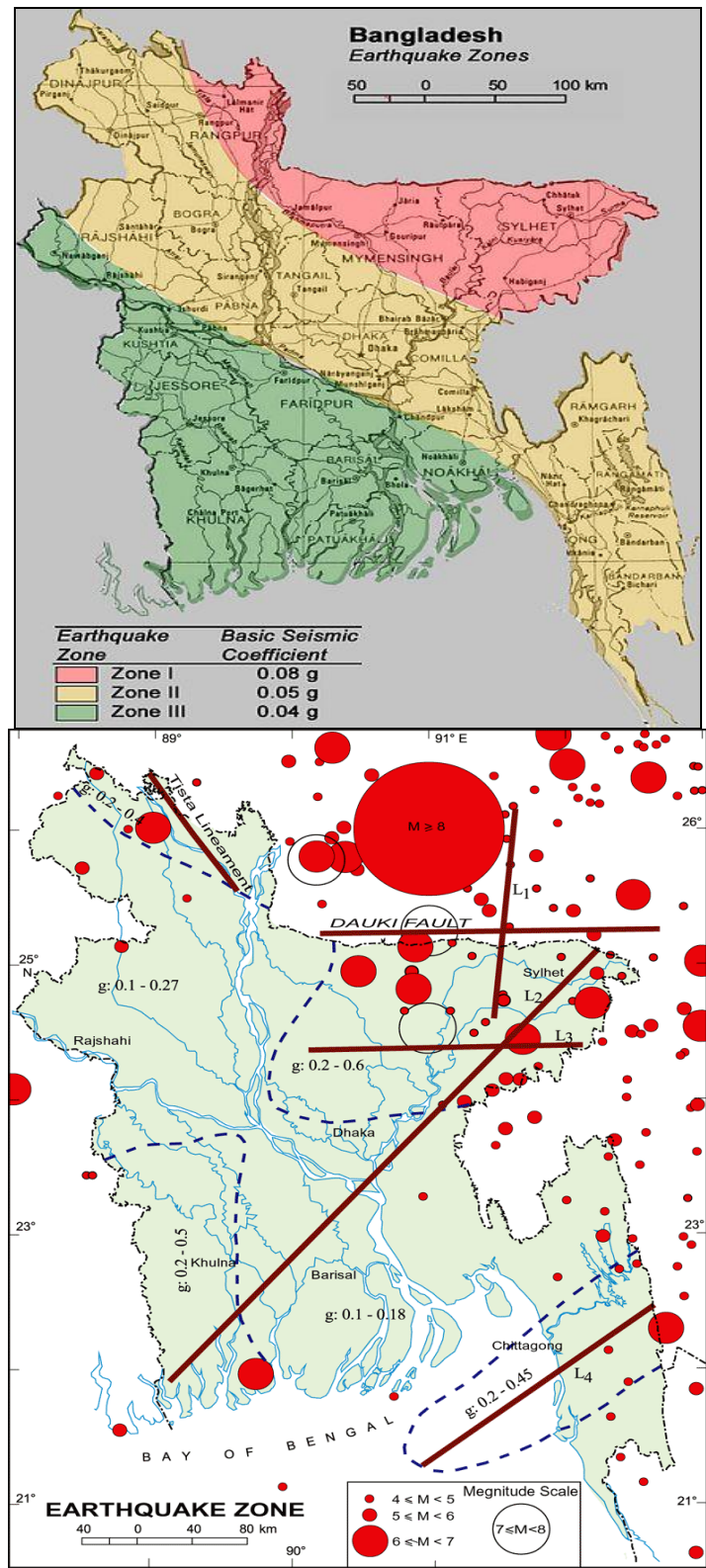
Rajshahi fails under Zone III with less seismic coefficient and far away from seismic sources. As such, Rajshahi is out of earthquake prone area.

13.4.2 Biological Environment

A preliminary assessment of floral and faunal diversity was carried out around the project site. The main purpose of the ecological survey were (i) to explore the plant and wildlife species with their national and international status, (ii) to investigate the distribution and abundance of flora and fauna including fish species, and (iii) to make the preliminary assessment of the impacts for the proposed project activities on the ecological environment.

i. Flora and Fauna

Two types of ecosystem exist in the project site and adjacent area viz. terrestrial and aquatic ecosystem. The project site comparatively has low floral and faunal density. Urban terrestrial ecosystem plays an important role within the existing ecosystem. The project site has some natural trees. Herb and shrub are few in number and some grows naturally adjacent to the project area. The site is predominantly covered by grassland, with traces of shrubs. The soil is generally covered with green grass that may be attributed to the climate. Weed plants and shrubs were also noted.

The Most of the homestead cover consists of timbers plant species, few medicinal plants and some vegetables and fruit trees. These provided roosting area for the local resident birds. The roadside vegetation is mostly planted.

The Padma is the habitat of good number of fish. The site is devoid of any large animals but there presence of pet animals. Local farmers however graze their livestock mainly goats and cattle at the site area. Insects and small birds were found at the project site. The terrestrial and aquatic flora and fauna at the project site are given in the following figures.

Figure 13.4: Terrestrial and Aquatic Flora around the Project Site

Figure 13.5: Terrestrial and Aquatic Fauna at the Project Site

13.5 Environmental Impacts at Different Phases

This section of the report presents the potential environmental impacts and mitigation associated with pre-construction, construction and operation of the ICT project and is based on 'superimposing' the project components onto the baseline compiled during the various studies.

All activities related to the lifecycle of the project will include appropriate mitigation measures to ensure that negative impacts are properly mitigated and managed. Mitigation involves identifying the best options to be adopted to minimize or eliminate negative impacts, highlighting the benefits associated with the proposed project and the protection of public and individual rights. Practical measures are therefore sought to reduce adverse impacts or enhance beneficial impacts of the project.

13.5.1 Pre construction Phase Impacts

This stage involves the design, planning and pre-construction activities of the project. Key activities to be considered include:

a) Vegetation clearing;

b) Transportation of materials to project site;

c) Public consultations;

d) Storm water management;

e) Visual intrusion;

f) Landscape design;

ii. Positive impacts during the pre construction phase

a) Public consultation

Prior to any development, a proponent is required to conduct public consultations and obtain feedback from the community on their views concerning the proposed project. Through this activity the proponent gets to know more on the views of the community about the proposed development and therefore incorporates appropriate measures in order to be in line with the needs of the community before implementation of the project.

b) Environmental Sound Design

The incorporation of renewable sources of energy and recycling of waste water into the design of the Rajshahi ICT Village development ensure that environmental considerations have been taken into the concept of the development making it environmentally friendly

iii. Adverse impact during the pre construction phase

c) Vegetation clearing

During site preparation, vegetation consisting of grasses, shrubs and trees will be cleared and the overburden removed so as to commence construction of the structures. Vegetation clearing is associated with loss of biodiversity, soil erosion, sedimentation and siltation, increased run off and degradation of surface water quality.

13.5.2 Construction Phase Impacts

The project is designed to be very beneficial to the economy through providing support for digital Bangladesh. However, the potential positive and negative changes resulting from the project activities are predicted for the project area during the construction phase and into operations. An outline of the impact assessment procedure is as follows:

a) Identification of the baseline receptors;

b) Identification of the key project activities;

c) Impact evaluation; and significance ranking.

In a project of this magnitude and complexity there are some impacts which could affect soil, and water quality, and which could cause hindrance (noise, dust, traffic) or pose safety hazards (health and safety). The majority of these impacts is less significant and could be avoided, prevented or mitigated by contractors adopting good operational practices and environmental management guidelines and by permanent monitoring and inspection. Mostly all impacts could be prevented or mitigated by environmental management guidelines.

The components of the environment that may be affected by the proposed project during construction period are stated below-

i. Effects on Water, Air and Soil Quality

Generally, any project site is required to raise its level from the existing ground level by earth filling. This land raising from its original level certainly disrupts the natural surface of the earth which will obstruct the natural drainage system of the area, if proper mitigation measures are not taken.

A landscape is a subjective concept that cannot be precisely quantified. However, in general, industrial building when not designed in considering the landscape, it creates visual intrusion to the people. The proposed project, changes the local landscape of the area to some extent by covering a green area into a built-up area. This will change the natural and visual equilibrium for the local people.

Any built up of the project should be designed considering the key criteria of landscape like coherence, readability, hierarchy, harmony and stability. It is understood that the project will have a modern architectural view which does not provide any significant visual intrusion.

Impact on soil is not expected to occur as the project does not use any toxic or any chemical for its process and operation.

ii. *Effects on Flora and Fauna, Ecosystem and Habitats*

The whole area is an urban mixed setting and does not represent any natural ecosystem of significance. The project will be on abandoned land previously owned by PWD for several years and it will be within the existing some establishment /offices premises all around. As such there will be no loss and displacement of agricultural land and encroachment into precious ecological resources. Intervention of flora and fauna and habitats is expected to be negligible due to setting up the facility and its operation.

iii. Effects of noise and emission

The effect of noise in the operation phase on ambient conditions is insignificant. The facility does not emit any green house gases.

13.5.3 Operational Phase Impacts

Though information technology i.e., computer use at all walks of life brings enormous benefit to the economy its adverse impact at operation level cannot be ignored. Its environmental impacts are often not realized or considered. These impacts are expressed throughout the manufacturing, use and disposal of computers, and thus require monitoring and an understanding of each stage of a computer's lifecycle. The impacts during operational phase can be briefed in the following paragraphs.

i. Social related impacts

During the construction period, temporary employment will be created. In recruitment of workers and technicians for the project priority will be given to individuals who are lived near to the project, including women. After finalization of construction there will be new permanent jobs created, most of them related to operation and maintenance (O & M) of the project. It is envisaged that about two thousand ICT professionals would be employed in the ICT Village. Besides, a large number of supporting staff involving in ICT business will contribute in the development of the economy.

The most significant positive impact of the proposed facility would bring economic   benefits to the local people through employment in construction and operation phase of the facility.

ii. Effects on Disposal of IT Equipment

The disposal of computers is a unique issue due to the fact that most computers are often disposed of before they truly become useless. In fact, the main reason for purchasing a new computer is not to replace a non-functioning system, but to keep up with rapidly changing technologies (Williams and Sasaki, 2003). One key term which is important for industry, the   government, and the public, with respect to computer disposal, is "upstream management"; the   various methods employed to reduce the amount offing-coming computer wastes before they are   disposed of for good (Williams and Sasaki, 2003). These methods embody the concept of Reduce, Reuse, Recycle, and have proven to yield many benefits, both environmental and socioeconomic.

iii. Mitigation Measure on Disposal Hazard

Reducing the amount of computer waste relies heavily upon the reuse of systems that   may be out of date, but fully functional. Reusing old computers can manifest itself in two main ways; by the selling or donation of old systems, or by up-grading existing systems (Williams and Sasaki, 2003). The

key concept with respect to reuse is to meet the user's needs with existing machines, while extending that machine's lifespan.

13.6   Socio-Economic Survey

The socio-economic survey was undertaken in the Project Influence Area (PIA). Most of Project Affected Persons (PAPs) whose homestead and livelihood would be adversely affected in the PIA. Most of the slums have been occupying the PIA for over 15 years. The construction of the proposed ICT village will have an adverse socio-economic impact for the PAPs, the occupants of these slums. The main purpose of the survey was to obtain baseline data on socio-economic environment of the project site. The findings will help ascertain the extent of likely socio-economic impact the project will have, and also help decide on further assessment and feasibility of resettlement of those who will be affected. The baseline data covered the following areas:

a) demographic (household composition by age, gender, relationship, ethnicity, education levels);
b) income and assets (individual, or collective incomes as well as ownership of land, livestock, shops, wood lots, among households) as well as expenditures;
c) occupation (farmers, teachers, shopkeepers, labourers, transporters, students, etc.);
d) access to public services (health care, water supply and sanitation, education, etc.);
e) attitudes and preferences on resettlement.

The socio-economic survey was carried out from 20 to 24 November 2013. There are over 600 households living in the PIA. The survey was intended to cover 5% of the number of households anticipated to be displaced by the project, which is translated to 30 households. Due to resistance and unwillingness of the PAPs to participate in the survey, the survey team covered a total of 17 households only. The PAPs oppose the project, as they fear losing their homes, livelihood and other productive assets.

13.6.1 Methodology of the Survey

The survey was conducted administering questionnaires to households which include those will be adversely affected by the project. The questionnaires were prepared on the basis of information collected from the secondary sources that helped to have an understanding of patterns of use of land in the project site and the understanding of social and economic factors that relate to those likely to be affected by loss of assets.

The questionnaire was tested in real field situation. It was revised during enumerators' orientation on the basis of feedback from field tests. The objective of pre-test was to examine suitability and effectiveness of the questions in eliciting adequate responses and to find out linguistic issues that create problems for the respondents. Qualified and experienced field enumerators were selected to conduct the survey and were provided with an orientation to explain the objectives and the methodology of the survey, administering questionnaires. A database entry program was developed in Microsoft Excel application and data entry was closely monitored.

### 13.6.2 Baseline Socio-economic Profile

The following section describes about the baseline socio-economic conditions of the project area. Based on a survey done on the PAPs, it includes factors such as socio-economic conditions, demographic distribution, education, occupation and access to basic services, etc. Most of the households have been occupying the proposed site for over 15 years. None of them has legal title to land. The construction of the ICT village will mean the displacement of many already economically disadvantaged individuals and households. The existing socio-economic characteristics of the project area have been described below in terms of the five major themes.

Theme # 1: Social Demography

The parameters considered under this category included a set of demographic characteristics such as age, gender, religion, marital status, etc. It also looks into factors such as occupational trends and residency duration of the occupants. This information helps us develop a better understanding of the socio-economic background of the people living in the project sites.

The gender distribution of the respondents was equal between male (50%) and female (50%). People in the age group 31-50$^+$ accounted for majority (close to 50%) of the respondents, meaning that they are actively involved in activities to earn their livelihood. In terms of religion, respondents were mainly Muslim (84%), and a small percentage was Hindu (16%).Most of the respondents claimed to be married (52%) and having family size of 4-5. Occupancy is another area explored by the survey. It was found that a significant number of respondents (47%) have been living in the area for over 15 years (See Fig. …).

**Figure 13.6: Living Duration / Tenure**
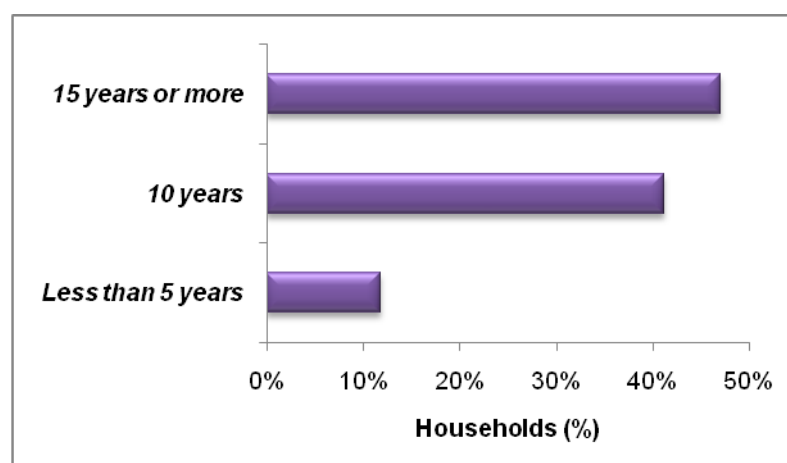
The overall literacy rate in the area was estimated around 66%, however a higher percentage of males (77%) were literate, as opposed to females (55%). On the other hand, 35% male and 10% female population of schooling age drop out during secondary level of school on various grounds, poverty being the main factor.

Theme # 2: Basic Services

For "basic services", the parameters considered include access to electricity, water, and sanitary/latrine facilities. Due to the illegal and unplanned nature of the slums, there is no access to electricity. All the households surveyed (100%) claimed to have no power in their homes. Many slum respondents rely on candle / kerosene oil for lighting. The picture is quite different when it comes to water supply. All of them have access to potable water either from tap water or from tube wells for daily use.

Figure 13.7: Access to Basic Services
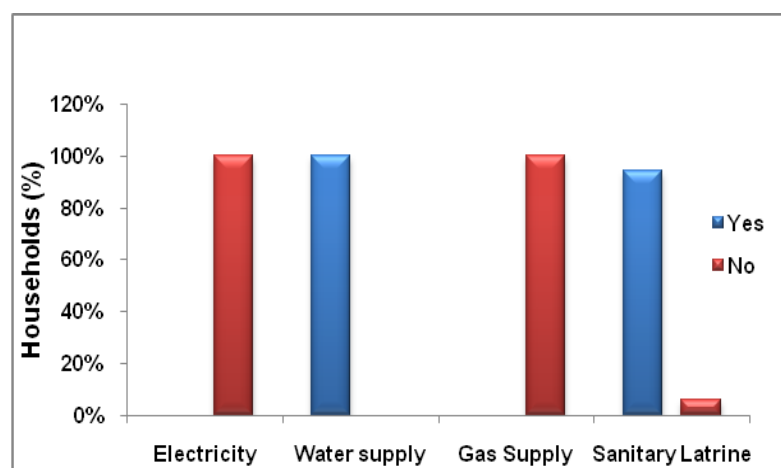
Fuel supply for cooking is a major concern to the population in the project area. No access to gas supply facility in this region. They use mainly firewood, cow dung or crop residues themselves from free sources for cooking. They also buy fuel for cooking (gas, electricity, or firewood).

Sanitary latrine facilities are a major issue in impoverished slum areas. The lack of proper facilities acts as a catalyst in spreading disease and creating unhealthy living conditions in poorer communities. In this regard, however a majority of the household (94%) responded to have sanitary toilets except a few have ring-slab and other forms of latrines.

Theme # 3: Land Use Pattern

A considerable area (close to 40 %) is classified as fallow land (bare, semi-natural grassland, or wetlands covered with sedges and reeds) and partly used for grazing cattle. The rest of the land is occupied by housing and settlement. In the project site, a significant number of semi-pacca houses exist – 65% of the surveyed households live in semi-pacca houses. Many of the respondents claimed that they use the land for commercial interest as part of the livelihood activity like – vegetation, mango orchard, livestock grazing, shops, etc.

Theme # 4: Income – Primary Occupation/Source

Women in the project area are mainly involved in traditional home-based reproductive and unpaid productive work. Male respondents have different occupations. The majority of the population being under age of 30 is consistent with the occupational distribution where the most respondents selected students (40%) as occupation. Housewife (24%) and Shop owners/Petty traders (10%) were the

second and third highest occupations respectively among the respondents. In general, the surveyed occupants all fell under 11 occupational categories.

Figure 13.8: Occupation Pattern
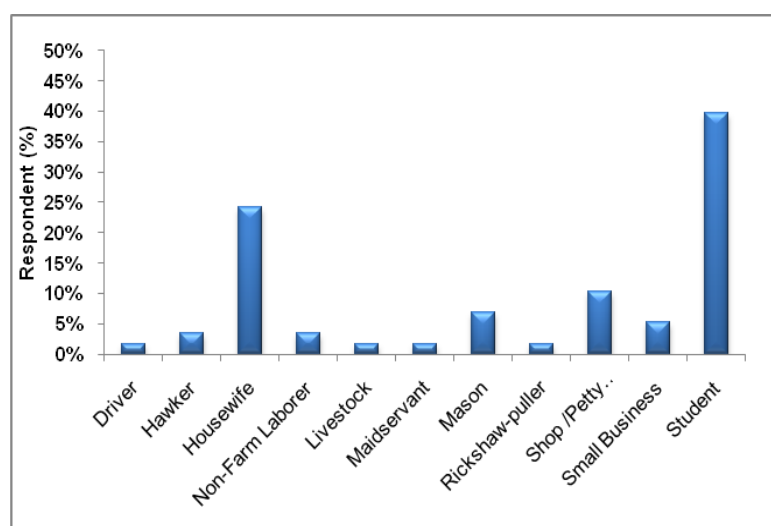
The average monthly income of PAPs derived from main occupation is less than Tk 5,000 that is generally considered to be the poverty line in Bangladesh. It is obvious that since the primary source of income will remain unaffected by the project, their regular livelihood will not get affected severely.

Theme # 5: PAPs' Preference to Resettlement

It is apparent from the survey that all the respondents expressed deep concern over losing their homestead, livelihood and other productive assets. The large displacement this project will have a large socio-economic impact. They demanded adequate compensation of all losses at replacement value during the process of resettlement. The PAPs prefer to move to a site near by the city with access to essential utilities, given support with finding work or re-establishing their small business.

Figure 13.9: Survey Photographs

13.7 Social Impact Analysis

At a broader system level, ICTs influence economic growth and bring about technological and societal change. Yet, while the increasingly widespread use of ICTs has changed people's lives dramatically and boosted economic growth, ICTs themselves, due to this success, are a growing contributor to greenhouse gas emissions. On the other hand, they probably provide the most significant opportunity to reduce greenhouse gas emissions in the major high emission industries of energy generation, waste disposal, building and transport.

13.7.1 Social Impact Assessment

The social impact of the facility is given below.

i. **Increase Job Opportunities:** The proposed ICT Village would increase the possibilities of suitable employment to the locals.

ii. **Increase Land Value and Demand for Houses:** The presence of Rajshahi ICT Village will increase the value of land as there will be demand for land to construct additional houses to meet the needs of professionals and other staff who will work in the facility.

iii. **Opportunities for Business:** Rajshahi ICT Village will generate extra business opportunities using faster communication technology. The increased business opportunities are expected to contribute to local as well as economic development of the country.

iv. **Increased and Improved Infrastructure:** The ICT Village would contribute towards provision of improved infrastructure facilities like supply of drinking water, roads and transportation. The improved roads and transport would not only help business and trade but also with access to education and health care facilities in addition to improving social relations and network.

v. **Effects on Human Health, Occupational Health and Safety:** The facility will be operated in a clean operation process and operation does not involve toxic chemicals or hazardous substance, human health and occupational health concerns are expected to be minimal out of its operation.

vi. **Fire fighting provision** will be maintained with adequate fire fighting equipment against the fire hazards with first aid medical facilities and proper ventilation.

vii. **Involuntary Resettlement** of squatters residing within the project area is often a major issue which needs to be dealt with adequate care. This issue has been briefly described in the following section of this report.

13.7.2 Resettlement of Project affected People

During the survey at project site, it is understood that there are more than 600 households with significant number of semi-pacca houses, which are being used for residential purpose by the slum dwellers. With large displacement of these households, there appears to be significant issue of resettlement.

Acquisition and Requisition of Immovable Property Ordinance, 1982 is currently the only legal framework that governs land acquisition in Bangladesh. The provisions

in the Ordinance do not permit to resettle the illegally occupied tenants in the project area.

One of the major gaps in the existing legal framework of Bangladesh with respect to OP 4.12 of the World Bank is as follows.

Eligibility for Compensation: The law stipulates compensation only for the persons who appear in the land administration records as the owners. It does not recognize the rights of those, such as squatters, who do not possess a legal title to the lands they live in or make a living from. There is thus no provision to mitigate the adverse impacts they suffer.

Entitlements to affected people without legal rights to land: Lack of ownership does not imply ineligibility for compensation rights. The lack of legal tenure to land or assets will not be regarded as a criterion for withholding financial compensation or assistance in relocation. Executing Agency will strive to provide suitable alternatives to resettle displaced squatter communities. The affected squatters will be carefully screened to ensure that resettlement and rehabilitation assistance is provided only to vulnerable families.

Relocation of displaced squatters: EA will explore all possible housing options to relocate severely affected/displaced squatters to minimize long-term social and economic impacts of displacement and to enable them to restore their livelihood and incomes levels within least possible time. In order to minimize disruption of existing social ties and sources of incomes and employment, particularly for affected persons, the priority will be to relocate them as close as possible to the existing locations with access to facilities and services better than, or at least similar to, those lost. Affected households will be provided with viable options for relocation that may include, among others: self-relocation; special package for transfer to the place of origin; and relocation to a suitable resettlement site either on available other public land or at other locations within the city.

13.8 Outline of Environmental Management Plan

This section of the report presents an Environmental Management Plan (EMP) for the scheme which outlines the management mechanisms (i.e. working arrangements) for how the environmental and social elements of the project will be managed from detailed design, construction and operation.

The purpose of the EMP is to ensure that any potentially negative environmental impacts during construction and operation are kept at an acceptable level. It sets out to ensure that all aspects of the works comply with the relevant legislation, license conditions and good practice and those measures to mitigate impacts identified are implemented.

The EMP contains environmental requirements which are required for the successful implementation of mitigation measures, environmental monitoring, emergency measures and environmental auditing to be carried out during the construction works on the site. The implementation of mitigation measures and emergency measures shall be the responsibility of the project proponent. The proponent shall ensure compliance with all environmental legislation, regulations and conventions. The responsibility for environmental monitoring lies with the Implementing Agency.

The contractor of the investor will be contractually required to conform to the requirements specified in the EIA and EMP and will be accountable to the private investor.

13.8.1 Principles of EMP and Detail Plan

The project should be implemented taking into account the need to minimize potential negative impacts and maximize its potential positive impacts on the biophysical and socio-economic environment as well as health and safety of workers and the public - this commitment must be made at various levels, from the senior management level of the project company, to the levels of all parts involved in the implementation. EMP includes monitoring activities:

Table 13.4: Environmental Management Plan

	Issues	Potential Impact	Mitigation Measures	Phase/s	Responsible Organization/ Person	
					Implementation	**Monitoring**
1.	Clearing the ground for construction site	Soil erosion, vegetation disruption	• Re-vegetation and soil compaction can be minimized the effects.	Construction	Contractors and Supervising Consultants	Project Implementation Unit (PIU)
2.	Surface and ground water pollution	Contamination surface water or ground water	• Wastes should be disposed of properly away from site. • Septic tanks and soak wells should be with proper design. • Pollutant materials such as fuels, lubricants, detergents, cement and others must be handled properly to avoid spills; • Minimizing disturbance of the groundwater level; • Washing of vehicles and equipment on the site shall be restricted. • the system for the sludge/slurry/ back wash water production should • ensure minimization of leakages of it to groundwater.	Design and construction phase	Contractors and Supervising Consultants	PIU
3.	Air/Dust pollution	Health hazard to labours and residents	• Watering of dusty roads; • Sprinkling and covering stockpiles; • Water will be sprayed to suppress dust on an as required basis in construction phase.	Construction and operation phases	Contractors/ Supervising Consultants	PIU

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Issues	Potential Impact	Mitigation Measures	Phase/s	Responsible Organization/ Person
4. Noise/ vibration pollution	Hearing hazards to labours and residents	• Scheduling of transportation not to disturb the community; • The vehicles and equipment should be inspected regularly to ensure its proper functioning and limit the release of fumes/noise; • The machineries should have silencing devises • Ear muffs will be supplied for workers to wear, when working close to machinery to protect noise. • Vibrator insulator/ pad will be placed under electric pump/ motor as well as diesel generator to protect / minimize vibration and false wall within/ besides the main wall of motor/generator room will be constructed to protect noise. • Canopy built generator should be provided.	Construction and operation phases	Contractors/ Supervising Consultants PIU

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	Issues	Potential Impact	Mitigation Measures	Phase/s	Responsible Organization/ Person
5.	Waste/ sludge disposal Management	Contamination of biotic environment	• Wastes and debris should be disposed properly • Construction debris must be stockpiled and removed to a safe site. • Do not drop or expose any debris while transporting. • The retention/ settling basin, given its potential for environment contamination, should be designed so as to avoid any risk of either groundwater (through infiltration) or surface water and soil (through leaks, cracks, overload, etc.) contamination. • The retention/ settling basin be based on soil or rock, capable to support the maximum load of the basin; • The width of the limits of the basin must also be sufficient to support a rapid level rise that can happen in the retention/settling basin as a result of heavy rainfall. • Finally, the transference of retention/ settling sludge to the landfill of inert material should be made to avoid any contamination of soil or water.	Pre-construction, construction and operation phases	Contractors/ Supervising Consultants PIU
6.	Soil erosion	Land slide/ battered slope, rain-cut etc.	• Ensure, layer to layer compaction, soil stabilization measures • Re-vegetate and restore disturbed soil • Shrubs/ herbs and Tree plantation may reduce soil erosion.	Construction and O&M phase	Contractors/ Supervising Consultants PIU

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	Issues	Potential Impact	Mitigation Measures	Phase/s	Responsible Organization/ Person
7.	Loss of soil fertility due to cut of top soil layer for construction	soil layer occurs for construction, soil fertility	To avoid loss of soil fertility, due to cuts of top soil layer for construction, the surface soil should not remain at a lower level of the soil profile where it was but be on the top.	Construction phase	Contractors/ Supervising Consultants
					PIU
8.	Trees and vegetation	Deforestation and desertification	• Enhance environment by tree plantation in proper place of the project premises and by the approach road side • Re-vegetation of barren surfaces be encouraged.	Construction phase and Operation phase	Contractors/ Supervising Consultants
					PIU
9.	Additional burden on utilities	Stress on water supply, energy, sewerage and communication	• Ensure adequate provisions for facilities with concerned organizations • Proper O&M for sustenance of the structures and approach roads. • Harvesting rainwater to reduce pressure on drinking water supplier	Construction phase and Operation phase	Contractors/ Supervising Consultants
					PIU
10.	Water supply and sanitation	Incidence of diseases	• Ensure adequate supply of drinking water to the labour. • Sanitation facilities for male and female workers separately. • All main pipes and connections to be used in subsurface must be inspected.	Construction phase and Operation phase	Contractors/ Supervising Consultants
					PIU

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Issues	Potential Impact	Mitigation Measures	Phase/s	Responsible Organization/ Person
11. Health and safety	Health hazards and general safety of workers and people	• Arrange training for contractors and workers. • Workers involved with the operation should use personal protective equipment compatible with the work to be performed. • Make mandatory the use of personal protective equipment (uniforms, fluorescent vests, boots, gloves, ear protection plugs, protective glasses, etc.). • The water supply provided to the construction site must comply with the standards of potable water. • Ensure that adequate first aid equipment is available and that all workers are properly trained to use. • Permanent fencing will be established around the perimeter of the Facility. • Provision and inspections of fire fighting equipments and fire hydrant system in all sections.	Construction phase and Operation phase	Contractors/ Supervising Consultants PIU

13.9 Monitoring

Monitoring of the performance of the facility is very important and sometimes vital. An industrial unit in Bangladesh generally monitors the quality of its raw material and product, but not the related environmental parameters, thereby neglecting environment. It should be mentioned here that the monitoring program should be such that it can ensure compliance with national environmental standards and legal requirements. The importance of this monitoring program is also for ensuring that the plant does not create adverse environmental changes in the area and providing a database of operations and maintenance which can be utilized if unwarranted complaints are made.

For surveillance of the performance of the equipment and the quality of the environment, monitoring of the environment of the work-zone and the general environment should be performed on a regular basis. The key objectives of monitoring are:

i. Ensure that the ESMP is implemented;

ii. Evaluate the effectiveness of the mitigation measures;

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iii. Verification of predicted impacts;

iv. Provide feedback to DOE/ licensing authorities.

Management can help reducing potential of any pollution or environmental concern, changes of accidents by putting trained operating personnel for effective operation and maintenance because it is the key for successful performance of any environment management system.

13.10 Way Forward

The analysis described above hinges on baseline data of affected area of the proposed project. It has identified the likely impacts of the project on environment and inhabitants. A preliminary environment management plan (EMP) including a monitoring program has also been outlined. Based on the analysis, an Initial Environmental Examination (IEE) report can be prepared to obtain Site Clearance Certificate (SCC) from DoE. The IEE report will include a terms of reference (ToR) for the Environmental Impact Assessment (EIA) and needs approval from DoE. After receiving the SCC, the project proponent needs to proceed for Environmental Clearance Certificate (ECC). For obtaining ECC, they have to prepare ESIA report and submit it along with the following documents.

- Feasibility Report
- Environmental Management Plan (including process flow diagram, layout plan, effluent treatment plant and its effectiveness)
- Emergency Plan relating to adverse environmental impact and plan for mitigation of the effects of pollution
- Detail Plan for addressing the DoE approved ToR

After approval of ESIA, construction of super-structure and erection of capital machinery can be done. ECC needs to be obtained before commercial operation starts.

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Project Implementation

## 14   PROJECT IMPLEMENTATION

14.1   Project Implementation

Project implementation includes all activities that need to be undertaken in reality. Following sections describe the activities for successful implementation of this project.

The key stages of this project are given in the following table. Immediately after this study, the stages will start. The estimated duration for each of the stages is also provided below:

Stage	Period
Stage 1: Engagement of Private Investor (RFQ and RFP)	1 year
Stage 2: Construction	3 years
Stage 3: Operation and Maintenance (O&M)	27 years[6]

The following figure shows the activities at different stages of the project.

Figure 14.1: Sequence of Proposed Activities
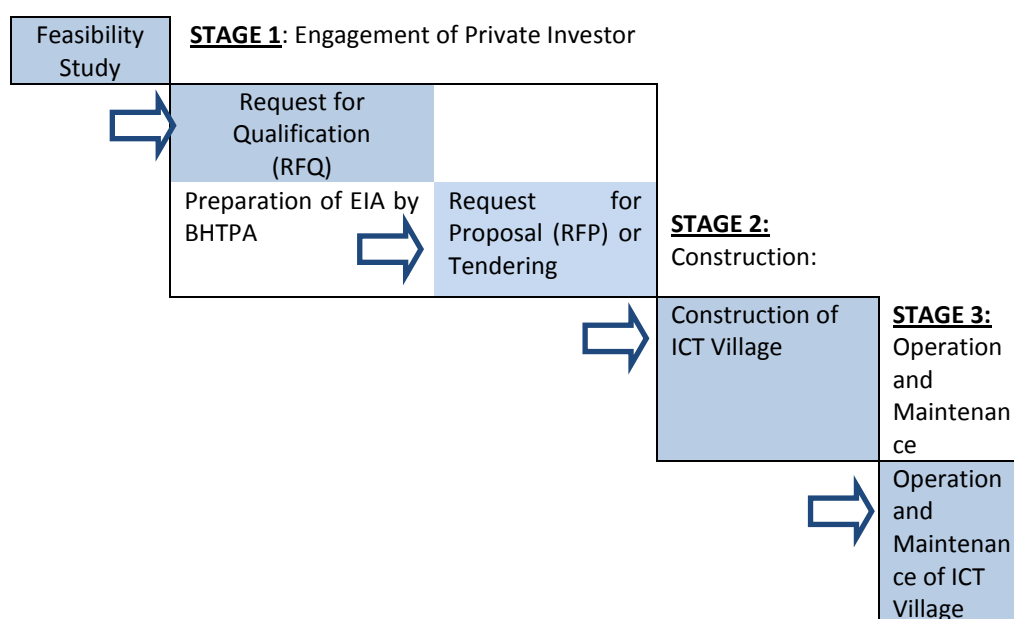
14.1.1 Stage 1: of Private Investor

At Stage 1, BHTPA with the help of transaction advisor will carry out the following activities to engage the Private Investor.

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[6] In the case of any permitted delay in any stage, an appropriate extension of the concession period will be considered as a remedy to the project company. Such extension will be specified in the PPP Agreement.

1.   Preparation and submission of Information Memorandum (IM) for the Project
2.   Publishing notification in newspapers for qualification document and arranging a conference for the interested investors
3.   Assessing qualification statements and notifying the qualified prospective investors
4.   Preparing tender document
5.   Publishing of tender notification in press and providing tender document to the prospective investors
6.   Arranging pre tender conference and providing clarification to the queries of the prospective investors
7.   Modifying tender documents (on agreed issues of the queries of investors)
8.   Forming a tender evaluation committee and evaluation of the tenders
9.   Issuing a Letter of Intent (LOI) to the successful investor, negotiating with the successful investor and receiving performance guarantee from Private Investor
10. Signing PPP agreement (Contract) with Private Investor

14.1.2 Stage 2: Project

This phase will begin after the financial closure by the investor and issuing request for the commencement of construction by BHTPA. In this phase the project finance will be drawn down and the supply, EPC contractor and subcontractors, engaged by the SPC, will start construction, testing and commissioning of the different components of the project according to construction schedule.

The major responsibility, related to the implementation tasks in this phase, will be borne to the SPC. With the support of consultant, BHTPA will have to work intensively on Contract Management. However, a management team from BHTPA will need to be in place from the outset to ensure timely and satisfactory construction completion and successful operation of the project.

Project management team of BHTPA will oversee the tasks related to project construction and its commissioning. In this stage, the core responsibility of BHTPA will be:

- To take steps in resolving differences in the interpretation of tender conditions
- To monitor the progress of project delivery and quality of work
- To oversee the conduct of required tests, evaluate the test results and take decisions as required
- To consider variations in the contract and take necessary steps

- To inspect equipment to be installed
- To provide certification and approvals as may be needed under the contract.

The construction phase will end with successful commissioning of the project. The start of construction will depend upon the PPP option chosen. The milestone of this stage will be the commercial operation date (COD), and the project will start delivering the contracted services. In the case of any permitted delay, this phase will be extended for a reasonable period.

14.1.3 Stage 3: Operation Maintenance

Operation and Maintenance (O&M) phase will be effected from COD. In this phase the SPC will operate the business as per the contract. Overall business operation, strategic planning in complying with the contract and necessary maintenance of the buildings will be the core responsibilities of the SPC. On a periodic basis the SPC will submit report on O&M activity to the BHTPA. For any material change from the contract, the SPC will need the consent from the BHTPA.

The major tasks, at this stage from government/BHTPA's side, will include the following:

- Contract Management
- SPC's O&M activity review
- Dispute Resolution as per the contract (if required)

This stage will continue up to the end of Concession Period. Intensive contract management by the government/BHTPA will be required at this stage. At the end of this stage, the Private Investor will be disengaged. The method of disengagement will depend upon the model of private sector participation.

14.2   Environmental Clearances

As per the Environment Conservation Rules, 1997 of Bangladesh, ICT Village at Rajshahi may be labelled as Orange B category for taking the environmental clearance from Department of Environment (DoE). If the project needs to be financed from the private sector window or any private sector financing facility of multilateral donors like the IPFF, carrying out necessary EIA and SIA as per the standard Environmental and Social Management Framework (ESMF) needs to be carried out. The following steps need to be adopted with respect to environmental clearances with respect to the new facility.

14.2.1 Obtaining Site Clearance Certificate

The new facility needs to obtain Site Clearance Certificate (SCC) first. For obtaining SCC the documents in the footnote[7] needs to be submitted to the DoE. Upon receiving Site Clearance Certificate the Private Investor may undertake activities for land development and infrastructure development.

14.2.2 Obtaining Approval for Environmental Impact Assessment

The new facility need to have EIA report to be approved by the Department prepared on the basis of program outlined in IEE Report along with time schedule and ETP design.

As a linked project, the EIA has to be initiated by BHTPA, possibly supported by the IPFF project, just after the Feasibility Study is completed. Either before or soon after the award, the EIA needs to be completed. With the EIA prepared by BHTPA, the Private Investor may apply for clearance of the EIA to the DoE. Upon receiving EIA clearance from the DoE, the Private Investor may start seeking funds from outside sources.

14.2.3 Obtaining Environmental Clearance Certificate

After obtaining approval for EIA, the Private Investor will apply for Environmental Clearance Certificate (ECC). For obtaining SCC the documents in the footnote[8] needs to be submitted to the DoE. Without ECC, the new

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[7] For obtaining SCC the following documents need to be submitted by BHTPA to DOE:

    (a) Application Form
    (b) Feasibility Report
    (c) Initial Environmental Examination (IEE) report including the terms of reference for the Environmental Impact Assessment of the unit or the project and its process flow diagram
    (d) No objection certificate of the local authority.
    (e) Emergency plan relating adverse environmental impact and plan for mitigation of the effect of pollution.
    (f) Outline of relocation, rehabilitation plan (where applicable).
    (g) Other necessary information (where applicable).

[8] For obtaining ECC the following documents need to be submitted by MPA to DOE:

    (a) Application Form
    (b) Feasibility Study
    (c) Description of raw materials
    (d) NoC of local authority
    (e) Income tax certificate
    (f) Location Map
    (g) Layout plan
    (h) Process flow diagram
    (i) Mouza Map
    (j) Ownership dalil or lease-holding contract
    (k) Registration of Board of Investment

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facility will not receive utility connection, and cannot start operation.

14.2.4 Responsibility with respect to Environmental Clearances

The following table shows the responsibly of BHTPA regarding the Environmental Clearances:

	Tasks
(a)	Preparing IEE
(b)	No Objection for Local Authority
(c)	Submitting application for SCC
(d)	Preparing EIA
(e)	Submitting application for EIA Approval and receiving EIA Approval
(f)	Preparing all supporting documents for submitting application for ECC (except items d, e, i, j of footnote 2)

14.3 Pilot Programme during Construction Period

It is evident from the findings of market survey that most of the IT companies do not have much motivation to relocate to the proposed ICT Village, except those companies having expansion plans. However, it is expected that in the long term, the ICT Village will become a tech-hub for accommodating large domestic players even global IT services players for setting up their software development centres and BPO facilities. Hence, the need for promoting entrepreneurship is highly critical.

The proposed ICT Village project is currently in the design phase. It will take about three to four years for the construction works to be completed. Considering the time lag of four years before it comes into operational, the authority may work out a plan to kick-start ICT development activities by promoting ICT-based entrepreneurship in that locality. To this end, BHTPA may undertake a pilot programme to set up an incubation ecosystem. A local business incubation ecosystem will help nurture entrepreneurship by providing support to early-stage start-ups. The ICT Village will gain when these start-up companies become regular occupants after a certain period.

(l)   Certificate from BoI./Bank/financial institution indicating date of establishment of the facility
(m) License from Fire Service
(n) IEE report
(o) EMP report

14.4   ICT Business Incubation Ecosystem

To create an incubation ecosystem, it is imperative to have linkage to centres of excellence and IT industry body. The authority may adapt institutional arrangements by entering into a tripartite partnership with BHTPA as the executing agency, Rajshahi University of Engineering and Technology (RUET) as the centre of excellence and BASIS as the industry body for the ICT sector. The partnership will provide a satisfactory basis for the proper management of the incubation facilities.

Figure 14.2: ICT Business Incubation Ecosystem
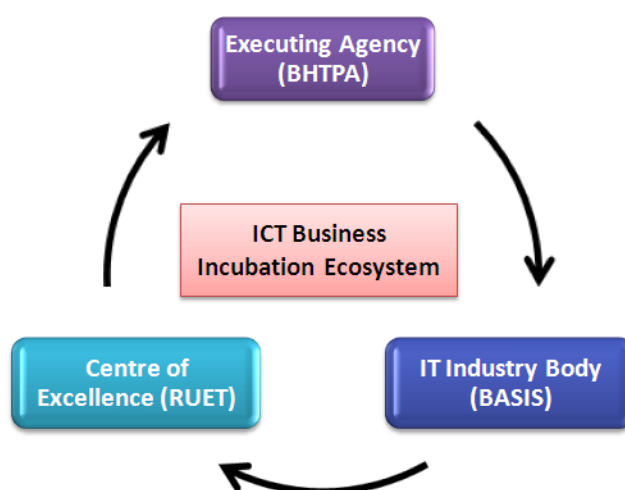
A typical ICT incubator provides business services, training, mentoring, and reasonably priced space, connections to industry and academia, and introductions to potential investors and links to global markets.

14.5   Roles of Parties Involved

The tripartite arrangement needs to stipulate individual roles of involved parties (*i.e.* BHTPA, RUET and BASIS). Some of the major activities are mentioned as follows:

- BHTPA will play a supportive and proactive role in formulating efficient institutional and implementation mechanism for the incubation ecosystem. They will monitor periodically to observe the progress of the facility.

- Unlike other industrial clusters, ICT Villages are not constrained by factors such as the availability of natural resources, or raw materials. The key resource requirement is availability of quality manpower. Therefore, close working relationships with academic institutions such as universities and colleges and R&D institutions are essential to bring world-class IT training standards and certifications to foster skills development and to promote innovation. RUET will play vital role in this regard.

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- BASIS facilitates market development through networking and business linkage events as well as brand promotion of the industry at domestic and international level. For this incubation facility, it will act as a bridge between industry and start-ups. It will also maintain interaction with universities on industry's current and future skills requirements for ensuring necessary changes in curriculum.

The incubator can be set up at rented facility in a cost effective way rather than constructing a new one and may continue its operation there for about four years. By that time the proposed ICT Village will came into operation and consequently, the incubator can be relocated to the Village permanently.

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Conclusions and Recommendations

15   CONCLUSIONS AND RECOMMENDATIONS

The results of the feasibility study indicate that development of ICT Village at Rajshahi through PPP will be financially viable when some major steps are taken to structure the project. The proposed steps are discussed below:

15.1   PPP Option

The financial model has been prepared based on **Model C: Concession PPP Model (BOT)** as the base case. Under this model, the Private Investor will be responsible for land development, construction of internal infrastructure such as internal roads, drains etc, and construction of MTB. After construction completion, Private Investor will lease out office space in the MTB and the industrial plots. In return for the right to use BHTPA's land, the private investor will pay Royalty to BHTPA. Royalty payment will be in two forms:

- Upfront payment of Tk 5 million at signing of PPP Contract
- Yearly payment of 2% of Gross Revenue

Private Investor will also be responsible for operation and maintenance of the ICT village including the MTB and Industrial plots throughout its PPP Contract Term. After end of Term, the O&M of the ICT Village will be handed back to BHTPA. BHTPA will be responsible for construction of the Dormitory and the Residential Buildings with its own fund or with support from donor agencies.

Financial analysis of the base case option demonstrates that the project will not be financially viable under this model.

Financial analysis of Model D has been conducted as an alternate PPP options. In this model, private investor will not operate the ICT village for 30 years but for only 10 years. However, they will be allowed to transfer the leaseholdings of the built-up space for long term leases (99 years) to building tenants. In this model, private investor will pay royalty to BHTPA in the amount of:

- **Upfront payment of Tk 500 million at signing of PPP Contract**
- **Yearly payment of 5% of Gross Revenue**

Financial analysis of this option demonstrates that the project will be financially viable under this model. Higher rates of return in Model D compared to Model C as well as shorter payback periods indicate that Model D will be more attractive to private investors. BHTPA will also earn significantly higher royalty in Model D, compared to Model C.

15.2   Environmental and Social Impact

o   No major irreversible impacts are expected from the project. Being largely focused on the service sector, levels on environmental are low compared to other infrastructure projects.

o   Adequate measures should be undertaken during construction phase of the project in order to mitigate environmental hazards like air and noise pollution, traffic congestion etc.

o   There are over 600 squatters living in the project area. Relocation/ Resettlement of squatters is often a major issue which needs to be dealt with adequate care.

15.3   Site Improvement and Civil Constructions

o   The land on the western part of the I-bund is quite stable and high. Construction work for MTB building can start immediately with relatively less earth filling.

o   The eastern part of I-bund is low in elevation and has some ponds. This part will need more and higher level of earth-filling for site development.

o   During site development and earth-filling proper compaction of filling works will be an important part to monitor.

o   During construction of the MTB and other buildings, best standard practice is to be maintained and the Bangladesh National Building Construction Codes must be followed.

o   The course of river Padma on the south side of the site must be monitored. Necessary embankment construction or river protection works may be undertaken (with help of BWDB), if required.

15.4   Promoting ICT–based Entrepreneurship

o   As is evident from the market survey that a small number of software development companies are operational at Rajshahi and local demand for ICT based service is very low.

o   It is imperative to promote ICT based entrepreneurship by providing support to early-stage start-ups. As part of promotional activities, it is necessary to create awareness among the general public about the ICT Village specifically its functions and facilities.

o   Provision of angel investment, venture capital, and private equity have been identified as key enablers, specifically for development of start-ups and small and medium enterprises.

o   It is highly recommended to construct immediately the data center in the core business facilities in the ICT Village. The data center should have collocation as well as shared-service facility to grow and attract

specifically BPO companies/ start-ups to start business with minimal set-up. As conformance to good practice, emphasis should be given to ensure that it fulfils all the criteria of Tier level III standards.

- 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. A clearance agency with a physical presence in the ICT Village would facilitate the service in coordination with other Ministries, agencies and departments. Thus, delays on account of clearance/regulatory processes will be minimized.

15.5 ICT Business Ecosystem

- The authority may create an incubation ecosystem forming partnership with centres of excellence and IT industry body.
- It may adapt institutional arrangements by entering into a tripartite partnership with BHTPA as the executing agency, Rajshahi University of Engineering and Technology (RUET) as the centre of excellence and BASIS as the industry body for the ICT sector.
- Considering the long construction time and small industry size at Rajshahi, BHTPA can set up the incubator at rented facility in a cost effective way rather than constructing a new one and may continue its operation there for about four years. By that time the proposed ICT Village will came into operation and consequently, the incubator can be relocated to the Village permanently.
- In addition, it is highly recommended to ensure reliable supply of electricity and hi-speed internet connectivity. The authority should provide full support for the development of skilled workforce aligned with the IT-based service industry.

15.6 Next Steps

For successful project implementation, it is important to have a Project Management Unit in place in BHTPA. The unit needs to be assigned with the responsibility of project implementation including all the critical issues regarding this project. The management structure should involve a project team headed by a Project Director/Manager. The composition of the team may be changed time to time to meet the specific expertise needed during any phase of the project.

The appropriate model of inviting Private Investor and the Private Investor's scope of work that is suitable for the investors needs to be decided by BHTPA. A list of potential investors needs to be prepared, and the concept needs to be conveyed and consulted through a consultation paper in the Investor Promotion Meeting. In addition, steps need to be taken to start