ICT in Rural Development of Bangladesh : Investigation/ Observation on Present Growth and Guidelines

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Abstract

Information Technology (IT) is this era's and obviously forthcoming era's apex priority for engaging globally in terms of swift and easy communication for all. Information Technology is the branch of engineering that deals with the use of computers and telecommunications to retrieve, store and transmit information. IT is comprised of computers, networks, satellite communications, internet and automated office equipment. The information industry consists of all computers, communications, and electronics-related organizations, including hardware, software and services. The research considered that enterprises as small enterprises (to eliminate the confusion about the definition) that have less than 100 employees across the company, including all employees at all locations or branches.

Keywords: RDB (Rural Development of Bangladesh), Information & Communication Technology (ICT), Information Technology (IT) adoption, Small Scale Enterprises (SMEs), Gross Domestic Product(GDP). BTRC (Bangladesh Telecommunication Regulatory Board), and BTCL (Bangladesh Telecommunication Company Limited), Telecommunication, Networking, AMTUC – Agriculture, Mining, Transportation, Utilities and Construction, FIRE – Finance, Insurance and Real Estate (properties business)

1. Introduction

Govt. of Bangladesh has identified *ICT* as one of its important areas and has already formulated the ICT Policy. The regulatory bodies like ICT Task Force, BTRC (Bangladesh Telecommunication Regulatory Board), and BTCL (Bangladesh Telecommunication Company Limited) (formerly BTTB-Bangladesh Telegraph and Telephone Board) were mandated to enforce the IT & Telecom Act to facilitate the growth of IT and telecommunication with access to affordable information services at acceptable quality. *Telecommunication* sector has gained the historical growth over the last decade. The growth

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rate for PC and Printer marketing Bangladesh in the last year was only around 20%. Among the small industries, the usages level of PC and Printer is not satisfactory at all. *Networking* has emerged as a conceptual device and has become increasingly important in small enterprise development (Curran 1992). The growth in this sector depends on the usages level of PC. About 30% businesses are working in this environment. Indeed, this is satisfactory. Over the last ten years, there has been development of a new data industry known as *internet services*. Although there has been more than 200 ISPs in Bangladesh, this industry failed to experience high growth. Weak networks, low investment capacity, poor quality and high cost of services and lack of service innovation are major causes of slow growth of this sector.

2. Objective Of The Study
The study has been conducted keeping the following objectives in mind:
   i.   To analyze present situation of IT adoption, usage and attitudes of small scale organizations/enterprises in Bangladesh
   ii.   To identify the constraints faced by IT sector in small Industries in Bangladesh
   iii. To suggest remedial measures to overcome these constraints

3. Methodology
Population of the study is the small enterprises in Bangladesh that have less than 100 employees across the company, including all employees at all locations or branches. Data have collected either from the owners, CEO or from managers of the firms. Having the intended successful interviews (of 150 samples) approach gone to 325 firms among the cities and clusters. Finally 165 successful interviews were conducted. Both primary and secondary data were collected for the study purpose. Primary data were collected by face to face comprehensive interviews with a structured questionnaire. The questionnaire was pre-tested on a small sample of 20 randomly selected respondents. Minor adjustments were made to ensure conciseness, objectivity and clarity. Secondary data were collected from research articles, textbook and other published and unpublished research materials on the issue. The research covered the three main metropolitan cities: Dhaka, Chittagong and Khulna. Every city is divided into 9 clusters to ensure better representation. All enterprises segmented into 7 broad headed classifications by its nature and these are respectively AMTUC, Manufacturing, Wholesale trade, Retail trade, FIRE, Professional Business and Other Services to collect information. Educational institutions, non-profit organizations, religious organizations, charities, state or local government department were excluded in the classifications. Businesses operated from home were also not covered. Furthermore, 5 different segments were made in line with the number of employees and these are 1-5, 6-10, 11-20, 21-50 and 51-100. And interviews taken from the businesses have active personal computers (PC). Both quota sampling and simple random sampling technique were used for this study. Out of 150

samples the distribution was 45%, 35% and 20% respectively for Dhaka, Chittagong and Khulna cities. Intended quota for each enterprise segments and according to the segments of employee size was followed. The quota allocated among the industries was on the basis of their availability or existence. Table-1 shows the quota or sample allocation for industry and employee size.

Table-1: Sample allocation for Industry and Employee size

Industry/ Enterprise	Employee Size					
	1-5	6-10	11-20	21-50	51-100	Total
AMTUC*[1]	3	3	3	3	3	15
Manufacturing	3	3	3	3	3	15
Wholesale Trade	3	3	3	3	3	15
Retail Trade	6	6	6	6	6	30
FIRE*[2]	5	5	5	5	5	25
Professional Business	6	6	6	6	6	30
Other Services	4	4	4	4	4	20
Total	30	30	30	30	30	150

*[1] AMTUC – Agriculture, Mining, Transportation, Utilities and Construction

*[2] FIRE – Finance, Insurance and Real Estate (properties business)

4. Analysis, Result & Discussion

4.1 Firmographics

Demographic profile has a direct relation with IT adoption, e.g., an increase in number of employees may lead a increase in IT budget and their corresponding spending. Moreover, increased number of customers or vendors handled may indicate usage of various enterprise software like CRM, ERP, etc. In terms of the nature of the industries, almost all the segments were covered in this study. Regarding the number of employees, respectively 21% enterprises have up to 5 employees, 23% has 6-10, 21% has 11-20, 20% has 21-50 and 15% has 51-100 persons. Among the businesses 26% is planning to hire new permanent employees over the next 12 months. Regarding company's presence in industry and market, about 10% of the firms are doing business over the last 20 years, where 7% are new or below 12 months. The major portion is 41% existence in the market ranging from 3 to 5 years. In terms of approximate annual revenue, annual revenue of 25% small enterprises is below Tk.5 lacks, 32% of Tk.6 - 20 lacks, 20% of Tk.21 – 50 lacks, 5.5% of Tk.51 lacks - 1crore and 17.5% of more than Tk.1 crore. These revenue figures were increased over the last year ranging from 5% to 20%. About 13% of these trends were remained same or flat and only two percent's

trend has decreased. About 75% businesses revenue growth was in basic IT infrastructure, disappointingly the PC usage is not increased. Only 9% percent of them are using portable PC. Other technologies usage (like internet, telephone, typewriter, printer, scanner, electronic typewriter, calculator, telephone answering machine and etc.) within these businesses is poor except cell phone. And more terrible information is that they have no plan to use these technologies in the future.

4.2 Telecommunications

The adoption of various Telecom-related technologies in Bangladesh is still at a medium paced embryonic or emerging stage. Usage of various communication or telecom devices is very important since IT-adoption is related to usages of telecom products. Around 87% of the small firms are using telephone and 13% using cellular services for their long and short distance communications.

Approximate monthly expenses of surveyed companies are shown in Table-2. The major portion, about 45% of the small firms expends Tk 1,000 – Tk 4,999 for telephone and mobile purpose. Only 2% has no expenditure on this and 2.5% firms' expenditure is in between Tk 50,000 – Tk 100,000.

Table-2: Approximate expenses for telephone and mobile for the period of July 2006 – June 2007.

Expenses (Tk.)	Enterprise (%)
No Expenses	1.8
Below Tk 1,000	3.0
Tk 1,000 – Tk 4,999	44.8
Tk 5,000 – Tk 9,999	26.7
TK 10,000 – Tk 19,999	12.1
Tk 20,000 – Tk 49,999	9.1
Tk 50,000 – Tk 100,000	2.4
Total	**100.0**

4.3 Personal Computer

Basic infrastructure like PC and printer in Bangladesh is in the initial phase of technology adoption among the small scale industries. The usages patterns, upgrade dynamics, ownership patterns and preferences and amount spent of SB's are the concerned area. Prime portion of PC user, 32% enterprises are doing business during the last one decade, about 30% of them started with one PC. Second main portion is 13%, who commenced before one year and 50%

of them with only one PC. 37% companies started with one PC, 19% with 2 PC's. About 12% company commencement was with 20 plus PCs. The main reasons for buying PC while starting were; book keeping and accounting (49%), preparing bills or invoices for customers (38%) and other activities (13%). However, most common reason is composing various drafts everyday, 88% companies revealed it. After the first time purchased PC, 33% companies have not yet bought additional PC. The reasons behind not purchasing additional PC are too much costs, benefits are not worth the cost and cost of service, support and maintenance is too high. Nonetheless, most of them think they do not need to add additional PC. Around 35% of firms bought additional PC after 1 to 2 years. 22% bought within 12 months. The primary user of first time purchased PC was then CEO or company head 70%. The main component of the PC is microprocessor and basically Intel (brand) based chips are used among the business. More than 40% of the small firms have full time in-house employees and an additional outside contractors to operate and maintenance of PCs, about 35% have neither full time employees nor outside contractors for this purpose, but have plan to add in the future. In terms of preference of having additional PC, some influential factors are: easy finance plans for PC's availability, available software applications and more ways to use PC, easy finance plans for software applications availability, networked all PCs with each other to share information, number of PC user for smoother and efficient operations, available reliable PC service and support at a reasonable cost, old PCs are unable to manage new software, old machines becomes too slow and unproductive, updated PCs are available, old PCs are not economical to get it repaired, plentiful supply of computer literate labour force, automated backup and recovery is available with PCs, anti-virus protection is available with PCs, fewer and simpler functions that various employee could use without much training, etc.

Among the surveyed businesses around 47% are using Monochrome Laser. However, only 4% have planned to use this item in the next 12 months. Nevertheless, some other type of printers and their users ratio are 20%, 28%, 4% and 16% respectively for Colour Laser, Inkjet, Multifunction all-in-ones and Dot Matrix.

High speed printer usage is in the primary stage. 22% of the businesses are using high speed laser printer in its category. In terms of dot matrix printer, about 7% are using high speeded one. There is no noticeable portion for the other types.

Regarding Brand, 60% preferred Canon brand, second used brand is HP/Compaq of 28%. Epson, Lexmark, Brother and Xerox are also used. A very few enterprises use one more brands simultaneously.

An essential accessory for printer is toner/ink cartridges, branded and non-branded refills both are using. Brands are relatively prevalent than non-branded and the percentage correspondingly 65% and 35%.

Spending pattern for printer for a period of 12-month is shown in Table-3.

Table-3: Approximate expenses for printer for the period of July 2006 – June 2007.

Expenses (Tk.)	Enterprise (%)
No Expenses	38.8
Less than Tk 15,000	41.4
Tk 15,000 – Tk 19,999	12.0
Tk 20,000 – Tk 29,999	3.0
Tk 50,000 – Tk 74,999	1.4
Tk 75,000 – Tk 99,999	1.4
Tk 1 lac – Tk 1.49 lacs	1.4
Tk 1.50 lacs – Tk 2.49 lacs	0.6
Total	**100.0**

4.4 Extended Connectivity and Network

A network is a collection of computers and devices connected together via communication devices and media. In small scale industries, companies with more than one computer, around 30% of them are working in the extended connectivity or network environment. Server is the base component to operate the LAN. Different mode of servers is being used like branded, assembled and desktop converted server. Among the LAN users, 61% uses desktop converted 29% uses assembled server and 10%. branded server There is no noticeable brand server user among the businesses. Among the branded server user of 10% are using mostly Dell and HP.

Main network equipments are Hubs, Switchers and Routers and those using preference are respectively around 8%, 17% and 3%. Preferences for operating systems to run the server are Windows Small Business Server (SBS), Linux, Windows 2000, IBM AIX and etc. Around 67%, 10%, 13% and 10% are using respectively among the businesses. Windows based OS (80%) is commonly used. Regarding the importance on IT-enabled business, some focus areas are covered for having the company's responses. Over the period of July 2006 to June 2007, the responses under each connectivity and networking areas are as follows:

a.   Enhance enterprise IT security - 80%

b.   Increase IT storage capacity and deploy enhanced storage solutions - 58%

c.   Enhance data security and privacy via firewall, encryption, etc. - 60%

d.   Upgrading bandwidth for data networking - 58%

e.   Linking electricity with supplies or customers - 49%

f.   Extending the network connectivity to branch offices and other remote locations - 48% and

g. Upgrading bandwidth for data networking - 52%. Effort emphasized on IT buying preference of the businesses. Following statements and response rate (% of companies) reflects their opinion concerning company's IT purchase.

a. Develop and formalize a process by which our company will purchase IT products and services -83%

b. Continuing to purchase IT brands we currently use – 60%

c. Upgrading to the latest IT hardware/software/services soon after availability – 52%

d. Buying all the components of solution from a single manufacturer/brand – 42%

e. Price is the most important factor in determining an IT purpose – 52%

f. We try to understand the total cost of ownership before purchasing IT products/services – 50%

g. IT solutions/products we purchase must be a part of our overall business strategy and process – 59%

h. Channel partners from whom we purchase IT products/services should reflect a good understanding of our business – 48%

i. Purchasing IT products and services that are scaleable to meet the growth of our business – 52%

Desktop converted server, assembled server, branded server, network hubs, network switches and network routers are the components we treated for this study of basic networking hardware. Table-4 shows the spending patterns for the companies of about those components:

Table-4: Spending pattern for the period of July 2006 – June 2007on basic Networking Hardware

Expenses (Tk.)	Enterprises (%)
No Expenses	77.0
Below Tk 15,000	12.1
Tk 15,000 - 19,999	1.8
Tk 20,000 - 29,999	0.6
Tk 30,000 - 49,999	4.8
Tk 50,000 - 74,999	0.6
Tk 75,000 - 99,999	2.4
Tk 100,000 and above	0.6
Total	**100.0**

In terms of networking software category like Network Operating System during the period of July 2006 to June 2007,

Figure-1 below is the findings for the businesses:

Figure-1: Expanses for Network Operating System for the period of July 2006 to June 2007
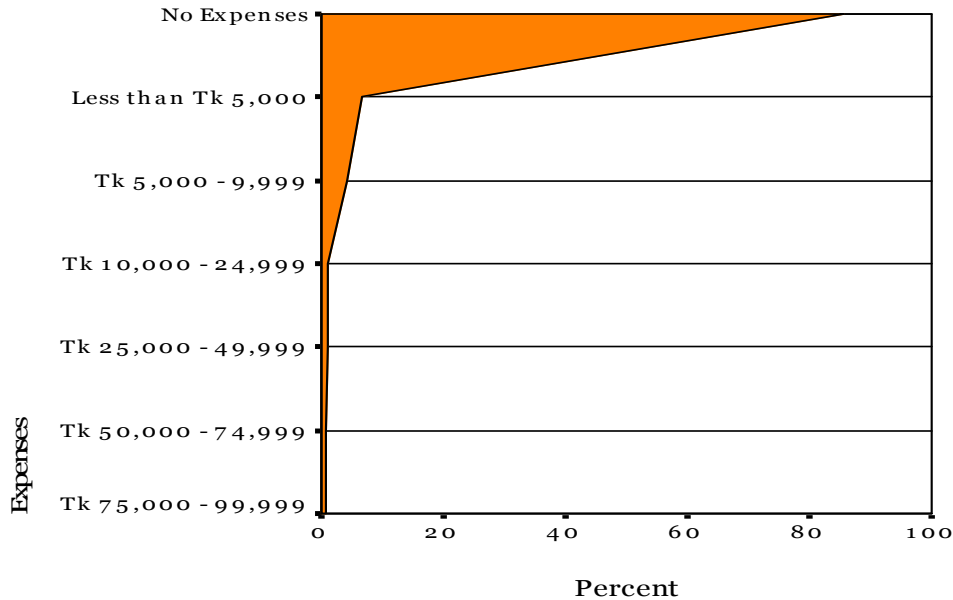
The major portion (85%) has no expenses during this time, 7% expends less than Tk 5,000 and a least percent of just below 1% expenses were taka ranging from 75,000 – 99,999.

4.5 Software

Windows based software is mostly used in the small businesses. In a very few cases, Linux, Apple and other Unix based software are used. Among the Windows users, about 84% are using Windows XP Professional/Home Edition and 15% working under Windows 2000/NT.

4.6 Internet

Internet access, ISP's usage frequency of various websites, e-commerce etc are the modern virtual communication system. Responses have been collected from the user companies regarding their status for internet access. Table-5 shows the response rate against three kinds of situations.

Table-5: Internet access status of Small Enterprises

Internet Access	Enterprises (%)
Currently access the Internet	56
Plan to access the Internet in the next 12 months	25
No plans to access the Internet in the next 12 months	19
Total	**100**

Among the users, pattern of internet connections and their responses are: dial-up connection (12%), ISDN (6%), DSL (10%), Cable modem (21%), T1/fractional T1 line (7%) and Satellite wireless (below 1%).

In terms of virtual existence of the enterprises, Website status is shown in Table-6 below:

Table-6: Status for virtual access of having website

Web Status	Enterprises (%)
Have a corporate web site	13
Do not have a corporate web site but plan to have one in the next 12 months	16
Do not have a corporate web site and no plans for a web site	71
Total	**100**

In terms of companies' participation in E-commerce, 7% of the small firms have active presence, 15% have plan to participate and rest either have no plan to use or not aware in this regard. In terms of spending patterns for internet communication and connection services, 35% companies are spending monthly up to Tk 25,000 for Dial-up subscription of low bandwidth. Out of the dial-up subscribers around 21% are spending ranging from Tk 1,000 to Tk 3,000. About 18% companies are using Fixed-line (i.e., ISDN, DSL and cable modem etc.) with high bandwidth and spends monthly up to Tk 25,000.

5. *Decision Making and Media Habits*

To understand the company's preferences regarding IT purchase, their awareness level with respect to various IT brands, sources that helped the companies in learning about various IT, internet and telecom products, opinions collected and accordingly flashes below.

In terms of habits of acquiring and using applications software, 80% businesses always use in different mode or method and 20% never use any software.

Major portions, approximately 85% of the surveyed enterprises' preference reflects the following statements regarding IT purchase and these are:

    a. Develop and formalize a process by which our company will purchase IT products and services

    b. Continuing to purchase IT brands we currently use

    c. Upgrading to the latest IT hardware/software/services soon after availability

    d. Buying all the components (HW/SW/SVCS) of a solution from a single manufacturer/brand

    e. Price is the most important factor in determining an IT purchase

    f. We try to understand the total cost of ownership (TCO) before purchasing IT products/services

    g. IT solutions/ products we purchase must be a part of our overall business strategy and processes

    h. Channel partners from whom we purchase IT products/ services should reflect a good understanding of our business

    i. Purchasing IT products and services that are scalable to meet the growth of our business

Awareness level of the enterprises with respect to the brands in the IT market is basically need-based. Also there is an impact of media to hear and aware about IT products. Among the brands peoples are very familiar with the names like Intel, Microsoft, DELL, IBM, HP, Apple, etc. There are some other brands peoples heard like AMD, Acer, Oracle, Lenovo and etc. Above 50% responses came against the brands are Intel 89%, Microsoft 86%, DELL 60% and IBM 59%. Regarding media sources to learn about IT, Internet and telecom-related products are newspaper, business and IT magazine, Television, Internet/website, friends and family and etc. These are also trusted sources in product recommendation and comparison. Newspaper is the most powerful media and its response rate is about 86% following the other media like Internet/website 61%, Business and IT magazine 59% and Television 57%.

6. Barrier and Recommendation

The PC shipment expanded 16.4% to 164,400 in the year 2006 (*Springboard Research report 2007)*. The forecasting year to year average rate of the PC shipment to the end users is about 21%. Having the calm environment than before and the realized IT's importance to among the all concern, this research expects IT adoption and usage should have at least double in all the sectors presented above. More specifically, in the small scale industries this should up to be

50% in this time, where it is below the level. Using and cope up with IT for productive purpose and for real benefits should be the main issues. It is clear that high service charge by the providers, lack of awareness of all concerns, poor telecommunication systems, poor infrastructure, restive political situation, government policy, low buying power of potential users and institutional supports are major barriers. Service charges still a barrier to unfold to the users to take IT's fruits. From the all segments of IT like PC (including hardware and software), ISP, Telecom and other relates to ICT charges should be reduced at the rate of peoples economical condition. Better to less it 15-20% on the current rate. Awareness level should be improved of all irrespective of providers and users positively. For instance, buying IT products (like PC), some users think it an unnecessary expenses and it will not replenish at the same ratio. This is an illogical thinking no doubt. However, reality is that the expenses now will return at the geometric rate if using perception in a proper manner. On the other hand, from the providers end, they would take honest initiative (in terms of sells and services) to build awareness to user prevalence. Some free services, training and proper guiding to users to get proper products would make a positive growth. Well-off ICT infrastructure definitely would make a substantial IT environment for all. Overcoming continued political tensions and restricted internal politics would be one of the prime barriers for this country to ICT growth. More genial and realistic government policy and regulatory body's effort may improve the total scenario. National newspapers may play a key role in creating awareness. Service charges should be decreased from all the related providers. All concerns including service providers as well as IT users should realize effectively its importance. Government may introduce lucrative consumer loan policies and should reduce taxes (current sales taxes of 5%) on computers and accessories to enable people to have their own IT products.

7. Conclusion

Priority should be to create a situation for IT access and adoption to all, irrespective of end users, all sorts of service sectors and business industries. Although possible political disruptions in 2006 and 2007 as well as concerns over social unrest and violence, the Bangladesh IT market is expected to continue overcoming challenges to post healthy market growth. Bangladesh is one of the most populous nations in the world and recent economic indicators showing positive outlook for 2006 and 2007. In addition, there seems to be acceleration in the amount of focus and investment from multinational IT vendors and IT promotion bodies that is generating a greater level of marketing and awareness that we expect to boost demand. Overall, the Bangladesh economy, driven by industrial and services sector growth, increased foreign aid and worker's remittances, performed well in FY 2007 and registered a full year GDP growth of 6.5%. The interim government has also reiterated its commitment to develop the country's IT sector, and around 2.4% (i.e. US$0.28 billion) of the new fiscal budget was allocated to ICT development. This allocation was 12% higher than in the previous fiscal year's budget.

In spite of booming the IT sector for the last decade, increased the suitability of government policy and formulating different regulatory bodies to enforce positive growth of ICT sector, it is still in the medium embryonic stage. However, more specifically, small industries in Bangladesh is a slow adopting sector comparing with others and need to be boosted up just to the double at all level of all discussed aspects in this paper.

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