Ministry of Foreign Affairs of Denmark
Danida

BUSINESS OPPORTUNITIES WITHIN THE IT AND TELECOMMUNICATION INDUSTRY

BANGLADESH

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Business Opportunity Study within the IT and Telecommunication Industry in Bangladesh

A sector study prepared for Danida
by Håndværksrådet (The Danish Federation of
Small and Medium-Sized Enterprises)
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Executive Summary

ICT industry in Bangladesh

Industry profile

ICT industry in Bangladesh is relatively new in comparison to other business sectors. However, the unlimited potential of the ICT sector has commended inquisitive interests from all concerned. The impact of global hype of the ICT sector is clearly visible in Bangladesh as well. In the recent years, the local ICT sector has grown enviably.

With over 3,000 local enterprises operating in hardware, software and ISP segments, the size of Bangladesh ICT industry at present stands at USD 160 million. With the advantage of earlier initiation, the hardware segment dominates the market share (65 per cent) while the relatively late entrant, software segments command about 15 per cent of the total market. The ITES segment (15 per cent) and Internet and Network Services (5 percent) make up the remaining part of the market.

The software segment is relatively new in the market; however, the segment is showing healthy growth in terms of export earnings. According to Bangladesh Bank sources, export earnings from Software and ITES was USD 27.01 million in 2005-06, registering a growth of 113 per cent from the previous year. The software companies in Bangladesh mainly focus on servicing the IT/ITES needs of the local leading sectors like Garments, Banks and Government. At the same time, leveraging the global nature of the IT business, the local entrepreneurs are always looking for international opportunities. Thanks to these efforts, Bangladesh now has become one of the most potential outsourcing destinations in the world.

The core strengths of Bangladesh ICT sector is the people. An educated, trainable and young workforce working in this sector possesses the required skill sets to compete in the global scenario. A BCS source revealed that in 2006, the number of IT professionals in Bangladesh was 25,200, which was 12.50 per cent higher than in 2005. The majority of this work force excels in pure technical tasks such as programming and networking. In fact, a survey conducted by BASIS on 1,100 employees of 55 IT companies revealed that, respectively, 42 and 14 per cent of the respondents were engaged in programming and networking jobs. However, the same survey states that, much to the delight of the industry experts, the number of ‘non-code’ personnel in the IT companies is rising at fast pace.

The success of the IT industry has prompted many relevant associations to evolve to provide focal points for entrepreneurs and foreign investors. The government of Bangladesh has declared the ICT sector as ’thrust’ sector. The creation of a separate Ministry for ICT (Ministry of Science and Information and Technology), formulating favorable laws and initiating government IT projects are encouraging steps for the local/international investors in the Bangladesh ICT industry. In addition to the policy development, the government is keeping close interactions with various industry associations. BASIS, BCS, BCC and ISPAB are some of the apex bodies working for the improvement of the ICT industry in Bangladesh.

Labour force

Bangladesh enjoys a clear competitive advantage in its IT labour force. The leading universities in the country provide world class IT courses. Each year, various institutions produce about 2,000 IT graduates. In addition to that, a huge number of non-IT graduates are working in the sector as well.

The most significant advantage of the Bangladeshi workforce is the low wage rates. The salaries for IT professionals could be as low as USD 75/month. On the other hand, the higher salary ranges at approximately USD 1,000-1,200/month. The quality of the graduates coming out of various institutions is satisfactory. Bangladeshi students have proved their potentials in the international competitions by winning a number of programming contests.

However, the available workforce is still not adequate to meet the industry demand. According to Mr. Fahim Mashroor Chowdhury, CEO, Bdjobs.com (BASIS director as well), each year the industry faces a shortage of about 1,800 to 2,600 professionals. He identified the 'brain drain' and a 'perceived lack of career prospects' as the two major reasons for this short fall. Along with other industry experts, he suggested improving the industry-academia collaboration to produce the right people for the right jobs.

Infrastructure

Bangladesh has been building its infrastructure support for the IT industry over the years. This year, the country ensured global connectivity by connecting to the 'Information Super Highway' through SEA-MEA-WE 4 consortium. High-speed Internet connectivity through fiber optics cables costs about USD 2.67/per month for 1 kbps connection. The existing VSAT backbone will continue to remain the major Internet infrastructure until the new Backbone (Submarine Cable Connectivity) operates 100 per cent. There are as many as 150 ISPs in the country and the competition among Internet service providers has resulted in significant improvement in their services. Most of the ISPs are now providing 24/7 on-site technical support.

In relation to infrastructural weaknesses, all the stakeholders identified stable electricity as the top priority. In general, the country lacks adequate electrical supply. The companies operating in Bangladesh, therefore, must make alternative arrangements to ensure smooth power supply, This has developed a strong market for alternative power equipment in the form of UPS (Uninterrupted Power Supply) and IPS (Instant Power Supply). For smaller projects, the cost addition due to power shortage may not be significant, but for larger projects the cost of a project may increase for this reason.

Hardware and technical back-up

According to research by Springboard Singapore, the volume of the hardware market in Bangladesh is USD 129.4 million at present. 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 6000 whereas the ‘unbranded’ version costs about USD 2,000. The average workstation price is USD 700-900 for a brand PC and USD 500-600 for a clone PC.

After sales support of the hardware is satisfactory. Most large organisations usually go for AMCs (Annual Maintenance Contract) with the vendors. The AMC is customizable in accordance to the client’s need. However, the local vendors are of the opinion that an international warranty is not always suitable for clients of brand equipment. Their logic is that the designated vendors (local agents) would always keep their direct customers on their priority lists. Additionally, the international warranty does often not make them directly obligated to provide local support.

Industry competencies

As stated in earlier section, cheap labour is the biggest competency for the Bangladesh ICT industry. The skilled labour force is easily trainable and quick learners. They also show greater commitment to specific areas of concentration – provided the employers carefully build the loyalty.

The industry experts opined that the geographical location of the country is suited to reach out to other markets in Asia. Additionally, India is moving to a higher strata of the global IT market, which has created an opportunity for Bangladesh to capture the lower niches (left by India) of the market.

Bangladesh does have willing investors with comprehensive local business knowledge. The investors in other sectors (textile, garments etc.) have proven their competencies in international business. They are good at spotting new business opportunities and implement them efficiently. The favorable government policy for the ICT industry is attracting these investors towards this sector. With their accomplishments in international businesses, they could become the ideal strategic partners for international companies intending to venture into Bangladesh ICT industry.

Regarding specific competencies, Bangladesh at present is more suited for 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.

Local market opportunities

In recent times, Bangladesh has become one of the prominent outsourcing destinations in the world. Danish companies could easily venture into this readily available opportunity.

The telecom boost in the country presents another opportunity for the IT companies as support service to the telecom companies. The major focus of the telecom opportunities lie in the form of mobile content development and value added service solutions. The government is yet another big opportunity that is worth pursuing. To act on its declaration of ICT as ‘thrust sector’, the government is seriously taking initiatives towards public

IT projects. The focus of these projects is in the form of e-governance and office automation.

The SME sector in Bangladesh has the potential to become a lucrative market niche for the Danish companies. According to a survey report (by BASIS-KATALYST), the 'latent IT/ITES demand' of the specific SME segments is about USD 17.94 million. The report also suggested that demand is gradually growing along with the increase in the awareness level of the SME entrepreneurs.

The opportunities exist without any doubt. Moreover, Nordic companies are making use of these opportunities already. The successful companies in Bangladesh identified pre-planning and market-analysis as two of the major success factors for new companies entering the Bangladeshi IT industry.

Market threats

The Bangladeshi IT industry has many of the right ingredients for success, however, according to the industry stakeholders, some existing/perceived threats for the industry remain.

At individual company level, the business vision (or lack of it) of the local IT entrepreneurs is the biggest threat. Groups of companies have many times started in IT as a chance venture. This naturally, in most cases, did not succeed. On the other hand, the lack of finance for the 'real' IT entrepreneurs has limited them from reaching their true potential.

The country's IT policy is favorable, yet, Bangladesh faces a big threat of 'resource crunch' in the near future. Brain drain and attractiveness of other business sectors are reducing the number of professionals pursuing an IT career.

Bangladeshis are used to short term profit from investing in the textile business. Many of the investors from this sector are also expecting short-term profit in the IT business.

The management style in Bangladesh is largely based on a top-down approach. Apart from clashing directly with the Danish/Scandinavian style i.e. each person is responsible for its own job – it also means that Bangladesh is short of middle management skills.

In Bangladesh, the process of legally establishing a company takes a long time. It can take up to six months to obtain the necessary licenses, approvals etc.

The existing supply of Internet access is somewhat constrained. The costs of Internet access are relatively high, and even at high costs no optimal connection is yet available.

China, Vietnam and similar countries pose a future threat to the Bangladeshi IT industry. The industry prospect/potential for those countries is very similar to Bangladesh. In addition, they enjoy more stable political situation. The even field in the lower strata of IT industry – created by the fact that India moving to higher strata – provides equal chance for all potential countries like Bangladesh, China, Vietnam etc.

SWOT

The specific success factors that Danish companies could leverage when entering the Bangladesh ICT industry are:

- Business Vision (taking IT as core business)
- Management Practices (proven effective management practices and business acumen)
- Business linkages (links with prospective clients in Nordic/EU regions)
- Regional knowledge (knowledge of the business practices of the regions from where many outsourcing projects placed)
- Danish Government's presence (support for relationships between Danish and Bangladeshi companies)

The Danish companies, however, need to improve on some aspects if they are to succeed in Bangladesh. The foremost success factor is to improve local knowledge. Similarly, the HR management needs to be customized to suit the local culture. Overall, the communication barriers are to be addressed properly.

Entering Bangladesh would help Danish companies in expanding their market and would help them enter new markets. In the long run, Danish companies could venture into the potential Asian markets and they could capture the SME market niche in Bangladesh and in other regions. However, the road to success presents some challenges for Danish IT companies. The lack of methodical approach of Bangladesh IT companies (and IT professionals) and their lack of information could become major hurdles in business planning. On the operational aspect, the training requirement and communication barrier has to be addressed properly to achieve the desired outcome.

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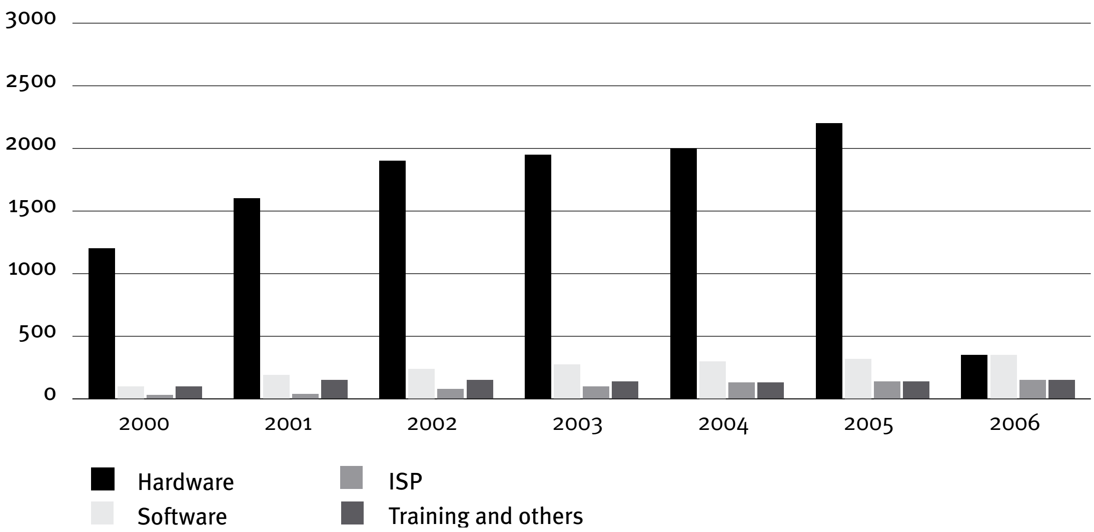
1 Introduction to Bangladeshi ICT industry

During the late 90's, Bangladesh has seen an increasing growth of the ICT industry. Initially, the favorable tax policy of the government of Bangladesh in 1998 accompanied by the global affordability of personal computers have had tremendous impact on the usage of computer. The favorable import tax policy on computers and computer accessories during that time was one of the timely steps taken by the government of Bangladesh. From then on, in accordance with the global trends, both private and public sectors in Bangladesh caught up with effective utilization of information technology. The formation of a substantial number of software development companies is a good indication of this development. Recently, wide spread telecommunication (especially the cellular telephony) outreach all over the country has given the ICT industry in the country an added impetus to move forward.

1.1 Number of enterprises

A report by Bangladesh Computer Samity (BCS) provides an overview of the composition of ICT enterprises in Bangladesh. However, the report is focused on software, hardware, Internet services and training and other segments and the statistics of the telecommunication enterprises are not included in that report.

Fig. 1: Number of ICT enterprises in Bangladesh



(Source: BCS)

As seen from the figure, the hardware segment dominates the industry with 2500 enterprises in 2006. In accordance with the growth in hardware demand, this segment has shown a steady growth of about 11 per cent per year from 2000 to 2006. The software segment grew at good rates in earlier years but has slowed down relatively in the recent years. At present, there are about 350 software development firms in Bangladesh. The Internet Service Provider (ISP) segment is in tune with the growth of software segment.

The recent introduction of advanced technological backbone in the ISP shows a decent growth of the ISP segments (presently 150 ISPs are operating in the country). There are 150 training institutes and auxiliary ICT support companies in the country.

The telecommunication segment is sometimes treated separately in the country, but the impact and the huge volume of the telecom segment is quite significant in the total industry performance. According BTRC[1], the number of mobile phone users has reached 15.5 million in August 2006. According to ITU[2] data, currently, Bangladesh has around 1,000,000 fixed telephone lines installed by the BTTB[3], Sheba Telecom and Bangladesh Rural Telecom Authority (BRTA). The present tele-density in Bangladesh is approximately 0.5 per cent.

1.2 Size of enterprises (industry volume)

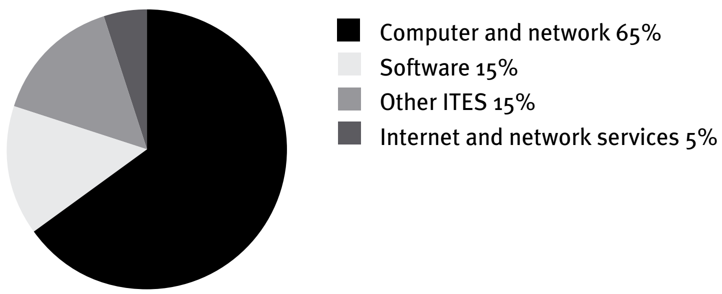
A report[4] included in the "Software Product Catalogue (2006)" published by the Bangladesh Association of Software and Information Services (BASIS) states that the total ICT market size in Bangladesh is USD 160 million. The approximate proportion of the ICT industry among different segments is as follows.

Table 1: Domestic ICT market in Bangladesh

Market segment	Volume (million USD)	Proportion (per cent)
Computer and network hardware	105	65%
Software	24	15%
Other ITES[5]	24	15%
Internet and network services	8	5%

(Source: BASIS)

Fig. 2: Bangladesh domestic ICT market (major) segments



1) *BTRC: Bangladesh Telecom Regulatory Commission*
2) *ITU: International Telecommunication Union (ITU)*
3) *BTTB: Bangladesh Telephone & Telegraph Board*
4) *Bangladesh Software Industry and its dynamics*
5) *ITES: IT Enabled Services*

1.3 Proportion of GNI

As per Word Bank source, the GNI indicators for Bangladesh are as follows:[6]

GNI (million USD)	66,646
GNI per capita	141.8

The available data for the sector specific GNI were not available. However, taking the total ICT industry size as USD 160 million (source: BASIS), the approximate GNI from ICT sector comes to 0.002 per cent of the total GNI. The export earning from software for year 2005-06 is very nominal 0.0004 per cent of the total GNI.

1.4 Export of ICT services

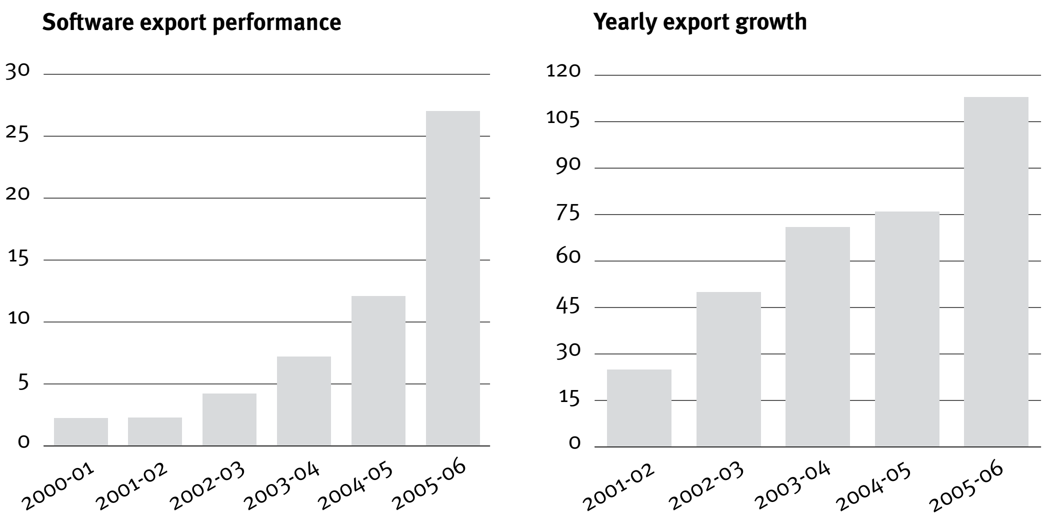
According to the Bangladesh Bank source, export earnings from Software and ITES was USD 27.01 million in the fiscal year 2005-06 registering a high growth of 113 per cent from the previous year (2004-05). The following chart shows the Bangladesh software and ITES export earning for last five years.

Table 2: Export earning of Bangladeshi software in recent 4 years

Figures in million USD						
	2000-01	**2001-02**	**2002-03**	**2003-04**	**2004-05**	**2005-06**
Software export	2.24	2.80	4.20	7.20	12.68	27.01
Yearly growth	-	25%	51%	51%	76%	113%

(Source: Bangladesh Bank)

Fig. 3: Software export from Bangladesh



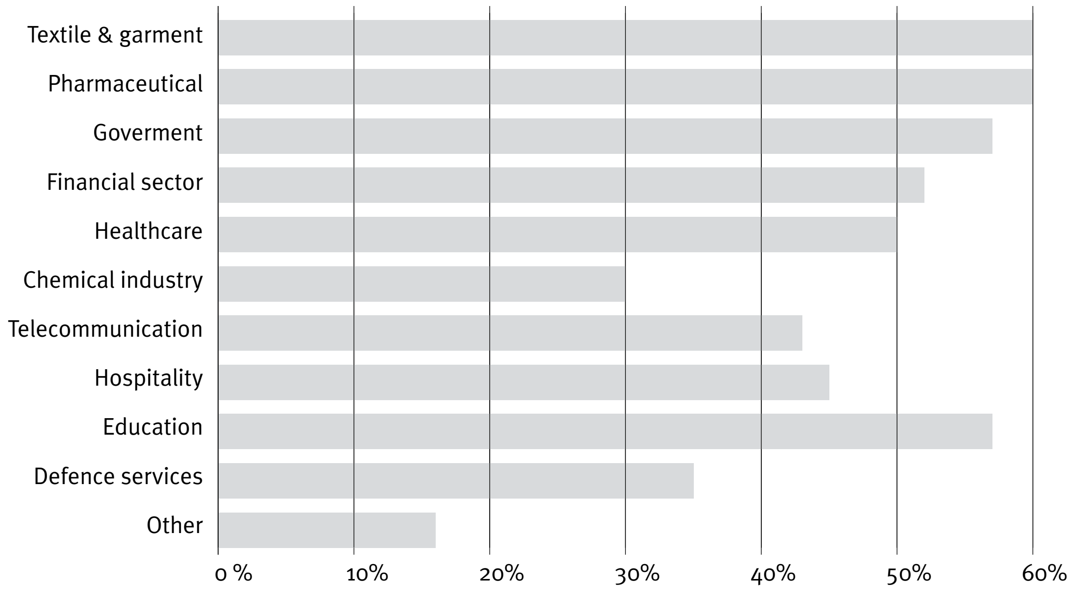
6) *Source: http://www.doingbusiness.org (Word Bank - Doing_Business_2007_Country_pages.pdf)*

According to industry experts (BASIS leaders), the recent development in joint ventures and business collaborations among Danish companies and Bangladeshi software companies would assist significantly in sustaining the enviable growth in the export earning. Some of these projects are already in place and many others are either in the pipeline or perceived to be coming in the near future. Another factor that has contributed to the recent high export growth is the influence of the multinational telecom companies. These companies while operating in Bangladesh utilized the local IT sector for many of their international projects giving a good software export opportunity for Bangladesh. At present, there are about fifty companies in the country engaged in exporting software and ITES to thirty countries across the globe. The export destinations are USA, Canada, EU countries, Middle East, Japan, Australia, South Africa and some South East Asian countries.[7]

1.5 Key areas of operation

BASIS carried out a survey among the 152 participating companies in SOFTEXPO[8] 2005 to find out some key industry trends[9]. One of the findings of this survey provides a good insight into the client/industry focus of the software companies operating in the Bangladeshi market. The following section reproduces the findings of the BASIS survey of operational domains of the software companies.

Fig. 4: Industry focus of Bangladesh ICT (software segment) industry



The industry analysts find the survey results positive because of the fact that a significant proportion of the software companies (57 per cent) are focusing on the government sector. The obvious implication is that the public ICT projects are increasing in numbers

7) *According to BASIS survey (2005) [152 BASIS members and non members companies were surveyed]*
8) *Yearly software & ITES exposition organised by BASIS*
9) *This section explains one of the trends and other sections (Labour force) explains the other findings of the survey*

and attracting business people towards them. The focus of the government spending on IT is targeted towards e-governance and office automation. The public sector is the largest domestic segment for software (IT) companies in Bangladesh. Greater access to this sector has definitely provided added impetus for the local ICT industry.

Among other sectors, the textile and garment and the pharmaceutical industry stand out (both at 60 per cent). The textile and garment industry is the largest export sector in Bangladesh. The international exposure and competition of the sector have prompted the garment manufacturers to streamline their productivity. The most effective and readily available option was the introduction of process control through automation. As a result, many export oriented garment companies opted for phase-by-phase automation and thus created opportunities for the local IT companies. Similar scenarios exist in the pharmaceutical industry. However, contrary to garment and textile industry, the pharmaceutical industry focuses on fulfilling the needs of the domestic market.

Another key operational area for the IT companies is the financial sector. In recent years, the banks are going online – creating a huge demand for software and network solutions. However, so far, foreign software dominates the banking sector.

The hardware/server market segment in Bangladesh is doing relatively good in its operations. A recent Springboard[10] research reported that Bangladeshi PC/server market generated growth of 23.8 per cent in Q1 2006 (Jan-Mar), compared to the first quarter of the preceding year.

From a buyer perspective, large enterprises are currently the dominant segment of the market, contributing around 23.0 per cent of the total PC/Server shipments[11]. The large corporations – particularly in banking and telecom – are the key customers driving market growth. The government segment showed strong growth of 30.7 per cent annually mainly due to the increased automation activities of local and national bodies. The SME market represents a significant portion of shipments (33.9 per cent) in Bangladesh but receives limited focus from IT vendors due to the substantial opportunities in the government and large enterprise sectors.

1.6 Investment scenario

The lion's share of the ICT market in Bangladesh is dominated by the international giants like Microsoft, Oracle, Sun etc. The off the shelf (packaged/license) software were introduced in the local market in the mid 90s. As a result, they enjoy a market dominance compared to the indigenous customized software segment. In addition, the multinational companies working in Bangladesh brought in their global software. Though, recently they have been working with local companies in procuring their ICT requirements. One other aspect of the investment scenario is the presence of international software vendors through local agents. Microsoft in this regard leads the way.

10) *A Singapore based market research company (http://www.springboardresearch.com)*

11) *The shipment refers to No. of PC/Server coming to Bangladesh.*

Mainly, the initiation and implementation process of IT projects at the organisational level is done through market exploration and an internal operational requirement assessment. The exploration based on the internal assessment mainly takes place in the form of market research for available solutions. In this case the more established companies (MNCs etc.) have their own in-house IT consultancy support available. For the other segments, the proper IT planning is sometimes missing. In light of that, an opportunity exists for IT consultants. There are a few such consultancy support companies who have started their formal operation (Microsoft, IBM etc.), but in most cases advice is sought from individuals with IT knowledge.

1.7 ICT industry employment scenario

The total number of IT professionals available in Bangladesh is more than 25,000[12] . The booming telecom industry has created a large IT related employment. As a result, the technological professionals are switching over to the telecommunication industry leaving alarming many vacancies in the other ICT segments. The most severely affected is the software segment.

Table 3: IT professionals in Bangladesh

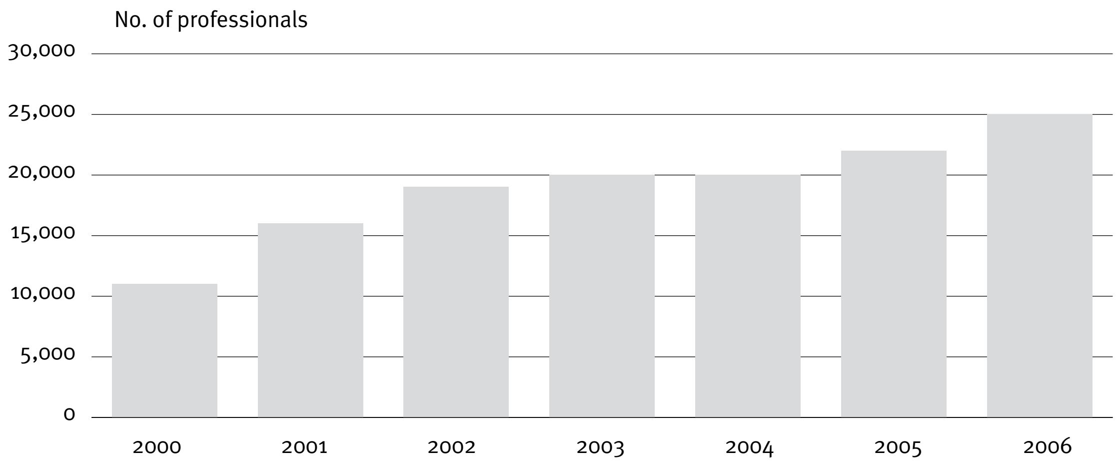
Year	No. of professionals	Yearly growth
2000	11,440	-
2001	15,840	38.46%
2002	18,960	19.70%
2003	19,720	4.01%
2004	20,480	3.85%
2005	22,400	9.38%
2006	25,200	12.50%

(Source: Bangladesh Computer Samity (BCS)

The BCS reports that in 2006 the number of IT professionals increased by 12.50 per cent. When considering the yearly growth, the table shows that there is a slow growth in the 2003-04 period. The reason behind is that the introduction of telecom companies encouraged many aspiring professionals to choose a business education instead of IT studies. However, the trend in the number of IT professionals is gradually increasing as the career opportunities and salaries are increasing.

12) *Information source: BCS (Bangladesh Computer Samity)*

Fig. 5: No. of IT professionals in various years



(Source: BCS)

According to BASIS, more than 300 local software companies employ about 5,500 software professionals. In 2005 (during SOFTEXPO 2005), BASIS carried out a survey on 1,100 employees working in 55 companies. This section discusses the general findings from that survey. Section 2.0 (Labour force) includes other findings (skill matrix, educational level etc.) of the same survey.

Table 4: Technical job distribution in software companies

Job type	No. of respondents	Per cent of total respondents
Network engineer	7,700	14%
Programmer	23,100	42%
System architect	3,850	7%
System analyst	4,400	8%
Testing/QA	4,400	8%
Project manager	3,850	7%
Graphic designer	3,300	6%
Web developer	4,400	8%

(Source: BASIS survey. Number of professionals surveyed : 55,000)

Industry experts are of the opinion that the significant proportion of the jobs in the 'non-coding' segments (Project Management, System Analysis etc.) is an encouraging sign. They contribute to the commitment and seriousness of the local software companies. Keeping in mind the ever used 80-20 rule for management and technical work in software projects, the experts believe that with the increase in larger projects, the 'non-code' professionals in IT companies could establish their prominence more effectively and efficiently.

The fact that non-technical people are more and more required in the IT industry, have encouraged many of the new graduates from the universities to choose a career in IT companies in areas of business development and customer services. However, the curriculum in the universities for business graduates do not include any specialization in business and IT (IT Marketing, IT Sales etc.). Consequently, there is a gap between the academics and the people from the IT industry. However, trade associations with the help of various industry development partners are in the process of bridging the gap between the requirements from the industry and the output of a skilled workforce. In this process, the biggest hurdle for the universities is the lack of impetus for the new students to decide on the IT all along. In most cases, other industry segments absorb the business graduates for their different operations. Moreover, as business and IT is still a relatively new field, top class business graduates are reluctant to engage themselves in the IT industry.

1.8 Related associations/governing bodies

- **Ministry of Science and Information and Communication Technology (MOICT) (http://www.mosict.gov.bd)**

The former government established the MOICT. The reason behind this establishment was to harness the potential of the IT industry and to channel government support for the growth of the industry. Headed by a Minister, MOICT works as the hub to spread IT around the country. The Ministry has set up an ICT incubator and is in the planning process of creating a Hi-Tech Park in order to promote ICT related investments in the private sector (from home and abroad).

- **Export Promotion Bureau (EPB) (http://www.epb.gov.bd/index.html)**

The EPB is a National Export Promotion Agency under the Ministry of Commerce. The organisation is reorganized by the promulgation of a Presidential Ordinance in 1977 as a semi autonomous body. The goal of the organisation is to promote export trade and improve plan and policies helpful to the private sector. IT is administered by a Board of Management (BOM) comprising members from both public and private sectors, the honorable Minister for Commerce is the ex-officio Chairman and the Vice-Chairman is the chief executive of the Export Promotion Bureau.

- **Bangladesh Computer Council (BCC) (http://www.bccbd.org)**

The main objective of establishing BCC was to ensure the effective application and expansion in the use of information technology. In view of this, BCC has been formulating appropriate policies and implementing them since its inception. BCC works in three major service areas:

I. Advisory Services
II. IT- Based Training Courses
III. Initiation and implementation of Development Projects

- **ICT Business Promotion Council (IBPC)**

Public and private sector representatives related to the ICT sector have formed an ICT Business Promotion Council. The Council is responsible for promoting ICT related service and businesses in foreign as well as local markets. IBPC has already established a shared office in Silicon Valley in California, USA, for Bangladeshi ICT companies interested in doing business in the US. Very soon, offices in Europe and other cities in the US will be established.

- **Board of Investment (BOI)(http://www.boi.gov.bd)**

The Board of Investment (BOI) was established by the Investment Board Act of 1989 to promote and facilitate investment in the private sector both from domestic and overseas sources with a view to contribute to the socio-economic development of Bangladesh. It is headed by the Prime Minister and is a part of the Prime Minister's Office. Its membership includes representatives (at the highest level) of the relevant ministries – industry, finance, planning, textiles, et.al. – as well as others, such as the Governor of Bangladesh Bank and heads of some business associations. The executive Chairman is the Operational Head and CEO of BOI.

- **Bangladesh Association of Software and Information Services (BASIS) (http://www.basis.org.bd)**

Bangladesh Association of Software and Information Services (BASIS) is the national association for software and IT related services companies of Bangladesh. Formed in 1997, the association has been working with a vision of developing a vibrant local software and IT service industry in the country. In light of this vision, BASIS has been working hard to create IT awareness in the society through underlining the high importance of making the country more IT capable for a better future of the nation. At the same time, the association has been working hard for creating an enabling environment for the software and ITES industry of the country so that it can flourish by rightly utilizing the huge market potential – both at home and abroad.

A nine (9) member Board of Directors (elected by direct voting by the members for a two-year term) runs BASIS. The Board of Directors has the overall responsibility for running the affairs of BASIS and setting policy guidelines for its secretariat. Aside from the elected board of directors, different sub-committees comprising of members deal with different policy and development issues. BASIS has a strong secretariat headed by the secretary. The secretariat is well staffed to deliver various member services and to carry out programs and activities in the different areas as specified within the broad goals of the association.

- **Bangladesh Computer Samity (BCS) (http://www.bcs-bd.org)**

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.

The ICT industries of Bangladesh comprises distributors, dealers, resellers of computers and allied products, locally assembled computer vendors, software developers and exporters, Internet service providers, ICT based educational institutions and training houses, ICT embedded services providers etc.

The total number of members comprises 524 at present. The body is run by a 7-number executive council elected every two years.

- **Internet Service Providers Association of Bangladesh (ISPAB) (http://www.ispabd.org)**

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. Their working areas include

- 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
- Cyber Café Owners' Association of Bangladesh (CCOAB) (http://www.ccoab-bd.org)

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.

1.9 Tax rules and other policies[13]

- The government declared the ICT sector as a 'Thrust Sector'
- A National ICT Task Force has been formed which is headed by the Honorable Prime Minister. The task force made 45 suggestions for improvements; 25 have been implemented by the government and further 9 are in the process of being implemented
- A pragmatic National ICT Policy has been adopted (2002)
- The 'Copy-write' law is enacted
- The draft of the ICT Act has been approved by the Cabinet (it awaits the final approval from the policy makers)
- The government have allocated minimum 2 per cent of ADP (Annual Development Program) in IT spending (more than USD 53 million per year)
- The software business in Bangladesh enjoys full Income Tax Exemption
- ICT and ITES products/services enjoy Value Added Tax (VAT) Exemption
- Generally a 5-7 year tax holiday is provided to foreign direct investors and full repatriation of invested capital, profit and dividend is available
- The government has exempted customs duties and VAT on computers, hardware and accessories
- Now, Bangladesh is connected to the Information Super Highway (submarine cable connectivity) through SEA-MEA-WE 4 consortium. The present VSAT backbone would soon be replaced by high speed fiber optic connection backbone

13) *Sources: Board of Investment (http://www.boi.gov.bd/invest_incentive.php); BASIS (www.basis.org.bd); National Board of Revenue (http://www.nbr-bd.org); http://www.itforchange.net/WSIS/dhaka .More on ICT policy and government initiatives is available at http://www.itforchange.net/WSIS/dhaka/*

- The fixed and cellular telephone connections have shown significant growth in the last few years
- An ICT incubator is established and an ICT park is in the pipeline
- Computer science as a course has been introduced at the High School level
- The Ministry of Science and ICT has introduced an ICT Internship Program in cooperation with the private sector
- There are about 600 cyber cafés in the country with 250 of them in Dhaka
- People are showing encouraging awareness for Internet use. Increasingly, the young generation is utilizing the Internet facilities.

1.10 Working hours etc.

Working days	Sunday to Thursday
Weekend	Friday and Saturday (Many software companies, most hardware companies, major branches of banks operate during Saturdays)
Time zone	GMT+ 6:00
Country IDD code	880
Dhaka city code	2
Working hours	9:00 am – 5:00 pm (However, most private companies carry on till 6:30/7:00 pm)
Special working hours/days	The software companies involved with outsourcing and international projects accommodate the time difference with the clients' countries by customizing the working hours and workdays

1.11 Political risks with the industry

The government of Bangladesh has declared the ICT sector as one of the major thrust sectors. This has prompted suitable/encouraging government policies for the sector. However, the sector is not immune to the general political risks. The country's political risks do not directly fall under the scope of this report and therefore, it is suggested to consult other reports to learn about the general political risks associated with business. In this regard, the 'Doing Business', published by World Bank could be very effective.

2 Labour force

2.1 ICT education in Bangladesh

In recent years, the growing number of private universities has provided new and broader opportunities for aspiring IT professionals to pursue relevant education. However, as the IT orientation is not quite widespread in the lower/secondary education system, the industry relies solely on the competencies the IT professionals obtain during their graduation/post graduation levels. Companies are stating that the students have a lot to learn when they have graduated and as a result, special training and on the job training play a vital role in developing the workforce in the software companies.

At present, most of the university level IT education is concentrated on computer science and engineering courses[15]. According to a presentation[16] by Mr. Fahim Mashroor Chowdhury, CEO, Bdjobs.com Limited, the industry demand for IT professionals per year is about 2,800. The estimate is based on an assumption of a 50 per cent industry growth and minimum 20 per cent attrition rate. Each year the number of IT graduates from different universities is 2,000. However, about 50-70 per cent of the graduates choose a non-software firm or go abroad. As a result, it is estimated that each year the industry faces a net shortage of qualified workers in the range of 1,800 to 2,600.

2.2 IT professionals skill matrix

The following tables show the academic qualifications and the skill set of the IT professionals working in the software companies in Bangladesh.[17] The findings are based on the BASIS Survey 2005. The survey interviewed 1,100 employees working in 55 local IT companies.

Table 5: Academic qualification of technical professionals
[% (respondent) of total technical staffs in the surveyed software firms]

Graduate in Non-IT	19%	(209)
Masters in Non-IT	23%	(253)
Computer science/engineering graduate (3/4 yrs.)	35%	(385)
Masters in computer science/engineering	9%	(99)
Diploma/certificate courses in IT	12%	(132)
Other	2%	(22)

(Source: BASIS survey)

15) *An overview of the IT course curricula is included in the appendix*
16) *Presentation made during a roundtable on 'HR problems for software companies and possible solutions' organised by BASIS on June/2005*
17) *Source: BASIS survey 2005*

Table 6: Skill matrix of local software industry
[% (respondent) of total surveyed employees skilled in particular area]*

Programming language			Database		
Basic/VB	50%	(550)	MS SQL	40%	(440)
C/C++/VC	28%	(308)	MS Access/FoxPro	39%	(429)
C#	16%	(176)	Oracle	27%	(297)
Java	24%	(264)	PHP	18%	(198)
Net	24%	(242)	**Operating system**		
HTML	34%	(374)	MS NT/2000	58%	(638)
ASP	21%	(231)	Unix/Linux/Solaris	17%	(187)
PHP	18%	(198)	**Other technical skills**		
Javabean	18%	(198)	XML	21%	(231)
JSP	16%	(176)	UML	17%	(187)
CGI Perl	5%	(55)	Lotus notes	4%	(44)
Cold fusion	4%	(44)			

**There are instances where the same respondent identified multiple skill competencies*
(Source: BASIS survey)

2.3 Availability of skilled labour

According to Mr. Chowdhury, the industry faces few specific problems in availing adequate IT professionals[18]. The following table present these problems as well as the underlying reasons.

Problems	Reasons behind
Unavailability of a pool of employees to be recruited	• Computer science course enrollment is declining • Better quality students opting for non-software industry (mainly Telecom and Banking)
High attrition rate	• High salary range in Telecom and Banking sector • Absence of structured HR policy in most software companies
Absence of institutional infrastructure for continued training	• Lack of 'finishing school' to groom fresh graduates • The curricula of training institutions do not match the industry needs

Though the industry faces problems in the HR pool, the inspiring fact of the matter is that the local software companies are seriously attempting to change the scenario. The company chiefs and top management have admitted their difficulties, which is a good sign in finding a solution. BASIS members have already identified specific steps for improving HR aspects of the software companies. Some of these are organisation sponsored training, induction of financial institutions, long-term internship and influencing

18) *Mr. Chowdhury is one of the BASIS directors and he has worked as the chairperson for the HR Sub-Committee of BASIS. The problems he identified were presented during a HR Roundtable among the BASIS member representatives. The participating CEOs and MDs in that roundtable agreed with Mr. Chowdhury while discussing the HR problems in IT companies in Bangladesh. In light of this, we can take the following as the 'overall' industry wide view for Bangladesh ICT industry*

academia. Additionally, the inclusion of a higher number of international projects in the industry has provided new impetus for professionals to seek opportunities.

2.4 Labour cost

There are three main categories of software companies that operate in Bangladesh; these are locals, joint ventures (JV), and transnationals. The labour cost (salary range) varies across the categories.

Following table displays the salary range of different categories of professionals working in the software industry.

Table 7: Salary range of IT professionals in Bangladesh Companies

Salary range (USD)	Local[19]	JV[20]	Transnational[21]
Network engineer	230 – 300	400 – 750	600 – 1200
Programmer*	75 – 400	400 – 700	400 – 1200
System architect	380 – 600	400 – 900	400 – 1000
System analyst	380 – 600	400 – 900	400 – 1000
Testing/QA	380 – 600	400 – 900	400 – 1000
Project Management	300 – 750	600 – 900	600 – 1200
Graphic designer	300 – 600	400 – 700	400 – 1200
Web developer	75 – 400	400 – 700	400 – 1000

** Depending on experience the range varies*

2.5 Universities and training institutions

According to statistics of the Ministry of Education, there are 73 universities in the country. Of them 21 are public universities while the other 52 are private universities. In terms of technical education, Bangladesh University of Engineering and Technology (BUET) is the leader. University of Dhaka (Computer Science and Engineering Department), Shajalal University of Science and Technology (Sylhet) and Khulna University are also producing good quality IT professionals. These public universities enjoy the 'quality intake' advantage over other private universities. The difference in the intake is mainly the result of the cost of education. The students in the higher education level in Bangladesh mostly come from middle class families. The high cost of education at private universities is still out of reach for most of them. Naturally, the government supported public universities become the obvious choice. In addition, the public universities also provide better resources and environment (faculty, infrastructure etc.). The private universities are new in the education system and most of them lack the basic requirements for university studies. Some of the private universities, however, in the recent times (last 2-3 years) have done well in IT education.

19) *Collected from a recent survey report by Mr. Mohammad Ashraful (the report is available at http://geekswithblogs.net/joycsharp/articles/84330.aspx). Some figures are collected through personal interviews*
20) *The figures are collected through personal interviews*
21) *The figures are collected through personal interviews*

The students pursuing IT education in the country have shown tremendous potential over the years – winning international programming contests, developing effective anti-virus software and many other such achievements are very common for Bangladeshi IT students. In this regard, BUET and Dhaka University have been most successful. Among the private universities, North South University, Ahsanullah University of Science and Technology, American International University of Bangladesh, BRAC University, Daffodil University and East West University are some of the leading institutions in IT education.

The following table provides the web address for the leading universities in Bangladesh for IT education.

Table 8: Leading Universities for IT education in Bangladesh[22]

Bangladesh University of Engineering and Technology (BUET)	www.buet.ac.bd
Islamic University of Technology (IUT)	http://www.iutoic-dhaka.edu
Dhaka University (DU)	http://www.univdhaka.edu
Khulna University of Engineering and Technology (KUET)	http://www.kuet.ac.bd
Shajalal University of Science and Technology (SUST)	http://www.sust.edu
North South University (NSU)	http://www.northsouth.edu
Ahsanullah University of Science and Technology (AUST)	www.aust.edu
American International University of Bangladesh (AIUB)	http://www.aiub.edu
East West University (EWU)	http://www.ewubd.edu
BRAC University (BU)	http://www.bracuniversity.ac.bd
Daffodil International University (DIU)	http://www.daffodilvarsity.edu.bd

In addition to the universities, there are number of Diploma/Vocational Institutions in the country who provide IT education. There are 20 government and 87 private polytechnic institutes in the country. These institutions mainly offer diploma courses on engineering subjects. Most of these centers are owned and administered by the government through the Technical Education Directorate.

An unauthenticated source reveals that there are more than 1000 private and public sector computer-training institutes offering IT skill development at various levels. However, the interviews with the stakeholders revealed a different scenario.

The industry experts (interviewed company CEOs and BASIS leaders) opined that the training facilities in Bangladesh for the ICT industry are inadequate. Especially, the types of training provided are not in line with the industry requirements. Most of the training institutions provide training in basic computer skills. Few specific institutions (NIIT, Aptech, Base etc.) provide advanced level of training courses. However, they lack the relevance to the actual needs of the software companies. Professionals have the option to acquire certifications by Microsoft Certified Partners.

22) *Source: Personal interview*

To overcome the deficiency of the institutional training facilities, almost all companies develop in-house training programs. Moreover, they strongly recommended foreign companies coming to Bangladesh to do the same.

3 Infrastructure

3.1 Internet bandwidth availability

Bangladesh has joined the Information Super Highway through submarine connectivity in 2006. Bangladesh Telegraph and Telephone Board (BTTB) is the official custodian of the new connectivity backbone. The BTTB authority has recently publicized a utilization plan of the submarine connectivity. The following sections provide a summary of the plan and the upcoming Internet connectivity scenario of the country.

Bangladesh connects itself to the submarine cable connectivity through the SEA-MEA-WE-4 consortium. Available capacity for BTTB in this cable is 468,000 MIU* Km which may have a maximum of 64 STM-1 (10 Gbps) at the landing station. MIU is Minimum investment Unit that is equivalent to one STM-1. Out of BTTB's total capacity, 50,000 MIU* Km has already been contributed to the common pool of the consortium for sale. The BTTB further plans to enhance the capacity of the cable in different phases with minimal investment. Minimum capacity unit for this cable is STM-1 i.e. BTTB has to utilize the capacity at STM-1 or multiple of that between any two landing stations.

Although the connection to the Submarine Cable Super Highway presents tremendous improvement opportunities for Bangladesh, the present situation in terms of Internet connectivity is not at all satisfactory. The present VSAT backbone connectivity is slower in nature and is prone to technical difficulties. The new Submarine backbone on the other hand, still has to be streamlined.

3.2 Bandwidth cost

The BTTB Internet connection sets the tone for the trend in connectivity. The full ranges of bandwidth/Internet connection costs are available at the BTTB's website (http://www.bttb.net). The following sections describe the general cost of getting an Internet connection.

Table 9: LOW COST Internet connectivity for corporate users[23]

Type of connection*	Average bandwidth	Backbone	Initial charge** (USD)	Monthly Charge (USD)	Technical support
64 kbps (shared – 2)	70% (of 64 kbps)	(Fiber optic) Submarine Cable Connectivity – 100% VSAT – 25% (as emergency back-up)	380	170	1. Connection within 7 days of work order. 2. Connection problem – Instantly within Dhaka • 9 am – 8 pm; at the site • 8 pm – 9 am; over the phone. 3. Backbone problem – within 2 hours.
64 kbps (dedicated)	100 % (of 64 kbps)			320	

Table 10: HIGH COST Internet connectivity for corporate users[24]

Type of connection*	Average bandwidth	Backbone	Initial charge** (USD)	Monthly Charge (USD)	Technical support
64 kbps dedicated (with VSAT support)	100% (of 64 kbps)	(Fiber optic) Submarine Cable Connectivity – 100% VSAT – 25% (as emergency back-up)	460	300	1. Connection within 7 days (max.) from work order. 2. Connection problem – Instantly 1 hour (max.) within Dhaka. Automated monitoring system with 24/7 on site technical support (assistance within 15 minutes). Redundancy support with 4 VSAT 3. Backbone problem – within 5 minutes
64 kbps dedicated (without VSAT support)	100% (of 64 kbps)	(Fiber optic) Submarine Cable Connectivity – 100%	460	210	
Average connectivity cost per month for 1 kbps = 2.67 USD [25]					

* *The client could opt for 'Higher Bandwidth' as well. However, according to Internet Service Providers, for typical usage 64 kbps is adequate*

** *The charge may vary according to location of the installation*

23) *Source: R-net Online (www.rnet-online.net)*
24) *Source: Bangladesh Online Limited (www.bol-online.com)*
25) *Source: Agni Systems Limited (http://www.agni.com)*

3.3 Electricity and power stability

The problem with electricity is one of the major hurdles the software companies in Bangladesh face. Through the ICT incubator[26], there are special arrangements for an uninterrupted power line, but the other companies with offices all around the city must arrange for alternative power sources. In this regard, most companies opt for an electric generator for supporting the larger electricity requirement. They use UPS (Uninterrupted Power Supply) and IPS (Instant Power Supply) for equipments and computer systems. The generators and UPS/IPS are widely available in the market and are quite reasonable in price. When asked to comment the cost addition to production due to this alternate electricity support, one CEO of a local company said that the problem has been prevailing for last 2-3 years and in recent times it has deteriorated further. He does not see immediate improvement in country's power sector. He strongly suggested on arranging for an alternate power source for any new ventures. However, he said that the additional cost is very insignificant for his company and it increases the cost by about 0.5 per cent. Most if not all IT joint ventures have assured that there is a power generator.

26) *ICT Incubator: Government supported infrastructure (floor space, utility, net connection etc.) facilities for small IT entrepreneurs*

4 Hardware and technical back-up

4.1 Overall hardware market

The PC/Server market in Bangladesh is estimated at USD 129.4 million (2005). Springboard, a Singapore based Research Company revealed this in one of their recent research reports[27]. The report also said that the market growth rate in the first quarter of 2006 (Jan-Mar) was 23.8 per cent as compared to the first quarter of preceding year. The laptop market expanded 24.0 per cent in 2005.

During Q4 2005, 48,340 PCs were shipped from international locations to end-users in Bangladesh for a value of USD 37.7 million, up from 34,884 units in Q3 2005. For the full year (Jan-Dec), the PC shipments expanded 16.4 per cent to 162,400, generating a value of USD 129.4 million. Aggressive sales and marketing activities undertaken by MNCs have helped increase PC market growth.

The large enterprises (companies with more than 500 employees) and government sectors collectively accounted for almost half of total PC/server shipments in 2005. NGOs are also an important source of funding for IT investment in the country, but generally, spending is routed through the public sector. In the private enterprise market, banks and telecom companies are largest on IT spending. The consumer and SME markets represent significant long-term promise, but both segments are currently in the infancy stage.

4.2 Servers/workstation availability

Locally assembled, often un-branded, machines continue to dominate the market, holding over 75 per cent of the PC shipment market shares. Most of the international giants also operate in the local market. In cases of brand equipment, the international giants usually rely on local distributors and dealers. IBM, HP and Dell all have local distributors in the country.

4.3 Servers/workstation price

The cost of a server/workstation varies with the configuration. The following table shows the cost of server/workstation with basic configuration.

27) *www.springboardresearch.com*

Table 11: Price (in USD) of server/workstation with basic configuration[28]

	Clone	IBM	HP	Dell
Server (Basic Config.)	1,800 – 2,000	4,800 – 5,000	5,700 – 6,000	6,000 – 6,500
Workstation (with OS*)	680 – 760	900 – 1,000	850 – 1,000	900 – 1,000
Workstation (without OS)	530 – 600	760 – 900	680 – 830	760 – 900

**OS – Operating System*

4.4 Availability of technical support

The position of the technical support for PC/server hardware troubleshooting is at a satisfactory level. The vendors have enough technical knowledge to provide after sales support to their clients. Most large organisations[29] usually have an Annual Maintenance Contract (AMC) with the vendors. The AMC is customizable in accordance to the client's needs. In some instances, the larger users prefer having their own technical support team; however, the general support from the vendors is adequate for smaller organisations.

The interviews with local hardware vendors revealed an interesting aspect regarding the after sales support. They opined that, the local agreement of maintenance is much more effective than a international warranty agreement. Though, as agents of the international giants, the designated local distributors are legally bound to take in the complaints from the customer, however, they may not necessarily be bound to take the responsibility of providing the technical support by themselves. They usually communicate with the regional office and hand over the responsibility to them. In case of a local agreement, the vendors would provide the support locally by using their own resources. In the latter case the support is more prompt and could be extended even to 24/7 support.

4.5 Major hardware companies' presence

Among international vendors, HP led the market with a 7.6 per cent share of the shipments in 2005, followed by Dell and Lenovo/IBM. A local brand, increasingly viewed as a viable alternative to international players, is Daffodil Computers (http://www.daffodil-bd.com), which made several strategic announcements in the fourth quarter of the year.

28) Source: Flora Limited (www.floralimited.com), Rishit Computers Ltd. (www.rishit.com)
29) Source: personal interview/experiences (Large Organisation – MNCs, Local Corporate)

5 Key competencies in Bangladesh's ICT sector

5.1 Key industry competencies

According to the industry stakeholders/experts, the major competencies (or comparative advantages) for ICT industry in Bangladesh are as follow:

Cheap labour

Bangladesh has one of the cheapest rates for work force among the similar business destination countries. Concerning the ICT industry, the highly skilled labour force comes at a significantly competitive price. In addition to that, the IT professionals in Bangladesh are very good at absorbing new learning (easily trainable).

Another great advantage with the Bangladeshi work force is their longer-term commitment to specific work areas. However, despite their commitment to their work areas, they are not always necessarily committed to their organisations.

The reason for the persistence with a specific work area could be related to the fact that the people working in the ICT industry in Bangladesh are not offered endless opportunities (as is the case for many of the neighbouring countries). Therefore, IT professionals build their skills in a particular area. As a result, clusters of experts with different skill sets are available in Bangladesh. However, most companies need to customize their HR policies to support a long-term commitment of the work force.

Quick learning/easily trainable

The Bangladeshi work force as well as the business people are traditionally renowned for their quick learning abilities. The work force, especially, has historically strong abilities in mathematical and logical analysis processes. Bangladeshi students have won a number of programming and mathematical competitions globally. Because of their capability to quick learning, the Bangladeshi work force can easily be trained to acquire specific technical knowledge.

Geographical location

Geographically, Bangladesh has the potential to become a business hub. Naturally, utilization of this advantage would result in growth in all industries. Furthermore, as 'non-nuclear' country, Bangladesh has added advantage for countries that have restrictions in collaborating with 'nuclear' countries.

Changed scenario in neighbouring countries

India is no doubt the leader in South Asia when it comes to outsourcing and IT as a whole and India is a pioneer. However, in recent times India has moved up in the ladder and is now operating in higher and more complicated levels of IT. In addition, salaries in India have increased. This creates a vacant position for an outsourcing partner who can operate at the lower strata of outsourcing. As a result, Bangladesh gains an edge on this segment of market.

Favorable government policies

As was explained above (please see section 1.9), the government of Bangladesh has declared the ICT sector as one of the major 'thrust' sectors. Added to special policy benefits for the ICT sector, the favorable investment policies for FDI should encourage companies from other nations to venture into the Bangladesh ICT industry.

Availability of financially capable investors

Local business investors in Bangladesh are well equipped to invest in strategic alliances and partnerships. The willingness of the investors combined with their local business knowledge could be utilized for better return on the investment. Another aspect of these local investors is that they have proven records of accomplishment in international businesses in other sectors such as textile. These people have funds and are ready to invest money in new industries. As a result, the foreign investors feel comfortable working with them. However, in this regard, the local investors have more or less never favored the IT investment, as intellectual investment in IT businesses sometimes make the return 'invisible'.

English proficiency

Bangladeshi people have higher competencies in English compared to countries like China and Vietnam. However, the language proficiency is to some extent skewed towards professionals with better schooling. In general, the English skills need to be improved for Bangladeshi IT professionals to be able to compete in the global market.

New outsourcing destination

Bangladesh is relatively new as an outsourcing destination. This means many unexplored areas of business. More and more investments are coming in and the industry is experiencing growth. The attractive business prospects are bound to encourage local and international investors in the near future.

5.2 Software application competencies

In response to the question regarding the specific software application competencies for Bangladesh ICT industry, the respondents of the interviews were of the opinion that Bangladesh is not yet ready for complex outsourcing support. They think that any foreign company intending to enter Bangladesh IT sector, should start with small projects such as web development, desktop publishing, data entry, 3D animation and back office development. For venturing into more critical software solutions such as ERP and CRM, the proper resources need to be built gradually. However, all the respondents were very optimistic about the potential of ICT in Bangladesh.

Software application	Present competencies	Potential competencies
Programming	****	*******
Hardware assembling	*******	*********
Desktop design, publishing	*****	********
ERP (Enterprise Resource Planning)	**	***
CRM (Customer Relationship Management)	*	***
CMS (Content Management System)	*	*****
EDI (Electronic Data Exchange)	***	******
Drawing and model construction	*	***
Data safety	*	**
Mobile content development	******	*********
Call centers	*	******
ASP (Application Service Provider)	**	***
Data base development	*	****
Game Development	***	*****
E-governance	**	*******

The rating system presented above is based on the opinions of the interviewed companies. It mainly asserts the attractiveness of different segments of software development.

In assessing the present competencies, the considerable factors were

- Market awareness
- Extent of use
- Availability of workforce
- Number of companies working in specific areas
- Competitive advantages over other countries

The considerable factors for the potential competencies were similar to the present competencies with the exception in case of potential, where the perception of the stakeholders was emphasized.

6 Local market opportunities and threats

6.1 Specific market segments

The prevailing opportunities within the ICT industry in Bangladesh are as follows.

Readily available

The top most readily available segment is the outsourcing segment. Bangladesh has come a long way in recent years to attract an increasing number of outsourcing projects. Major countries that are outsourcing IT projects to Bangladesh include USA, UK, Canada and Denmark. Knowledge and learning from the Business-to-Business (B2B) Programme could be a good indicator. The B2B Programme has as many as 42 projects running in Bangladesh at this moment. Of these, 11 are software development (outsourcing) projects[30].

The specific sub-segments within outsourcing are more ready than the others, they include Web Development, Back Office, Data Entry, Animation and Multimedia and Desktop Publications.

Potential/upcoming

The telecom sector in Bangladesh is rising at great pace. The number of mobile phone users in Bangladesh has crossed 15.50 million in August 2006 with GrameenPhone as the leading operator[31]. An encouraging fact about the mobile phone usage is Bangladesh is that it is not restricted to the urban areas only; rather it is wide-spread throughout the country. The booming mobile communication has provided new business opportunities for software companies. The concentration of these opportunities at present lies within value added services. However, the assurance of local support would definitely influence the major telecom companies to procure their operational software from local market

A similar segment that came right after the telecom boom is mobile content development opportunities. Many of the local companies are capable of providing support to the local and international telecom companies.

The government commitments/initiatives towards e-governance have provided a very important opportunity for the software companies. Additionally, the ICT4D propositions – though not directly designed with a business focus – would result in new business opportunities for IT companies.

30) Source: http://www.psdbangladesh.com

31) Source: Bangladesh Telecommunications Regulatory Commission (BTRC)

Niche

The SME sector in Bangladesh is growing at a steady rate. The use of IT for the SMEs is not wide spread. However, the potential remains. A survey report[32] on the SME segment in Bangladesh revealed that there exists a demand for IT/ITES estimated to the value of USD 17.94 million. The demand is expected to rise at a rate similar to the SME sector growth rate. The demand for software includes accounting, billing, productivity and inventory management.

6.2 Micro level

Regarding the individual IT companies in Bangladesh, the most difficult aspects at present are: disloyalty of employees in the IT business, recruitment (on a medium to long term basis), access to bank finance and lack of business vision of the entrepreneurs.

Bangladeshis are used to short term profit from investing in the textile business. Many of the investors who come from this sector are also expecting short term profit in the IT business. The management style in Bangladesh is to a large extent based on a top-down approach. Apart from clashing directly with the Danish/Scandinavian style i.e. each person has the responsibility for his/her own job – it also means that Bangladesh is short of middle management skills. There is not one large company (like in India, for instance) to operate as an example and drive the development of the IT business. During the interviews, the stakeholders reiterated these facts and opined that the aforementioned difficulties could become even larger threat in the future (unless proper steps are taken).

Based on the experience of Danish companies, it takes long time to establish a company legally in Bangladesh. The process of obtaining licenses, approvals etc. has a duration of up till six months. This factor influences the ease with which new ICT companies are established, and it can decrease the speed and number of companies in the development of the ICT sector.

As well, the cost and the quality of Internet connections influence this development. The costs of Internet access are relatively high, and even at high costs no optimal connection is yet available. The quality of Internet connections will affect especially the international possibilities for the sector, as effective communication overseas is somewhat constrained.

6.3 Macro level

The interviews with different stakeholders revealed that the following industry wide threats might affect the ICT industry in the future.

- Labour constraints: Most stakeholders perceive the quality labour constraint as the most threatening aspect to the Bangladesh ICT industry. The vicious cycle of a less attractive career path in IT and the less developed sector due to lack of resources could deeply affect the sector. Especially, the quality of the Bangladesh IT professionals is deteriorating all the time.

32) *'BASIS-KATALYST IT/ITES Study' (2005) – jointly conducted by BASIS (www.basis.org.bd) and KATALYST (www.katalystbd.com)*

- Lack of interest: The universities are faced with a problem of declining number of students for IT courses. Even the business graduates are not willing to work for IT companies. In most cases, the other industry segments absorb the business graduates for their different operations. Moreover, as the Business IT is still a relatively new field, top class business graduates are reluctant to engage themselves in the IT industry.
- Brain drain: Brain drain further worsens the labour constraints. A talented group of IT graduates is leaving the country to pursue higher and better education and most of them do not return.

6.4 International

The international threats from the neighboring countries (especially India) have always been present. Recently, the business threats coming from India has changed. India is going into an upper segment of the outsourcing/IT support market, which has created an even field for the second category countries. In this regard, countries like Vietnam and China could become large threats for the Bangladesh IT industry.

7 SWOT

Strengths

According to the literature research and the opinion of the stakeholders, the Danish companies (especially the IT companies) could bring in some specific strengths that will lead to success of their venture in the ICT industry in Bangladesh. They are as follows.

- Business vision: Most of the IT companies in Bangladesh severely lack the broader business vision. The usual trend was/is to start up an IT company, then look for opportunities and expect a fast profit. The IT sector does not enjoy the proper business planning as does the other sectors in the country. This is where the Danish companies can bring new knowledge. The management and business professionalism of the Danish companies is expected to encourage the potential/existing investors from Bangladesh to venture into IT. The Danes could make the investors understand that a long-term view is required and help them see the world of opportunities.
- Cultural bridge: Knowledge of the outsourcing country's culture could be of great help. Especially, the trade and investment routines of the particular country would provide direction for the strategic partnering companies to serve the specific market. One of the interviewed stakeholders expanded on this point by specifically saying that the Danish companies could utilize their 'Nordic Way' to good effect.
- Business linkage: Danish companies could use their networks in EU region to secure outsourcing projects and utilize the competencies of the Bangladesh ICT to deliver.
- Danish government's presence: Danish government has been involved in the development process of Bangladesh. Bangladesh and Denmark enjoy a good relationship. The Danish IT companies could use their government's good relationship to enter into public service IT projects in Bangladesh.
- The existing presence of a good record of Danish-Bangladeshi IT projects: Danish companies have already made some progress in entering the Bangladesh ICT industry. Through the B2B programme and private initiatives, many Denmark-Bangladesh Joint Venture IT projects are operational at present. The experiences of these projects would be helpful for planning new business projects in this sector.

Weaknesses

- HR policy: The Danish companies have to be very careful in trying to implement the HR policy that works in Danish region. The employee force in Bangladesh has different value sets and that has to be addressed while venturing into the local market. The Danish companies intending to come to Bangladesh should prepare themselves to cope with the complexity of culture in Bangladesh and to some extent be less naïve in their approach.
- Local business knowledge: The stakeholders in the Bangladesh ICT industry opined that foreign companies (especially the Danish companies) trying to come to Bangladesh should spend a significant amount of time on pre-planning. The differences in cultural values, unless addressed properly, could have serious negative consequences. For instance, the lengthy bureaucratic system in Bangladesh is almost an integral part of business. People have to find their ways around these systems and cope with them. The best way to deal with these difficulties is to take in local people

on board. Another option could be to outsource the bureaucratic procedures of 'Doing Business in Bangladesh'.
- Conservative approach: Some informants said that sometimes the very cautious approach of the Danish companies frustrates the ambitious local partners.
- Communication: The business communication of the Danish companies sometimes causes misunderstanding, as pointed out by a local IT company CEO. He said the problem is not very significant now. However, he is of the opinion that when increasingly more interactions take place in the future, a common communication system would become necessary.
- Conservative vs. expressive communication: Bangladeshi are very polite and do not always express their opinion i.e. Danish business people would always get the reaction they expect, misunderstand, and think that everything is in order when it is not. On the other hand Danes are very straightforward, impatient (for example when it comes to reaching a decision or to get an answer) and not always very polite in their communication. The two cultures are surely clashing regarding the issue of communication and this is something both parts have to recognize and try to overcome.

Immediate opportunities

- Horizontal market expansion through outsourcing

Outsourcing to Bangladesh gives the Danish companies a definitive competitive advantage in terms of lower costs for products and services. They could utilize this advantage in expanding into new market segments in (and outside) Denmark.

- New market entrance

The cost savings and new revenue flows gives the opportunities to venture into new markets and different segments.

- Training needs

By adding a new service to their portfolio, the Danish companies could capitalize through addressing the need for training in Bangladesh. The advanced technology as well as business training by the Danish companies would also result in attracting the right people for right job for Danish companies interested to operate from within the Bangladeshi ICT industry (in order to gain competitive advantages).

Long term opportunities

- Asian market penetration

The geographical location of Bangladesh provides a great platform for operating in Asian markets.

- Niche market penetration

The SME sector in Bangladesh has a great demand for IT services. The untapped market could through extensive awareness and marketing drive become a lucrative niche segment for Danish IT companies. The successes of this niche would provide a platform to enter the neighboring countries where the market size is many times larger than that of Bangladesh. In this regard, strategic alliances with support organisations (e.g. financial institutions) could be helpful.

- Market capturing

The Danish companies could go for an ambitious plan of challenging the Indian giants in capturing markets in other countries. The starting point in this process could realistically be to take on some of the work, which is now too expensive to outsource to India. The tools for success in this regard would be the immediate development of competencies in the Bangladesh ICT sector.

Hurdles

- Training requirements

The labour market in Bangladesh is cheap. However, there is a significant need to train the existing labour. Generally, the training areas include areas of advanced technology, business acumen and middle management skills. One positive aspect in this regard is that the labour force in Bangladesh is easily trainable.

- Lack of methodical approach

In general, Bangladesh companies and people lack documentation skills and systematic work process skills. The continuity of work could be lost due to this. Especially, many of the companies face difficulties in times of employee turnover. Another impact of the lack of methodical approach is difficulties in quality control.

- Language barriers

Bangladeshi labour force in general lacks English language proficiency. In specific areas, the presentation and correspondence skills of the local labour force has room for improvements.

- Lack of information

The information sources in Bangladesh are scattered and it can sometimes be difficult to get specific information. Usually, people use their personal network to get information. Some government agencies do provide related information. However, the overall research-based/authentic information sources are not adequate.

Appendix A

Abbreviations and web references

List of abbreviations

BASIS	Bangladesh Association of Software and Information Services
BCC	Bangladesh Computer Council
BCS	Bangladesh Computer Samity
BoI	Board of Investment
BRTA	Bangladesh Rural Telecom Authority
B2B	Business-to-Business
BTRC	Bangladesh Telecom Regulatory Commission
BTTB	Bangladesh Telegraph and Telephone Board
CCOAB	Cyber Café Owners' Association of Bangladesh
EPB	Export Promotion Bureau
FDI	Foreign Direct Investment
IBPC	ICT Business Promotion Council
ISP	Internet Service Provider
ISPAB	Internet Service Providers Association of Bangladesh
ITES	IT Enabled Services
ITU	International Telecom Union
JV	Joint Venture
MNC	Multi National Companies
MOICT	Ministry of Science and Information and Communication Technology
NBR	National Board of Revenue
SICT	Support to ICT (task force)
SME	Small and Medium Enterprises
USD	United States Dollar (For this report the currency exchange rate is taken as 1 USD = 66 BDT – Bangladeshi Taka)
VAS	Value Added Services
VAT	Value Added Tax

Reference web sites

BCS	www.bcs-bd.org
BTRC	www.btrc.org.bd
ITU	www.itu.int
BTTB	www.bttb.net)
Doing Business (World Bank)	www.doingbusiness.org
BASIS	www.basis.org.bd
World Bank	www.worldbank.org
Springboard Research	www.springboardresearch.com
MOICT	www.mosict.gov.bd
EPB	www.epb.gov.bd
BCC	www.bccbd.org
BoI	www.boi.gov.bd; www.boi.gov.bd/invest_incentive.php
ISPAB	www.ispabd.org
CCOAB	www.ccoab-bd.org
NBR	www.nbr-bd.org
Daffodil University	www.daffodilvarsity.edu.bd
BRAC University	www.bracuniversity.ac.bd
Bangladesh Online Limited (BOL)	www.bol-online.com
R-net Online	www.rnet-online.net
Agni Systems Limited	www.agni.com
Flora Limited	www.floralimited.com
Rishit Computers Ltd.	www.rishit.com
Danida PSD	www.psdbangladesh.com
KATALYST	www.katalystbd.com
Ministry of Education	www.moedu.gov.bd
Somewhere in……	www.somewherein.net
DataSoft Systems Bangladesh Limited	www.datasoft-bd.com
Bdjobs.com Ltd.	www.bdjobs.com
eGerneation Limited	www.egeneration.com.bd
The Decode Ltd.	www.decodebd.com
Southtech Limited	www.southtechlimited.com
Spinnovation Limited	www.spinnovation.com.bd
WSIS (World Summit on the Information Society)	www.wsis-online.net; www.itforchange.net/WSIS/dhaka
TRADO (IT Trade Opportunity)	www.trado.org; www.trado.org/Cou/BD/CouBDIts.aspx
Bangladesh Development Gateway	www.bangladeshgateway.org

Appendix B

Case study

Nordic-Bangladesh joint venture

To following is a case study of a Nordic-Bangladesh joint venture in Bangladesh ICT market.

Somewhere in…… (www.somewherein.net) – An outsourcing success story

- Background

With the motto 'offshore web solutions – the Nordic way', Somewhere in…… has been operating within the Bangladesh ICT industry as one of the best outsourcing companies (as claimed by Somewhere in management) for the Nordic region. The major working partnership of Somewhere in…… is with Norway though they have also commenced exporting to other Nordic countries. The strongest competency of the company lies in its in depth knowledge of the two different regions (viz. Nordic and Bangladesh). The Norwegian Mr. Arild Klokkerhaug, Head of Opportunities, Somewhere in…has been living in Bangladesh for more than 12 years. He along with his two partners brings with them the Nordic culture and blends them effectively with the local culture. That is the secret of the success behind the company. Let us now look in detail at the road to success for 'Somewhere in…..'.

- Challenges

Before the partnership began, the company identified the challenges that lay ahead. Three basic roadblocks were as follows:

i. Establishment

After identifying the rough business idea based on their ICT skills, cultural bridging expertise and mission in life, the founders went into a month of self-analysis and observation. Their thinking process was "We had to know and understand ourselves, our identity and values before starting a business, or else how can we design the foundation? They came down to the core values of inclusiveness, imagination, curiosity and engagement, and all talents we employ, all projects we take on and all partners we work with must be recognized for these values. People can learn java, they can learn French, but unless curiosity is in their nature, it is hard to learn." By religiously applying these values along with their business purpose of creating colorful moments, Somewhere in… has a clear direction for growth."

Every country presents itself with some unique difficulties in business establishment and Bangladesh is no different. The business culture in Bangladesh can sometimes be very 'unprofessional' and the lack of commitment is one of the major hurdles for intending investors. The legal procedures can also be very tedious owing to deep-rooted bureaucracy. However, the IT sector in Bangladesh (and foreign investment in general) enjoys favorable policies and encouragement, still, the procedures and documentations can easily frustrate people. "Therefore, to ensure focus on the core business, Somewhere in… outsourced the registration and accounting process to a well-reputed, professional firm".

ii. Human resources

Somewhere in... at the very beginning identified the people as the most crucial resource. To be successful working for the Nordic market, the founders realized that they had to get only BoB; "Best of Bangladesh" working for them and to get the BoBs to join, they needed to make Somewhere in… a magnet for the best talents. Here the Nordic Way proved effective; establishing freedom with responsibility, leading by values, appreciating and encouraging participation and giving every talent a chance to build up a small ownership in the company.

In addition to people, ensuring physical infrastructure such as connectivity, hardware, office etc. was also quite formidable challenge for Somewhere in... "Insisting on fast Internet connection, we pay twice as much to the ISP as for house-rent and electricity".

iii. Business development

You could have all the ingredients of the successful company, but if you do not have the business you do not survive. This simple rule we all know, but we really comprehend the implications of this rule when we start the venture. Mr. Klokkerhaug appreciated this fact and took up the challenge from the very beginning.

- Strengths

In overcoming the challenges, Somewhere in... identified their relevant strengths as follows.

i. Local knowledge: Mr. Klokkerhaug has been living in Bangladesh for over 12 years. He knows the culture and people and has a vast network of business relations. This is one of his most critical success factors.
ii. Nordic background: The top management's Nordic background and values has been the best foundation for successful business development of the company.
iii. ICT industry knowledge: Finally, with all founders having long managerial careers in the local ICT business gave them required business confidence and understanding of opportunities.

- Strategies

While addressing different challenges, Mr. Klokkerhaug and other partners set specific strategies to follow. The methodical approach was evident in the fact that they took 1½ year in planning and initiating their business.

First, they addressed the legal process. Discussion with top management of Somewhere in... revealed that their strategy in this regard was to ride with the system. They were so successful that they now believe that the bureaucratic hurdles are not in fact a major block if proper strategies are followed. They took similar approach to ensuring infrastructure. However, in the latter case they took a liberal financial strategy. Their argument was that they would compromise on cost competencies for the shorter term to leverage the foundation in the longer term.

The most difficult of the challenges, according to Somewhere in... management was finding the work force. They were not worried too much about the management competencies, as both Mr. Klokkerhaug and his partner were capable and efficient in that regard. However, the largest worry was to get the right people for getting the job done. In this regard, their creativity prompted them to redefine their HR policy. They challenged many of the traditional practices of HR in Bangladesh (as well as in many other countries). They designed a comprehensive recruitment and evaluation system where the employees' are not treated as employee, rather they are treated as minipreneurs' and business partners. One example in this regard is the different designation for the operational positions. Rather than using the traditional 'business development', they use 'opportunities' and the people working in Somewhere in... are treated as 'talents'. In addition to ensuring 'belongingness', Somewhere in... also ensures proper recognition and compensation for its talents with a combination of low basic pay, large potential team bonus (not individual) and company shares.

Final hurdle to overcome was to ensure successful business flow. The strategy the company followed was to maintain tight focus on the market they wanted to serve. Naturally, with Nordic connections and understanding, they only serve that region and rejects offers from elsewhere. In that regard, Mr. Klokkerhaug and his other Norwegian partners provided the bridge between the two regions and created a 'comfort zone' for the Nordic companies to outsource their projects. In their own words, Somewhere in... people assure the Nordic companies in the following manner.

Cost-efficiency: invest in us as your offshore development centre to buffer against market demand fluctuations.

Synergies: get a virtual in-house department up running without sending key personnel and hard-earned cash to the unknown or why not rent on-demand programmers whenever you need?

Focus go from good to great and deal in confidence with like-minded people and culture.

- Success

The success of Somewhere in... is best described as the leading offshore partner from operating in Bangladesh for Nordic companies. Success brings success. Somewhere in... is now in a process of launching one of the largest strategic alliances in the Bangladesh IT sector.

Appendix C

Interviewed companies

Spinnovation Limited (www.spinnovation.com.bd)

Spinnovation, an ICT Solutions and Services Company, was launched with the objective of developing domain capabilities in identified verticals, such as Business Services, Manufacturing, Distribution, Healthcare, Banking and Financial Services etc. and to provide value-added consulting solutions and ICT services to leading players in the global arena, using the onsite-offshore model of outsourcing.

In order to gain a firm footing in its chosen niche, the company is constantly engineering its process architecture to bring up its customer relationships to a knowledge-alliance model that would lead to co-development of industry components and reusable code in the customers' respective domains, without compromising the flexibility of vanilla services offerings from an offshore perspective while implementing the work and cultural practices of the client.

Rather than size, Spinnovation looks at knowledge as a scalable resource and is committed to quickly respond to customers' business needs with alacrity and creativity. Acknowledging that price performance is key to its customers' competitiveness, Spinnovation is committed to make a difference to its customers' ROI by effectively leveraging local talent and passing on the cost benefits that the region offers.

The execution and support engine at Spinnovation is powered by a team of experienced and talented software professionals, carrying vendor certification from Microsoft, Lotus, IBM, and ORACLE.

Somewhere in net ltd. (www.somewherein.net)

Somewhere in... is a Norwegian (80 per cent) Bangladeshi (20 per cent) joint venture company that has set out on a journey to make a global solution for local communities. We started in Bangladesh, a country lacking good web and mobile value added services, but with a huge and fast growing domestic market.

We have 30 talents working with us as of mid July 06, and have a fast growth rate. Of these, seven programmers are dedicated for our research and development of mobile solutions for Bangladesh. We are located in Gulshan just five minutes away from all major telephone operators.

Our management consists of Arild, Espen, Arve, Jana and Misho, the first three Norwegian, with the first four with long experience from the telecom sector in Bangladesh and Norwegian content providers and the latter being a top programming personality in Bangladesh.

We do have a normal cp agreement with Grameenphone and are from July launching commercial content services under our own brand. We aim at having cp agreement with the four major operators by the end of this year. We are also the strategic partner with the following companies (Digitania – Hungary, Digitania – Norway, Wavenet – Sri Lanka, Starlife – Russia, Escenic – Norway, Nordsource – Denmark and Rystadenergy – Norway).

Southtech Limited (www.southtechlimited.com)

Southtech Limited provides outsourcing services in the Software Application Development Sector primarily using Microsoft and Oracle technologies on the Microsoft and UNIX platforms. We bring together strong domain experience in areas of banking and finance, retail and wholesale management, hospitality management, human resources management, healthcare, enterprise resource planning and education along with our well-proven technology capabilities.

Our managers have extensive experience of working in North America, Europe, Middle East and Asia for large multinationals and corporations.

Southtech has leveraged a wide array of software platforms and languages in crafting solutions, including Visual Basic.NET, ASP.NET, ADO.NET, Visual Basic 6, Visual C++ 6, ASP, ADO, COM+, XML, Web Services, MS SQL Server 2000 and 7, Oracle 8i and 9i, MS Access, Visual FoxPro 7.0 and 8.0 etc. In developing software, we follow industry standard methodologies that encompass RAD, JAD and DSDM techniques. However, for projects driven by Object Oriented Analysis and Design (OOAD), we follow Unified Modeling Language (UML) and Rational Unified Processes (RUP).

Southtech is an ISO 9001:2000 certified company for software design, development, maintenance and sales. The company is currently working to become a CMMI company.

DataSoft Systems Bangladesh Limited (www.datasoft-bd.com)

DataSoft, since its inception back in late 90's, stepped into the core field of ICT to cater to the needs of enterprise, governance and economy. Bolstered by a 60-member team of experienced professionals we have a unique approach towards continuous training and development of our human resources to adapt to the market demands, both for the national and international venues. DataSoft initiated Enterprise Software development projects namely ERP and EAI for manufacturing firms; partnered with the Temenos of Switzerland for Banking IT solutions; DBMS for large scale firms like Government authority/corporations/ministries; Credit Bureau DB for international Donor firms and local NGOs; WAP solution for mobile devices. In response to the global demand, DataSoft set its platform and is poised to hone its strength of skill and experience into Gaming software for mobile devices, medical software and embedded software for various electronic devices. Standing on three pillars of excellence, quality and durability, DataSoft is incorporating new technology to further expand our client base and continue to serve our clients with a little more than utmost satisfaction.

Bdjobs.com Ltd. (www.bdjobs.com)

BdJobs.com Ltd. is the first and leading career management site in the country. Eight young business and IT professional backed by strong command over e-business and in-depth understanding of the needs of job seekers and employers in the country's context started this venture on July 2000. The vision of the company is to try bringing Internet technology in the mainstream business and economic life of the society.

Our web site aims to explore maximum benefits of the Internet. We believe our service will help the job seekers manage their career more efficiently. This site will also help employers solve many of the problems associated with traditional recruiting methods and allow them to save time and money.

Right after its launching, the site has been able to attract the Internet users in the country. The site regularly updates Job Information (on average more than 1000 valid job news are placed at any point of time at the site), provides facility to the job seekers for posting resume and online application. The site has also been able to get good response from a large number of organisations in the country who use online job advertisement facility, online CV bank access and online application receiving and processing facility of www.bdjobs.com. Until now, more than 2,500 employers in the country have recruited more than 35,000 professionals at different levels for their organisations through Bdjobs.com service.

eGeneration Limited (www.egeneration.com.bd)

eGeneration is a software services company with tested and matured Software development processes like eGen SDP, CMMI, ISO and RUP. With its comprehensive understanding of diverse business verticals and wide resources, eGeneration mobilizes the right people, skills, and technologies to help organisations enhance its performance and transform cost burdens into competitive business assets.

eGeneration operates in the areas such as Application Development, Application Maintenance and Production Support, Reengineering, Migration and Consulting.

The brief technological competencies eGeneration are as follows:

Technologies	.Net, Web Service, Remoting, ActiveX, SOAP, SML/XSL, Win32 API, TCP/IP, sockets.
Programming	C#, VB.NET, ASP.Net, PHP, Jscript
Database/RDBMS	MS SQL Server, Oracle, MySQL, PostgreSQL
Application/Web Servers	Microsoft IIS, Apache
Process	eGen QMS, CMMI, ISO, RUP, MSF
SDLC tools	Suite, MS Visual Studio 2005 Team Systems
Software Modeling	UML, Agile Modeling
Case tools	Rational Rose with UML, ErWin
Testing tools	Rational Robot, Rational PureCoverage, Rational Quantify, NUnit, FxCop
Build tool	NANT
Scheduling tool	MS Project, MS Project Server

Groupware and Document Management	MS SharePoint Server
Version Control System	MS Visual SourceSafe
Others	Crystal Report, Macromedia Dream weaver, Flash MX 2004, Adobe Photoshop, Adobe Illustrator, Install Shied

Webcontact

Contact person: Tanveer Ahmad, CEO, e-mail: tanveer@technomentor.com

Webcontact is one of the many small IT companies in Bangladesh solely serving the web development requirements of International Clients. With competencies in e-Commerce website programming and design, Webcontact has already made enviable progress in specific market niches. The following is a brief of their operation and specialization areas:

Services
- Website maintenance service
- Product catalog creation
- Basic SEO

Domain Expertise
- Clothing and accessories website
- Comprehensive ticket booking system
- E-goods selling websites (Electronically distributed products like: software, photo, information, membership, e-book, e-zine selling websites)

Supporting products
- Content Management (CMS)
- Forum/Blog

Line of business
Export oriented web development.

Markets focus
30+ small companies and SOHO from USA, Canada, UK, Australia, New Zealand and West Indies.

The Decode Ltd. (www.decodebd.com)

It is a multidiscipline organisation with several sections of activities. Green Field Toons is the cartoon animation wing of Decode. Other sections of Decode are CAD Conversion, GIS Application, 3D/2D Modeling and Non Linear Video Editing.

Established in 1997, The Decode Lid. specializes in Animation, Digital Mapping and Digital Video Productions. Decode has multiple partnership projects with Canada and Denmark and employs almost 200 people.

Key competency

- 2D classical animation from concept to story board, character design, layout, Animation, composting and post production and 3D Animation in Maya, 3D Studio Max. Animation Studio is fully equipped with 150 trained artists to cater to all levels of international standard requirements
- 2D/3D Modeling and walk through from all kinds of Architectural and Engineering drawings
- Digital Maps from aerial photography and satellite images
- Video post productions, Special effects, color correction with digital output

Technology focus

- US Animation, Maya, 3D Studio Max
- AutoCAD, AutoCAD Maps, ArcCAD etc.
- Discreet Smoke System on

Flora Limited (www.floralimited.com)

Background

Flora Limited is an ISO 9001:2000 certified company and have achieved multiple national and international awards. We have started our journey on 1st April, 1972, with 34 years of direct client dealing experience from office automation to any IT sector. We are a matured company and ready to handle any volatility and unpredictability of the IT industry.

The uniqueness of Flora

We have developed our corporate structure in such a resilient way that we can deal with any kind of IT project not once in a month but day by day and hour by hour basis. From small clients to corporate clients, every one has access to any of our management team in any time. We believe that every client has his or her own demands and problems, so as result our solution is tailored to that unique client. Our focus toward the clients and their need are second to none, and that is the reason we have around over two hundred thousand satisfied customers around the country.

Rishit Computers Ltd. (www.rishit.com)

Rishit Computers Limited commits to give the best service up to your satisfaction. Rishit Computer has started its journey at 1999 at BCS Computer City. Taking part at the day by day improvement along with BCS Computer City, Rishit always tried to give its customer the best service up to their satisfaction. Rishit has the motto "satisfaction comes when price meets quality". Rishit is always working with only one thing in mind customer satisfaction. When satisfaction is the main matter Rishit is working on Price, Quality, Company Management also come along with it. Rishit is bringing the latest technology from the world leaders to the customer end, integrate them with their system, making it familiar to the user end and technology easier.

Appendix D

Outline of the CSE course curriculum

- **Technology**
  - Math
  - Programming
  - Physics/Chemistry
  - Electronics, Digital circuit and logic
  - Computer organisation and architecture
  - Database
  - Network
  - OS, compiler
  - Software Engineering

- **Generic knowledge related to resource based industries**
  - Management
  - Accounting
  - Finance
  - Marketing
  - HR
  - IT

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