Economic Policy Paper on Computer Software and Database

1. Software Development

Computer software and data processing is one of the most booming sectors of the global economy. The vastness and scope of this sector surely suggests it to be the leading economic solution for a country like ours, where we have the basic grounding incentives and offer sheer volume of manpower.

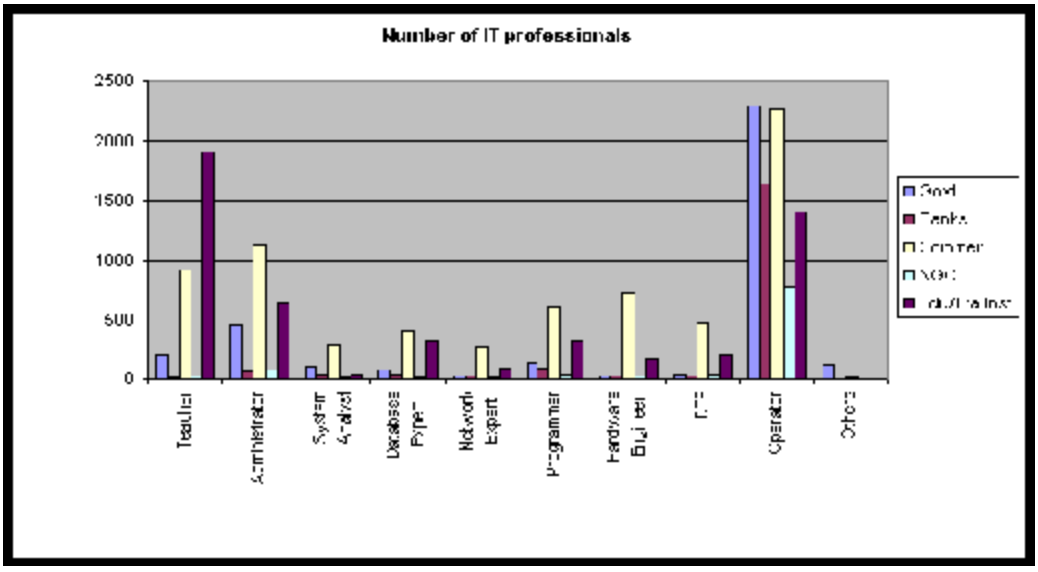
1.1 Situation Analysis

Our huge population can easily be converted to skilled and semi-skilled personnel in appropriate proportions. But in doing so, we first have to analyze the existing situation and sort out the prioritized necessities that are to be fulfilled. If we take a look into the present situation, supported by data, we get a fairly precise overview.

Statistics of IT Professionals and People in Different Sectors

Among the IT professionals, the number of computer operators is the highest i.e. 8,372 (44.72%) out of 18,717 sampled professionals (based on information from a survey by Bangladesh Computer Council, April 1999). The number of programmers is 1,221 (6.52%) only. Major part of the IT professionals namely 7,137 (38.13%) are employed in commercial organizations. Percentage of IT professionals in different sectors is as follows:

Commercial organizations 7,137 (38.13%)
Education/Training Inst. 5,134 (27.42%)
Government organizations 3,477 (18.57%)
Banks 1,952 (10.43%)
NGOs 1,017 (05.43%)

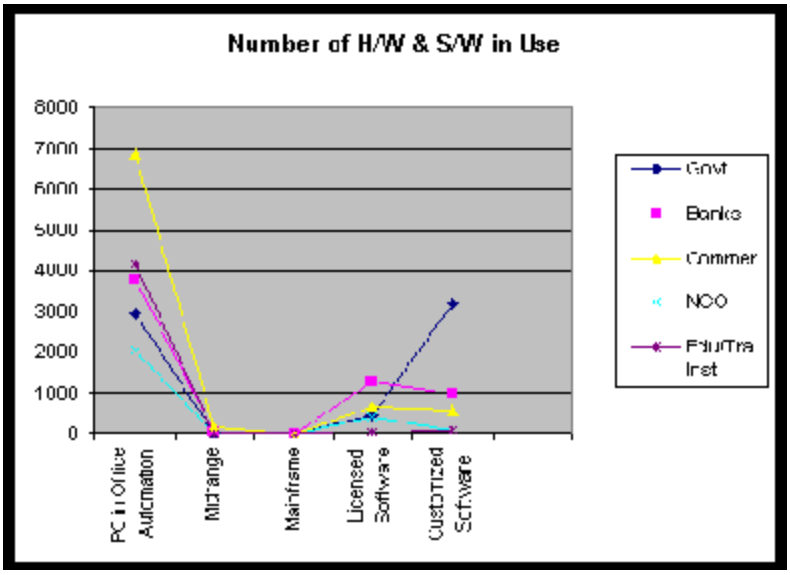


Type of IT Professional	Type of Organizations					Total
	Government Organizations	Banks	Commercial Organizations	NGOs	Education/Training Institutes	
Teacher	203	10	924	23	1,905	3,065

Administrator	469	64	1,130	78	645	2,386
System Analyst	98	43	290	11	43	485
Database Expert	80	32	403	17	338	870
Network Expert	24	26	281	10	91	432
Programmer	139	84	621	39	338	1,121
Hardware Engineer	29	26	731	21	172	979
DTP	40	23	480	42	195	782
Operator	2,286	1,644	2,265	776	1,410	8,372
Others	109	0	12	0	6	127
Total	**3,477**	**1,952**	**7,137**	**1,017**	**5,134**	**18,719**

Statistics on Computer Hardware and Software in Different Sectors

There are 19,797 PCs in use for office automation, the highest number, namely, 6,837 (34.53%) being used by the commercial organizations. The highest number of customized software, namely 382 (65.21%) is being used in the government organizations.



Computer Hardware/Software	Type of Organizations					Total
	Government Organizations	Banks	Commercial Organizations	NGOs	Education/Training Institutes	
PC in Office Automation	2,950	3,798	6,837	2,052	4,160	19,797
Midrange	19	22	148	9	12	210
Mainframe	6	8	2	1	2	19
Licensed Software	462	1,245	666	394	61	2,828
Customized Software	3,182	971	564	73	89	4,879

1.2 Market Potentials

The IT market in our country has just started to expand. We are now in the foundation process of the market. If we analyze the data of the yearly growth of IT business organizations, and yearly income in the software and data entry sector, for the past few years, we will find that day by day it is increasing in a geometric progression.

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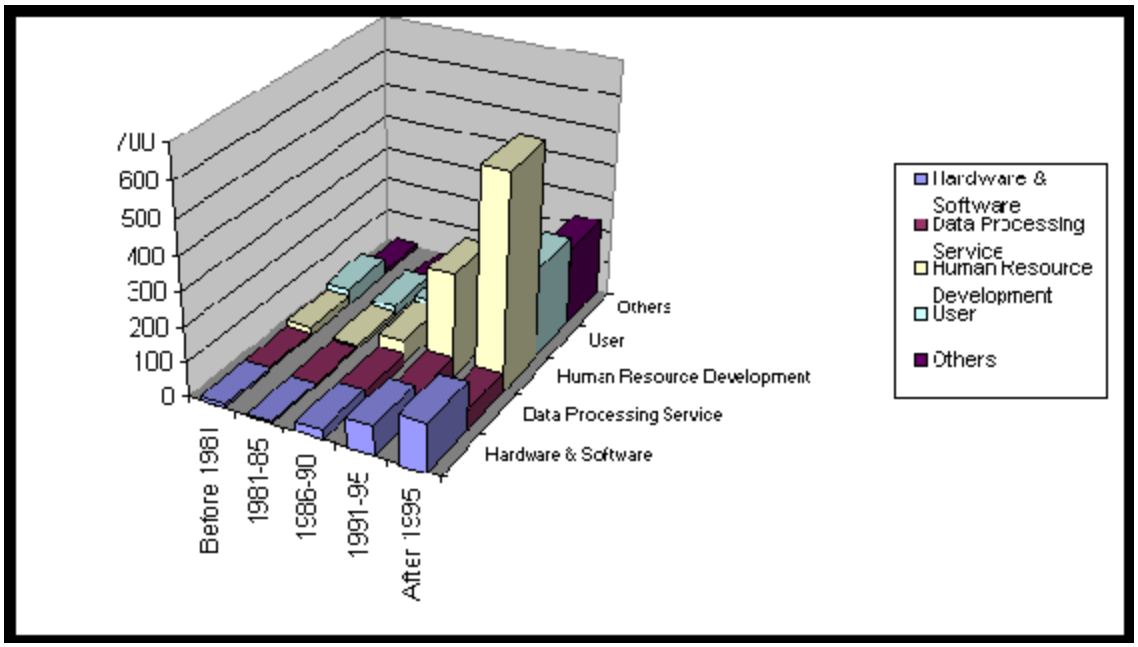
Yearly Growth of IT Business Organizations

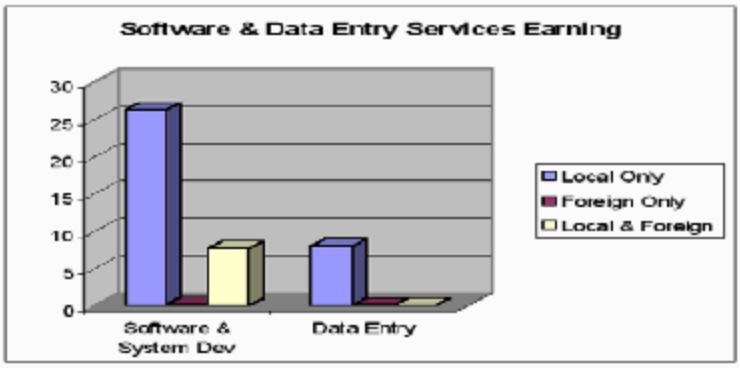
The total number of organizations surveyed by Bangladesh Computer Council was 1,836. Of these, 966 organizations (52.61%) were established after 1995, 563 (30.77%) during 1991-94, 148 (8.06%) during 1986-1990 and 44 (2.4%) before 1981-85. The maximum growth of the IT organizations registered is found to be for Human Resources Development (HRD). Out of 1,836 organizations 1,025 (55.82%) are involved in HRD program.



Type of Involvement with IT	Before 1981	1981-1985	1986-1990	1991-1995	After 1995	Total
Hardware & Software	9	6	30	87	140	272
Data Processing Service	10	8	27	55	54	154
Human Resource Development	26	13	69	298	619	1,025
User	46	28	84	235	261	654
Others	13	2	27	105	229	376
Total	**113**	**44**	**148**	**565**	**966**	**1,836**

Earning by Software & Data Entry Services During 1997-1998

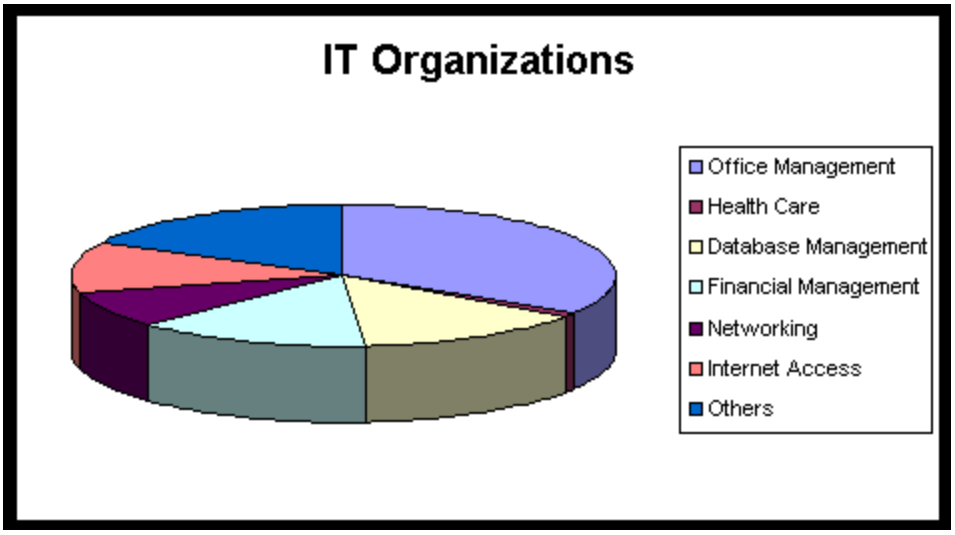
From the table below it is found that there has been some earning from the software and data entry services sectors. However, the foreign currency earning has not been significant.



Type	Type of Services				Total Taka (million)
	Software & System Device		Data Entry		
	Number of Organizations	Taka (million)	Number of Organizations	Taka (million)	
Local Only	31	26.2635	9	8.0200	34.2835
Foreign Only	1	0.1500	1	0.1000	0.2500
Local & Foreign	11	7.6732	0	-	7.6732
Total	**43**	**34.0867**	**10**	**8.1200**	**42.2067**

1.3 Utilization

Most of the institutions that use computers in Bangladesh, use them for office management. Other uses are database management, financial management, networking etc. From the table below, we see that 902 (49.47%) organizations use computers for office management and 371 (20.35%) organizations use computers for database management only.



Type of Utilization	Number of Organizations
Office Management	902
Health Care	23
Database Management	371

Financial Management	374
Networking	223
Internet Access	313
Others	459
Total	**2,665**

1.4 Problems

As we go through the existing situation of the software and database sector of our country, and the proposed IT policy, some impediments are immediately foreseen that stand in the way of expanding this sector to its fullest extent. The major problems are listed below:

1. The user base of computer is extremely low because of high cost of computers and peripherals.
2. In the absence of any incentive scheme, the exporters do not feel encouraged to explore the potential of the overseas market.
3. The existing banking procedures are too complicated to induce exporters to bring their export remittances through banking channel.
4. The absence of domestic software industry is a major constraint in developing software to compete in the international market.
5. Absence of source of funding is proving to be a drawback for the growth of the sector.
6. No market promotion and no R&D fund are other constraints.
7. Course curricula for computer-related education followed in the Universities does not fully reflect the requirements of the software industry.
8. The number of graduates in computer related subjects produced by the Universities each year is far less than the actual requirement.
9. Substantial number of such graduates leaves the country for overseas employment.
10. Private IT training institutions lack the required quality of trainers.
11. Private IT training institutions do not follow any standard course curricula and examination system.
12. There is no planned scheme to increase computer literacy.
13. Absence of necessary laws protecting Intellectual Property Rights discourages prospective overseas customers from using Bangladesh as a source of supply.
14. The facility of high-speed data (both nationally and internationally) is very limited.
15. Present cost of data communication is very high.
16. High Speed Video Conferencing facility is not available.
17. ISDN Telecommunication line with Fiber Optic backbone does not exist.
18. Resource materials on Information Technology, such as books, magazines, software etc. are scanty and scattered.
19. Whatever little hardware, software and communication resources are available, they cannot be found under one roof.
20. Custom formalities for handling equipment/documents for export purpose is too time consuming to encourage export.
21. Bangladesh is not known to be a potential offshore source of software and data processing services.
22. Information on prospective overseas customers is not available.
23. Not all software in use are licensed.
24. The use of Customized Application Software is virtually non-existent. Therefore, domestic software market has not developed at all.

2. Export Oriented Software

In the long run, software export will be the major source of income of our country. In this regard, we need to have a clear idea about overseas market situation, buyers' requirement and competitive price of the overseas market.

2.1 Overseas market situation

In the Information Technology industry, software exports and offshore services are likely to be the biggest area of export from Bangladesh over the next few years. Hardware manufacturing is still a long way from exports. Clearly, Bangladesh's advantage lies in its potential to quickly build up a vast resource of technically skilled computer personnel.

Six years ago, India's software exports were barely $ 33 million. In 1994, the figure was well beyond $ 350 million. The software industry has enjoyed a phenomenal growth of 45% in exports over the last six years. World Bank report of 1995 showed that India's software exports could touch $ 1 billion by the end of 1996. In fact, in 1998, the export was $ 2.5 billion. The projection for 2008 is Rs.8.1 trillion. The number of IT professionals (excluding operators) would increase from 23,000 in 1998 to 1.1 million in 2008. This situation could very well be similar for Bangladesh.

The biggest consumer of Bangladesh's exported software is the United States followed by Western Europe, where Germany is the most important market.

Bangladesh software exports can typically take one of the three routes. Many companies like Swissair and Lufthansa have out-sourced all or a major part of their IT needs to Indian companies. The second route is the joint venture, which usually services the domestic market as well as produces software solutions for export back to the West. The third route consists of Bangladeshi software house exporting solutions directly using western companies as intermediaries.

The biggest advantage for Bangladesh is that it could offer a wide spectrum of software services ranging from clerical support and data processing to sophisticated software systems. Consultancy services illustrate the reason for the phenomenal growth of the software industry.

2.2 Buyers' requirement

In recent years, the software buying companies have become most specific oriented and have definite focus on specific segments of software development. Nearly two thirds of the buyers want customized software–users application products and services ranging from straightforward accounting systems to specialized niche market products or customized services. The rest require consultancy, systems integration, supply of specialized software systems such as software tools, communication software for dedicated hardware devices etc. In general, the buyers' requirement can be classified as follows:

Data Entry/Data Processing

This is the most important and frequent requirement of the buyers. This needs low cost, English speaking, skilled manpower. Some of these activities survive till date. High-end data entry/processing jobs like digitization of maps, objects, records are in demand. These activities pay higher than ordinary data entry jobs but significantly lower than software projects.

Body-Shopping

Body Shopping is a rather derogatory term for the activity of carrying "on-site" software development in USA. From data entry to programming was a logical next step. Without adequate infrastructure and project management skills, software programming had to take place at client's site. On-site project work continues to form a part of any software company's activity in varying proportions till today. Companies like Leading Edge Systems still earn bulk of their revenues from body shopping. Ultimately, commercial exigencies took precedence over political needs.

Customized Software

This is the biggest revenue earner for the industry, in the past and for the present. Diverse variety of customers seek these services – companies from Europe, Japan, government and US bodies, NGOs, defence services etc. The software is mostly commercial software, dealing with mundane jobs like payroll accounting, billing etc. Historically, US companies started with mainframes and carry over the legacy. Till a new one replaces the entire system, the programs already installed need enhancement, new features, debugging etc. An essential feature of such re-engineering/ customization projects is that the software company needs to have a sound knowledge of client's business and systems.

Y2K

Known variously as Y2K problem or the millennium bug, it has created a massive scare among companies and governments alike. Towards the end of 1996, the Gartner Group (a highly regarded IT research firm) estimated an aggregate cost of US $ 600 billion to take care of the two little places left out in programming.

Migration

This is an on-going and sustainable business model for software companies. However, the requirements are stringent - expertise on older platforms along with that on emerging platforms. With innovations and obsolescence in existing software, there is an urgent need to shift the massive amounts of data to the new version/software and update the system from old to the new platform while maintaining the operational integrity. For example, Ingres has fallen out of favour with most companies, while Oracle has maintained its number one position in RDBMS.

Product Maintenance

This is an emerging area of activity. Large US software companies in existence for a long time have a fairly evolved product portfolio, among which are products with a depleted user base and low-selling packages. Nevertheless, need to provide support services, de-bugging, enhancements and added features on a continuous basis remains.

ERP Installation

The latest buzz word among technically progressive companies. ERP installation is fairly complex process that requires outlay of large amounts of time and money. Domain expertise is another pre-requisite. ERP installation earns the highest revenues on an hourly basis. While the rates for other activities would vary from US $ 15 to 20, ERP can go as high as US $ 75 to 100. Cybertech Systems of Mumbai has devoted itself entirely to ERP and the results are seen in its above-industry margins.

2.3 Competitive price and quality assurance

The major issues related to competitive price and quality are mentioned below:

- There is an urgent need to implement the national standards and develop Bangla Software.
- There should also be a standardization procedure for imported software products and also for locally produced software.

3. More Value Added Software

3.1 Institutional & policy support

Since 1995, almost all the leading international training institutes such as NIIT, APTECH, NCC heralded their presence by opening full-fledged training schools in Bangladesh and started to provide international standard training through short term and long term programs. Human resource of the IT industry have been growing rapidly since the government declared this industry as a thrust sector, and has embarked on a mission to make the industry as one of the leading export sectors of Bangladesh by the end of the next decade. The vital statistics for this sector are:

- More than 300,000 IT professionals including operators are engaged in the industry.
- 26 universities offer under-graduate and graduate degrees in computer science and engineering.
- More than 1,000 private and public sector computer-training institutes offer IT skill development at various levels.
- The government has taken decision to produce 10,000 programmers annually by the year 2000.

On the other hand, the possible IT policy should provide the necessary support to the industry such as:

- The government should be the largest user of computers and related technology.
- Government should implement large-scale computer systems.
- Development of National Data Resource Centre Network is necessary.
- The human resource development policy must not only encourage widespread computer literacy and an adequate supply of IT professionals, but also do so in a manner that ensures that no one is excluded.
- Institutes should be facilitated to offer formal training on software and data processing.
- Government support should be extended for introduction of computer courses, training teachers for these institutions and for providing proper laboratory and computer facilities in schools and colleges.
- The strategy for research, training and development in the area of computers in Bangladesh is inadequate. It is to be changed accordingly.
- Research and development should focus on applied research,
- The Ministry of Science & Technology will formulate plans to invigorate R&D in Universities, Polytechnics, BITs and Colleges.

3.2 Fiscal and other incentives

True to its commitments, the government has cut through a lot of red tape to ensure the right kind of environment for IT entrepreneurs to thrive in this country. The incentives and other facilities made available (or will be made available very soon) for the IT industry are:

- All export oriented companies in the computer software and data processing service sector will enjoy a 5 year tax holiday and the National Board of Revenue (NBR) will issue a SRO in that regard.
- Keeping the interest of the government in mind, the condition regarding the track record will be eased and developed software using our local fund will enjoy a 15% domestic price preference for the locally developed software.
- Working capital loan for software development is available with no collateral.
- With the intention of better and fast service, the Ministry of Science & Technology will formulate a guideline to computerize all the Ministries and wings of GOB.
- A software village will be established within the area required by the BCS having a land space of 20,000 sqft.
- Up to 2 MBPS telecom link is going to be installed while 64/128/192 KBPS data links have been operating for the last few years.
- VSAT installation is permissible and can be installed within a reasonable time.
- 20 ISPs with VSAT providing dialup connection and leased line.
- The Ministry has approved a copyright legislation. The government will implement the law as soon as possible.
- A total number of 300 people will be trained as trainers of IT field in BUET, Dhaka University, Khulna University, Rajshahi University and Shahjalal University within next year.

University, Rajshahi University and Chittagong University within next year.

3.3 Other means of making IT competitive

Besides the above circumstances, what more we can do to make IT more competitive can be:

- Priority should be given to meet the demands of data communication in the state management, market economic development, education and research & development fields.
- Steps should be taken by the Central Bank to computerize all banks in the country.
- Development of Electronic Commerce and market intelligence.
- The government should assist IT societies to create computer awareness among various levels of the general public.
- We must select appropriate tactics for technology transfer.
- A plan should be formulated to train personnel abroad.
- Software experts and expatriates living abroad should be encouraged to return home.
- Broadband communication, broadcasting infrastructure along with all networks should be modernized.
- Nation-wide satellite coverage for both broadcasting and communications, and Internet backbone should be created.
- A telecommunication policy aimed for rapid growth of IT infrastructure is to be formulated.
- The whole of Bangladesh is to be brought under telecommunication networks within the shortest possible time.
- Software technology parks with satellite data communication facilities should be established.
- Bangladesh must adopt a national software development plan.
- All custom software development and package adaptation should be performed locally.
- R&D institutes and Universities should be encouraged to develop software.
- Government should lend start up financial support to such institutes.
- Association of software manufacturers should be encouraged to exchange ideas.
- High wages and corporate downsizing will create economic conditions for development of the industry.
- Special efforts should be made to ensure adequate resources for the effective implementations of IT policies.
- All economic sectors should be encouraged to make there own investments regarding IT.
- A centralized fund for R&D in this sector may be created.

4. Policy framework requirement

4.1 Policy, act, rules and regulations

The implementation of national information infrastructure has given rise to policy, legal and regulatory concerns that do not exist in a paper-based physical world. With the pervasiveness of the internet and the information superhighway, issues relating to the creation, transmission and access of digital information have to be addressed. With the impending take-off of electronic commerce on the internet, we are being confronted with issues relating to identification and authentication, security, and electronic payments. Unless there are appropriate policy, legal and regulatory measures to protect the interests of consumers and service providers in the digital environment, we will find it difficult to realize the vision of the information age.

The key policy and legal issues can be grouped into six categories as shown in the table below.

Policy and legal issues	Brief description of concerns
1. Intellectual property rights	• How to manage and acquire rights in the digital environment • How to prevent piracy of copyrighted works • How to extend the current copyright regime to include digital works
	• Identification, certification and authentication of buyers and sellers, and administration of certification authorities

2. Issues relating to electronic commerce	administration of certification authorities • Legal status of digital signatures and digital certificates • Legal status of electronic payment mechanisms and electronic payments • Applicability of contract law: Rights, responsibilities and liabilities of various parties and dispute resolution mechanisms • Fraud and crime, and law enforcement in electronic commerce
3. Security and encryption	• How to protect against breaches of security in computer systems and networks • How to prevent crime in the digital environment • Rules on the use of encryption technology
4. Privacy and data protection	• How to protect against intrusion into individuals' private information • How to control use of personal information • How to facilitate trans-border data flow
5. Content regulation	• How to block objectionable materials on the internet • How to protect national interests against undesirable materials • How to reconcile conflicting cultural values in information content
6. Access and service provision	• How to manage technical standards in a networked environment • How to ensure interconnection and interoperability of computer systems and networks • How to regulate pricing and service quality of information services • Responsibilities and liabilities of access and service providers

Most countries have embarked on some form of legislation to address the legal challenges in the digital environment, whether issue-specific or introducing a broad set of "Cyberlaws". "Cyberlaws" refer to the enacting of new laws for cyberspace. Perhaps a more practical approach to "Cyberlaw" is to modify or extend existing laws where possible, and draft new laws only where necessary.

4.2 Institutional and promotional services

It is obvious that a developing country like ours, which is trying to enter the globalized market of software and data processing, has to go along a prescribed path aiming to achieve the highest yield. For this, after analyzing the current situation and the policy thinking of the government, some recommendations are presented below for institutional and promotional service towards achieving the goal.

1. To upgrade the Bangladesh Computer Council to the level of a Division and to give it the necessary authority to function as the primary facilitator to help growth of private sector IT Industry.
2. To produce at least 1,000 'Trainers' capable of imparting basic computer education in the latest programming languages.
3. To introduce 'Basic Computer Skills' as a 'Compulsory Subject' for all students in all Universities of the country at graduation level.
4. To introduce Computer Science Department in all Polytechnics, BITs, Universities and selected Colleges.
5. To review 'Computer Science' course curricula currently being used in various Universities. After discussions with the Universities, IT Professionals and IT Associations, keeping in view the requirements of the 21st Century, to request the concerned Institutions to consider changes in their curricula in line with the suggested recommendations.
6. To introduce compulsory education in Computer Studies at school and college levels in quite a bit more detail than now.

7. To incorporate industrial attachment program in final year of Computer Science course at degree level.
8. To allow export of software and data processing services through Sales Contract, instead of letter of credit.
9. To allow bonded warehouse facility.
10. To create a Special fund to be administered by the-Ministry of Science & Technology for giving interest-free loans to teachers and students for purchase of computers and related equipment.
11. To create a Venture Capital Fund of at least Tk. l0 crore (100 million) at Export Promotion Bureau for equity participation in export-oriented Software and Data Processing Services Companies.
12. To create, a Market Promotion Fund to be administered by Export Promotion Bureau for meeting the expenses of promoting Bangladesh as a potential source Of Software and Data Processing Services to the overseas markets.
13. To create a special fund for supporting industry oriented IT research and development activities.

4.3 Other support services:

Besides the institutional and promotional services, we require service improvement in other fields relating the IT industry. These improvements could be as follows:

1. To set up an Internet Node in the country.
2. To make Video Conferencing Facility available through VSAT.
3. To create separate cells at Chittagong and Dhaka, Kamalapur and Benapole Customs Houses to handle all incoming and outgoing equipment/ documents/ data media of export-oriented IT Industry, so as to ensure clearance of such equipment/ documents within 24 hours.
4. To create a Central Resource Centre with current books, magazines periodicals, software, manuals etc. on IT related subjects.
5. To set up ISDN/HDSN/ADSL lines all over the country.
6. To set up a Communication Hub in Bangladesh
7. To arrange meetings/seminars in selected locations In USA with a concentration of IT Professionals of Bangladeshi origin to inform them about the incentives being provided by GOB, and mobilize their support to help Bangladeshi entrepreneurs.
8. To ban use of all pirated software in all organizations, both in public and private sectors.
9. To encourage all Government, Semi-Government, Autonomous organizations, Sector Corporations, Banks, Insurance Companies etc., to replace the manual system of documentation and records by computerized system through the use of locally developed software.
10. To send Marketing Missions overseas.
11. To create a Database of all major organizations/institutions engaged in outgoing of software and data processing services.
12. To explore the possibility of obtaining business on sub-contract basis from the suppliers of software and data processing services of foreign countries.
13. To empower Export Promotion Bureau to ensure regular participation in all major international exhibitions for IT products.
14. To ask Export Promotion Bureau to set up permanent Liaison Offices overseas to be manned by professional marketers of IT field, who should perform and achieve definite quantified business objectives.
15. To create a database of Bangladeshi IT Professionals working at home and abroad.

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