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Development Studies for Sectors with Potential

Development Study for
Information Technology in Bosnia & Herzegovina

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Contents

List of Figures

List of Appendices

1. Introduction

Information Society industries contribute roughly 15% to growth of the European Union (EU) Gross Domestic Product (GDP) and create 1 out of every 4 new jobs in the European economy [1]. Throughout both the developed and developing nations, Information and Communication Technologies (ICT), plays an increasingly important role not only within national economic structures but also within regional market stability. It is this regional market stability that is the primary support mechanism for international capital market investment and growth. In a July 2000 meeting of the G7 Finance Ministers in Japan [2], the impact of what the Finance Ministers referred to as "the IT Revolution" on the Economy and Finance was defined thus:

> *"We, Finance Ministers of the G7 countries, note that the advance of the Information Technology (IT) revolution holds the promise of becoming a major force in the global economy in improving productivity, raising maximum potential output, and promoting higher living standards. In order to ensure that the benefits of IT are promptly reaped by our societies and do not lead to increasing inequalities, countries must put in place appropriate macroeconomic and structural policies."*

In recent testimony to the US Congress, US Federal Reserve Board Chairman Alan Greenspan noted, *"...our nation has been experiencing a higher growth rate of productivity—output per hour—worked in recent years. The dramatic improvements in computing power and communication and information technology appear to have been a major force behind this beneficial trend."*

The European Council held in Lisbon on 23/24 March 2000 declared an urgent need for Europe to quickly exploit the opportunities of the new economy and in particular the Internet. To achieve this, the Heads of State and Government invited the Council and the Commission to draw up *"...a comprehensive eEurope Action Plan [3] ....using an open method of co-ordination based on the benchmarking of national initiatives, combined with the Commission's recent eEurope initiative as well as its Communication 'Strategies for jobs in the Information Society'."*

As Bosnia and Herzegovina (BiH) continues to transition into a market-based economy, and as observed in any other economy (developed or developing), ICT will be required to play a vital and central role to the development of the BiH economy and society. However, little attention to date has been focused on this vital industry by either the BiH Government or the various multi-lateral aid and advisory agencies (the International Community, or IC) presently assisting BiH.

The purpose of this document commissioned by GTZ is to assist both the BiH Government and the IC to better focus on ICT both as a unique industry that itself commands exceptional opportunities for economic and social growth as well as a vital tool for the support of already existing economic, governmental, and social infrastructures of BiH.

[1] Source: EC
[2] See Appendix ___
[3] See Appendix ___

2. Definitions and Relevance

Due to the complexity and overlapping aspects of ICT, there are multiple ways to even define ICT. What follows is a very brief outline of selected forms of definitions of ICT, including: Macro-Economic, Structural, Industrial and Institutional, and General.

2.1 Macro-Economic

According to the Organisation for Economic Co-Operation and Development (OECD), an **ICT Sector** definition was adopted at the April 1998 meeting of the Working Party on Indicators for the Information Society (WPIIS) and subsequently endorsed and declassified at the September 1998 meeting of the Committee for Information, Computer and Communications Policy. The agreed definitions of the ICT Sector were based on the following principles:

For **manufacturing** industries, the products of a candidate industry:

- Must be intended to fulfill the function of information processing and communication including transmission and display.
- Must use electronic processing to detect, measure and/or record physical phenomena or to control a physical process. [4]

For **services** industries, the products of a candidate industry:

- Must be intended to enable the function of information processing and communication by electronic means.

Adoption of these principles led OECD Member States to a definition based on the industrial classes of revision 3 of the International Standard Industrial Classification (ISIC). Subsequent to the detailed definitions applied within the ISIC classifications, then a coherent macro-economic assessment can be initiated that both defines ICT within a specific market region (nation) as well as in contrast with other market regions (nations). In general, the following criteria are used to define ICT within macro-economic expressions:

1. Employment in ICT Sector
    a. Overall employment as a share of market labor
    b. In relation to share of Business Sector labor
    c. In relation to share of Industry Sector labor
        i. Distribution of ICT labor within Telecommunications Sector
        ii. Distribution of ICT labor within Manufacturing Sector
        iii. Distribution of ICT labor within Other ICT Services
2. Value-added [5] / Knowledge Transfer

[4] This generally refers to ***automation***. Automation includes the automation of data as well as automation of production processes. Within the context of ICT, automation refers to 'Back Office' (production, assembly, etc.), 'Front Office and Field' (administration and business-to-business electronic data management), and 'Customer Automation' (direct and value added services to the consumer).

   a. Overall Value-added/knowledge transfer within ICT Sector
   b. Value-added/knowledge transfer in relation to share of Business Sector
   c. In relation to share of Industry Sector
      i. Distribution of Value-added/knowledge transfer within Manufacturing Sector
      ii. Distribution of Value-added/knowledge transfer within Telecommunications Sector
      iii. Distribution of Value-added/knowledge transfer within Other ICT Services Sector
   d. Ratio of Value-added/knowledge transfer to Employment in ICT Sector
3. Expenditures/Investments
   a. Overall expenditures/investments within ICT Sector
   b. Ratio of ICT expenditures to Business and Industry Sector expenditures
      i. Distribution to hardware/networking
      ii. Distribution to software
      iii. Distribution to Value-added/knowledge transfer
4. Research and Development
   a. Overall R&D within ICT Sector
   b. Ratio of R&D to Value-added/knowledge transfer
   c. Ratio of ICT R&D to Business R&D
   d. Ratio of ICT R&D to Industry R&D
      i. Distribution of R&D within Manufacturing Sector
      ii. Distribution of R&D within Telecommunications Sector
      iii. Distribution of R&D within Other ICT Services Sector
   e. Ratio of R&D to GDP
   f. Ratio of R&D to GDP Distribution within economic sectors
5. Balance of Trade
   a. Overall balance of trade within ICT Sector
   b. Distribution of balance of trade within economic sectors
      i. Contribution to GDP growth
      ii. Impact on import demand

At present, the BiH Government does not maintain the above statistics, and as a consequence, a coherent assessment of the ICT Sector in BiH literally cannot be addressed according to European Union or OECD standards [6]. A much less sophisticated and less effective method of assessment – utilizing public-based questionnaires -- is addressed later in this document.

2.2 Structural

Due to the fact that ICT is both multi-functional and multi-participatory, a functional or structural foundation is required to support ICT both as a separate industry as well as a function of structural support within existing industries and social functions. This functional or structural foundation includes the following:

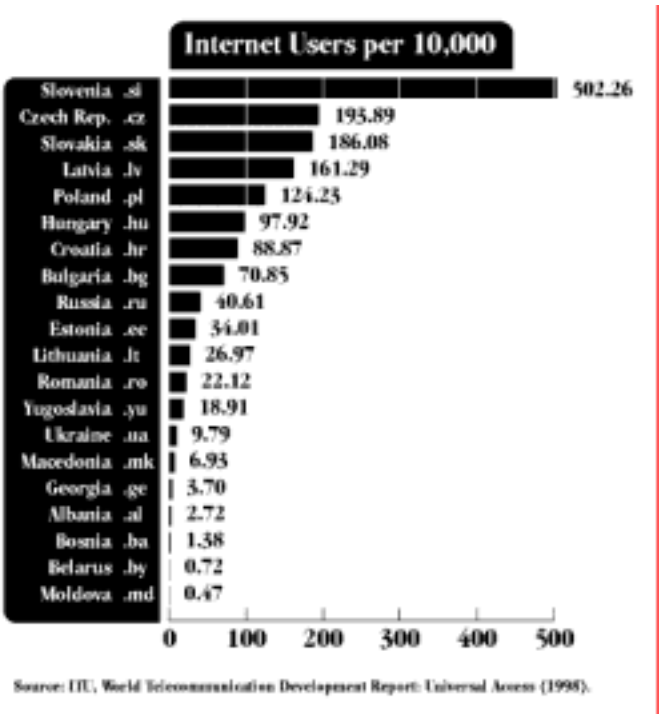
[5] Value-added is defined as converging two or more independent data streams to provide a product or service that is "greater than the sum of its parts". Such as converging electronic ordering of a product with electronic payment options; in essence, converging the manufacturer/distributor with a bank and with a communications network.

[6] For a more technical identification of various economics-based assessments relating to the impact of ICT, see "Growth and Employment Effects of Information and Communication Technologies in Europe", Francesco Daveri, May 2001 (Appendix ___); "ICT Investment And Economic Growth In The 1990s: Is The United States A Unique Case? A Comparative Study Of Nine OECD Countries", Alessandra Colecchia and Paul Schreyer, October 2001 (Appendix ___); "ICT investment and employment: The truth about e-skills", Luc Soete and Bas ter Weel, January 2001 (Appendix ___); and Miscellaneous OECD ICT Indicators (Appendix ___).

1. Connectivity – Are networks easy and affordable to access and use?
2. E-Leadership – Is E-Readiness a National Priority?
3. Information Security – Can the processing and storage of networked information and data be trusted?
4. Human Capital – Are the right people available to support E-Business and to build a knowledge-based society?
5. E-Business Climate – How easy and effective is it to do E-Business today?
6. E-Partnerships – How are Public-Private Partnerships impacting national E-Readiness?

Again, as stated in the previous *Macro-economic* section, BiH does not yet possess a formal mechanism to assess the ICT Sector utilizing formal *Structural* assessment tools. However, some data relating to *Connectivity* issues has been addressed by this GTZ study as well as other independent studies, namely the World Bank Consultancy Study, "The Country Development Gateway: Issues, Constraints and Opportunities for Country Development Gateway implementation in Bosnia and Herzegovina" [7], The EU European Survey of Information Society Projects and Actions (ESIS) (web site: www.eu-esis.org) [8], the Center for Democracy and Technology, "Bridging the Digital Divide: Internet Access in Central and Eastern Europe" [9]. A sample data set is included below (see Appendix ___ for the complete report). As can be seen in the chart below, however, BiH possesses the third lowest rate of Internet users throughout the Southeastern European region, whereas neighboring Slovenia and Croatia possess the highest and 7th highest rates, respectively, of Internet users in the region. It is also interesting to note that BiH possesses the lowest rate of Internet users throughout the Former Republics of Yugoslavia.

Figure 1 – Internet Users: SEE Region



[7] See Appendix ___
[8] See www.eu-esis.org/esis2reg/BAreg1.htm for the detailed report regarding BiH.
[9] See Appendix ___

Furthermore, the type of data assessed by international institutions relating to such sectors as ICT tends to be organized and interpreted differently by BiH specialists. An example of this can be found in "The Internet in Bosnia and Herzegovina: Some Indicators", compiled by Merim Bilalic and the Psychology Department of the Faculty of Humanities in Sarajevo [10], which is not simply a market assessment of the Internet, but rather is a 'commentary' assessment which observes the negative impact of 'globalization' upon BiH citizens via the Internet. Miscellaneous other studies which have been performed in BiH over the past few years tend to be primarily focused on fees and tariffs charged by the various Internet Services Providers (ISPs); but even these studies are rarely conducted by independent institutions, but rather are conducted by rival ISP competitors.

The following figure illustrates a sampling of a more sophisticated identification of Internet-related data, in this case, regarding category assessments of Internet 'secure connections' which delineates the data across 'number of users' versus 'time spent connected' data. As the figure illustrates, BiH will require more sophisticated and substantial data tracking *Structural*-based applications.

Figure 2 - Secure Connections Assessment - By Category [11]

Category	% Internet Users (1)	Time spent (2)	GDurP (1)x(2)
Bank/Insurance	5,0 %	36,3	181,5
Other Internet	3,3 %	7,3	24,1
Software	9,6 %	1,3	12,5
Internet Access Providers	3,4 %	3,2	10,8
Mail Order	1,9 %	5,5	10,4
Music/Literature	3,0 %	10,5	31,5
Web Hosting	3,3 %	1,8	5,9
Transport	1,8 %	1,0	1,8

2.3 Industrial and Institutional

Relating to the multi-participatory aspects of ICT, it is important to note that literally hundreds of new types of businesses will be created within a market to support businesses or entities that either:

- Utilize ICT to more effectively function within the market place or social activity (users).
- Develop and provide ICT services to those that utilize ICT (providers).

And more significantly, it is important to note that multiple users and multiple providers often collaborate together so as to 'converge' and add value to individual products or services. It is this vertical market positioning of partnerships that not only propels the ICT industry into the realms of revolutionizing the global systems of economics and capital flow (see Figures below), but also revolutionizing the nature of national, regional, and global social and political foundations (the digital divide, as an example). Consequently, market demand for ICT is impacted when users initiate a demand for ICT products and services that are in supply by the providers of ICT products and services.

The following 3 charts illustrate the growing importance of ICT-related investments in relation to global capital flow and use of investment proceeds:

[10] See Appendix ___
[11] Source: www.netvalue.com

Figure 3 - Capital Flow Distribution in Developing Nations [12]

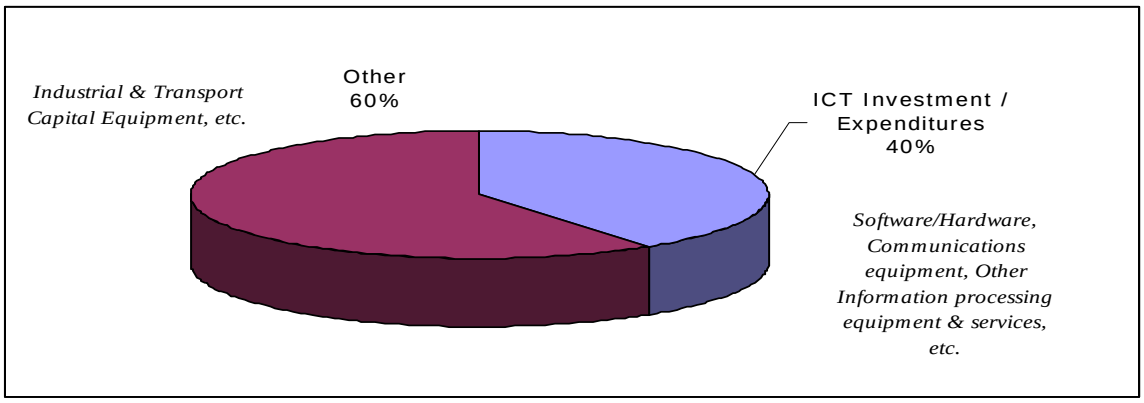
Table 2.1 Net long-term flows to developing countries, 1990–99
(billions of U.S. dollars)

	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999[a]
Total	98.5	124.0	153.7	219.2	220.4	257.2	313.1	343.7	318.3	290.7
Official flows	55.9	62.3	54.0	53.4	45.9	53.9	31.0	39.9	50.6	52.0
Private flows	42.6	61.6	99.7	165.8	174.5	203.3	282.1	303.9	267.7	238.7
International capital markets	18.5	26.4	52.2	99.8	85.7	98.3	151.3	133.6	96.8	46.7
Debt flows	15.7	18.8	38.1	48.8	50.5	62.2	102.1	103.4	81.2	19.1
Bank lending	3.2	5.0	16.4	3.5	8.8	30.4	37.5	51.6	44.6	−11.4
Bond financing	1.2	10.9	11.1	36.6	38.2	30.8	62.4	48.9	39.7	25.0
Other	11.3	2.8	10.7	8.7	3.5	1.0	2.2	3.0	−3.1	5.5
Equity flows	2.8	7.6	14.1	51.0	35.2	36.1	49.2	30.2	15.6	27.6
Foreign direct investment	24.1	35.3	47.5	66.0	88.8	105.0	130.8	170.3	170.9	192.0

Figure 4 - Percentage share of ICT investment in total non-residential investment [13]

		Australia	Canada	Finland	France	Germany	Italy	Japan	United Kingdom	United States
IT equipment	1980	2.2	3.9	2.0	2.5	4.6	4.1	3.3	2.9	5.1
	1990	5.5	4.5	3.6	3.5	5.5	4.2	3.8	6.0	7.0
	1995	8.4	5.7	4.0	3.9	4.6	3.5	4.6	8.6	8.7
	2000	7.2	7.9	2.9	4.4	6.1	4.2	5.2	8.4	8.3
Communications equipment	1980	4.0	3.0	3.2	2.9	3.9	4.0	3.4	1.6	7.1
	1990	3.8	3.8	3.9	3.2	4.8	5.7	4.0	2.0	7.5
	1995	4.7	4.0	9.3	3.5	4.2	6.7	5.3	3.6	7.3
	2000	5.6	4.2	15.3	3.9	4.3	7.2	6.9	3.6	8.0
Software	1980	1.1	2.2	2.6	1.3	3.6	1.7	0.4	0.3	3.0
	1990	4.6	4.9	5.2	2.6	3.7	3.8	3.1	2.1	8.0
	1995	6.4	7.1	9.2	3.5	4.5	4.3	4.0	3.5	10.1
	2000	9.7	9.4	9.8	6.1	5.7	4.9	3.8	3.0	13.6
ICT equipment and software	1980	7.3	9.1	7.8	6.8	12.2	9.7	7.0	4.8	15.2
	1990	13.9	13.2	12.7	9.4	13.9	13.7	10.8	10.1	22.5
	1995	19.5	16.8	22.5	10.8	13.3	14.4	13.8	15.6	26.1
	2000	22.5	21.4	28.0	14.4	16.2	16.3	16.0	15.0	29.9

Figure 5 – Percentage share of ICT investment in total business investment [14]



[12] Source: World Bank
[13] Source: "ICT Investment And Economic Growth In The 1990s: Is The United States A Unique Case? A Comparative Study Of Nine OECD Countries", Alessandra Colecchia and Paul Schreyer. See Appendix ___.
[14] Source: US Federal Reserve

The primary observations that can be realized from the above 3 charts are:

- 66% of global capital is invested in developing nations via Foreign Direct Investment, while 16% is invested via the capital markets (debt and equity markets), and while 18% is provided to developing nations via multi-lateral or bi-lateral government funding. This means that for BiH to assemble the capital required so as to effectively develop the national economy, BiH will require an environment that is indeed conducive to attract especially FDI. Less emphasis will be placed upon capital markets financing and government funding.
- A dramatic increase in overall percentage share of ICT investment in total non-residential investment has occurred since 1995 (nearly doubling).
- ICT-related investments in overall percentage share in the Business Sector investment is now assessed at 40%. This is, indeed, a dramatic shift in investment priorities throughout the Business Sector over the past 5 years. The impact of this is that for BiH companies to remain competitive in the regional and global markets, BiH companies will be forced to invest in similar (if not greater) degrees. [15]
- Investment capital generally follows effective markets, and within those markets, specific industries. So as for BiH to attract global investment capital, BiH will require an effective and conducive market environment.

In BiH, the development of the ICT Sector has been extremely limited due to multiple factors:

- Lack of growth in the manufacturing and business sectors, and as a consequence, lack of ICT-related investments within the manufacturing and business sectors.
  - This is of particular concern with respect to existing manufacturing and business sectors that possess the economic opportunity to export goods and services, but do not possess the functional opportunity to export goods and services. [16]
- Lack of focus and support for ICT within the BiH Government.
  - This lack of focus and support is expressed in the under-development of maintaining a statistical database identifying various macro-economic indicators as illustrated above with the OECD data.
  - Expressed in the under-development of E-Government [17].
  - Expressed in the under-development of European-standard regulatory foundations regarding market-based macro-economic growth and stability (such as licensing standards, open market competition standards, tax and fiscal policy in support of ICT-related investments, monopoly deregulation, opening markets for more effective foreign direct investments, etc.).
  - Expressed in the under-development of E-Business investments made within both state-owned and private companies.

[15] According to the US Federal Reserve, Productivity Output Growth in the non-farm sector has accelerated to 2.8% growth over the years including 1996-2000. This is in contrast to the 1.6% growth average experienced for the last 25 years prior to 1996. The US Federal Reserve attributes this accelerated growth of productivity to ICT.

[16] An as example, Elektroprivreda possesses the economic opportunity to export electricity to other regional markets, however, on January 17, 2002, the EU E-Commerce Directive (2000/31/EC June 8, 2000) brings into legal force that cross border financial transactions will be transacted via electronic banking systems, which BiH presently has not developed. As a result of the under-development of modern electronic banking systems within BiH, Elektroprivreda will not possess the legal opportunity to either export surplus electricity to other markets, or even to acquire or 'wheel-through' electricity from other markets into BiH. In this respect, BiH will increasingly be segregated from the regional and global economies, and hence, will increasingly grow economically unstable.

[17] As defined by the United Nations. See Appendix ___

- Expressed in the under-development of modern ICT technologies throughout the education sector (ICT as not only a unique industry, but a vital component of any other industry or specialty).

- Lack of focus and support for ICT development throughout the IC.
  - Expressed in under-development of modern ICT regulatory foundations for government, industry and business sectors, education and social applications (as an example, almost no regulatory support has been provided to initiate electronic banking applications in BiH, while another transitioning nation, such as Estonia, as an example, now possesses over 300,000 electronic banking customers which has added over $1.2 billion USD to the Estonia economy – or, as another example, there has been almost no focus or support targeting ICT applications within the Education Sector).
  - Expressed in the under-development of managing ICT to impact BiH macro-economic and fiscal policies (see Alan Greenspan comment, earlier in this document).
  - Expressed in the primary focus of ICT on simply providing a select number of "computer systems" to various IC-funded projects (the IC presently, and generally, considers ICT as simply a hardware component of a project rather than the "knowledge management" stimulus of a project). [18]
  - Expressed in negligible focus and support for industrial and business sector utilization of ICT to migrate to modern E-Business applications allowing for regional and global exports and imports (thereby reducing costs and increasing productivity, and increasing labor opportunities).

As a consequence of this lack of focus and support for the development of ICT throughout BiH, BiH is increasingly becoming segregated from the more modern regional and global economic markets, and hence, becoming increasingly dependent upon multi-lateral donations.

Regarding an Industrial and Institutional process to assess the ICT Sector throughout BiH, a non-sophisticated method of utilizing public-based questionnaires was initiated by GTZ for this document so as to begin to assess and define the nature of the BiH ICT Sector. Results of the questionnaire-based findings are outlined later in this document. It should be noted that the questionnaires only focus on Industrial/Business representation within the ICT Sector. Institutional representation within the ICT Sector is almost non-existent throughout BiH. As highlighted earlier, few statistical studies are carried out by independent institutions, but rather are carried out by variously aligned or competitive interests. In other OECD and EU markets, ICT-related institutions include literally hundreds of specializations, including, certainly, aligned interests as well as wholly independent institutions, including as selected example types [19]:

- Industrial Trade Associations
- Business Trade Associations
- ICT-specific Trade Associations
- Users Groups
- Academic Research Communities
- Independent Statistical Institutions
- Economic Policy Institutions

[18] Various IC and private sector donations of computer systems made to various BiH organizations to date are widely under-utilized and often are not utilized at all – due to the lack of ICT training accompanying such hardware donations.
[19] For more detailed examples of institutional specializations and agenda, see Appendix ___. *Note: this Appendix ___ presents an agenda based on Industrial/Business "self-regulation" of specific aspects of the ICT Sector – written specifically and jointly by the institutions.*

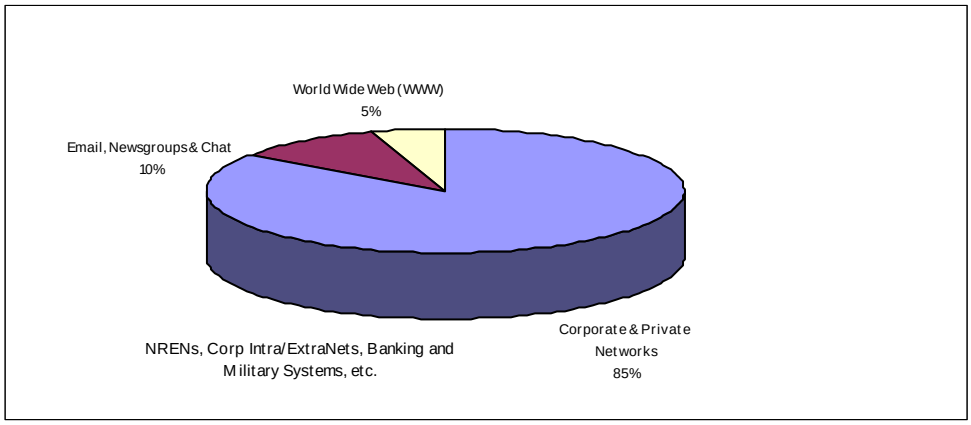
2.4 General

There exists a few specific general definitions of ICT which may be helpful so as to place ICT in perspective of -- as the G7 Ministers quantified as -- an "IT revolution". Actually, ICT is a result of multiple evolutions of economic policy and corporate management tools.

- Beginning in the late 1920's, the Industrial Sector adapted ICT in the form of production automation which exploited the assembly line and revolutionized mass production of consumable products.
- Beginning in the mid-1960's, the Industrial and Business Sectors adapted ICT to more effectively manage data and information which more effectively managed administration, production, and distribution procedures (this is technically referred to as Electronic Data Interchange, or EDI).
- Also beginning in the mid-1960's, the electronic management and transfer of currencies was implemented (this is technically referred to as Financial EDI). These transactions were conducted via "proprietary" connections between selected parties.
- Beginning in 1993, EDI and FEDI applications were merged via the international telecommunications networks utilizing a new technological application called the Internet. The Internet, in only a few short years, has transformed how and why the Industrial and Business Sectors inter-relate with each other, and with the consumer – ***converging*** data and services so as to increase value and brand identities throughout the global marketplace. Lately, this "inter-connectivity" has expanded to include governments, social institutions, and education. It is this convergence and inter-connectivity that best defines the "IT revolution".

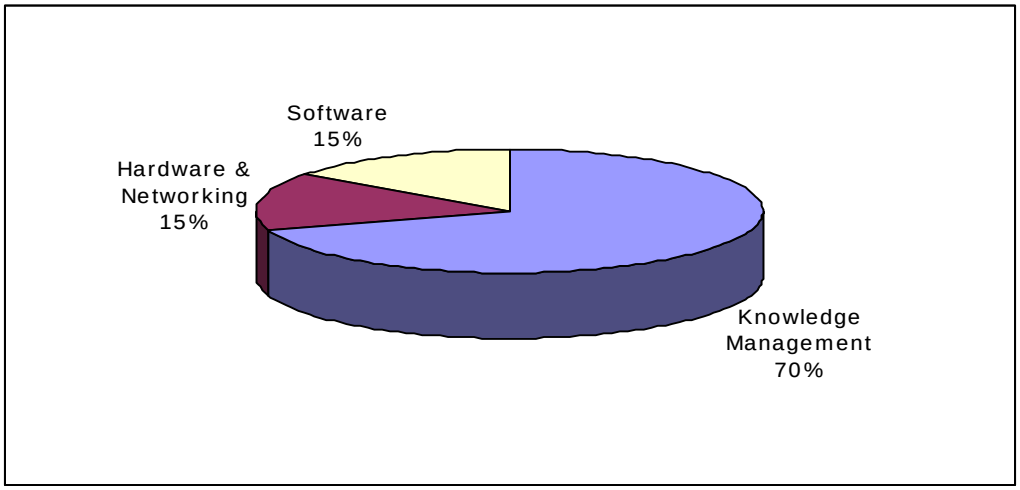
The Internet, itself, is often misunderstood. Technically, the Internet is an international software-based protocol that interfaces with international telecommunications networks so as to allow literally billions of computers to "virtually" connect to each other. The Internet is most effective when both the market users can effectively utilize the tools and applications of the Internet, which can only be as strong as the telecommunications network operating within a specific region. This is why BiH possesses an extremely under-developed Internet (and hence, ICT) market due to lack of investments in the data network infrastructure throughout BiH. Technically, the Internet is comprised of:

Figure 6 – Distribution of Internet Infrastructure



From a financial investment perspective, the cost of deploying ICT is generally quantified in the following manner:

Figure 7 – ICT Deployment Costs / Revenue Generation



Below, is an example of the investment impact of deploying ICT and migrating Business Sector applications (labor and consulting costs relate to knowledge transfer costs):

Figure 8 – Impact of ICT Deployment

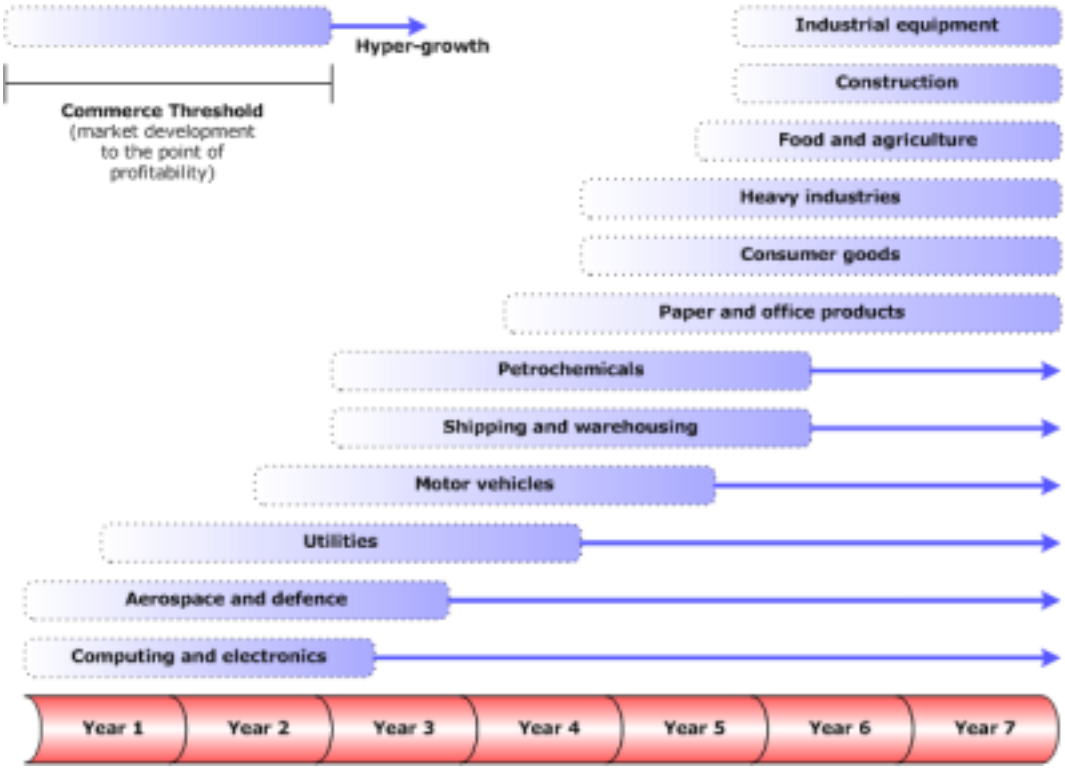
Enterprise Architecture:
Case Study of Migrating ICT Within a Financial Institution

PHASE	COSTS (USD)	BENEFITS
1. Planning 6 months	**$100,000** 70% Internal labor 20% Consulting 10% Miscellaneous	**Nonquantifiable** Business case Inventory Team
2. Initial Migration 80% complete at 12 months	**$400,000** 60% Internal labor 25% Consulting 15% Training tools	**$100,000** Purchases eliminated volume discounts
3. Application Migration 60% complete at 18 months	**$3 million** 60% Internal labor 20% Consulting 20% Other	**$500,000** 70% Labor 20% Hardware & software 20% Other
4. Post Migration Ongoing	**$100,000** Maintenance	**$5 million Yearly**

Source: Giga Information Group, Inc.

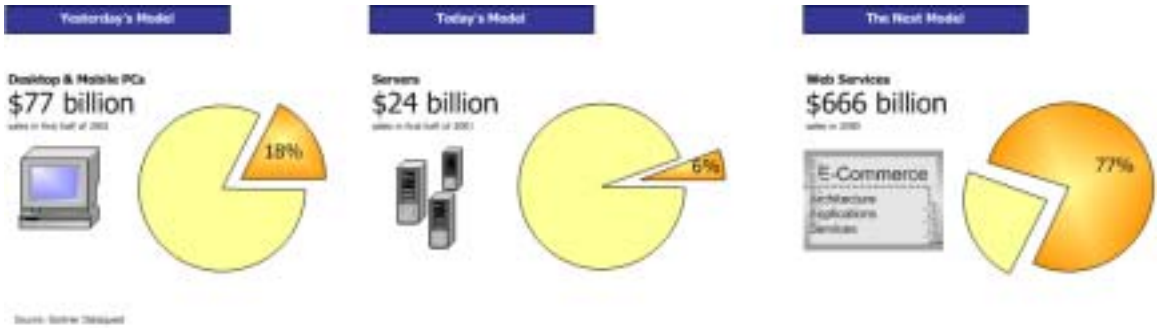
From an Industrial/Business Sector perspective, the sectors themselves migrate and deploy ICT at varying rates of speed and commitment, ultimately resulting in gaining profitability margins. The following chart illustrates the annual deployment schedule most widely experienced in the development of a market economy:

Figure 9 – Industrial ICT Deployment



As a result of the deployment of ICT throughout the global marketplace, the very nature of the "business model" adopted by the ICT-related Industrial and Business Sectors has evolved from marketing hardware and software to marketing web-based knowledge management services:

Figure 10 – Evolving Business Models as a Result of ICT



Within BiH, the majority of the business models of ICT Sector ***providers*** are generally focused on the previous models of hardware and software sales and installation and non-sophisticated Internet-based applications, rather than on the modern business models of web-based knowledge management services:

- Hardware and Software Sales
- Installation of hardware and software, Network Implementation (LAN, Intranet, Internet)
- Software Development
- Hardware Development
- Internet Services

The business models of ICT Sector ***users*** throughout BiH simply do not significantly employ sophisticated applications of ICT which would impact both corporate productivity as well as market expansion beyond the borders of BiH. To date, not a single BiH company has been identified that employs an 'end-to-end' E-Business platform to manage the back office, front office and field, and customer applications that readily defines a modern European business model.

As a result of employing ICT, and in specific, providing direct consumer procurement of goods and services via the Internet has had a compound impact upon macro-economic indices throughout the world. As a simple example, the Internet has impacted the global prices of various commodities, highlighted below. As now can be realized, for BiH to produce and export commodities via tradition market applications to markets that already are exposed to the modern market applications of the Internet, BiH will simply not be able to compete, and hence, will only be capable of producing for internal market consumption.

Figure 11 – The Internet's Impact upon an Economy

Downward Pull of Internet Prices

Percent price difference from traditional retail outlets (1999 figures)

	With Shipping Costs	Without Shipping Costs
Over-the-counter Drugs	-6%	-10%
Prescription Drugs	-28	-28
Apparel	-38	-38
Alcohol and Cigarettes	-28	-35
Groceries	0	-17
Home Electronics	-4	-5
Toys	+9	+4
Hardware	+2	-2
AVERAGE	**-13%**	**-14%**

Data: Lehman Brothers

Finally, as a consequence of the increasing utilization of ICT in almost every sector of social existence, the demands upon the workforce, education, and government affairs (***support infrastructure***) have

dramatically altered throughout the world over the past several years – defining the society of today as the 'Information Society'. Again, however, these dramatic changes are not readily visible throughout BiH, again illustrating that BiH is increasingly being segregated from the modern economic markets and social structures of the Information Society throughout the SEE region, Europe, and the rest of the world.

3. Findings

3.1 Introduction

As stated earlier, BiH does not possess and maintain the initial infrastructure upon which a coherent assessment of the ICT Sector in BiH can be addressed according to European Union or OECD standards. A much less sophisticated and less effective method of assessment – utilizing public-based questionnaires -- is addressed and summarized in the following findings:

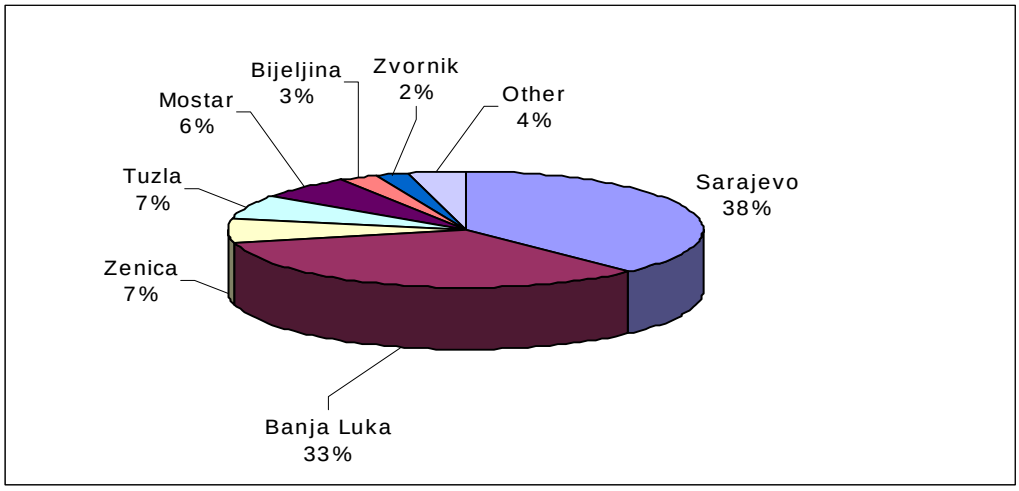
3.2 ICT Sector (providers)

To date, roughly 250 ICT-related companies are registered throughout BiH, and about 90% of those companies are private companies, while the remaining 10% are operated as service units of existing state-owned companies. Annual revenues from these companies are unknown.

The 250 companies presently employ roughly a total of 4,000 employees (most being between 20 and 35 years of age). This equates to roughly 16 employees per company, and represents only 0.1% of the population, whereas the average ICT-related employment rate throughout the OECD nations is 3.6%.

Average salaries of ICT-related employment throughout BiH are unknown. However, the average beginning ICT-related salary throughout the OECD nations is about 36,000 USD per annum. The ICT-related companies are geographically distributed as follows:

Figure 12 – BiH Regional Distribution of ICT Companies



The general types of ICT-related companies are, as outlined in the Definitions section of this document, include the following:

Sales and distribution of hardware and software

This generally refers to companies dealing with the distribution and sales of goods, generally relating to major brand suppliers (third party or generic brands are rarely marketed in BiH, which due to the lack of these value brands, generally increases the overall ICT costs to the consumer). Additionally, it was found that only a limited number of distributorships exist throughout BiH, and the majority of retailers are forced to purchase from these distributors at market inflated prices, again, increasing the overall ICT costs to the consumer). Whether an ICT-specific retailer, or a multi-purpose store, the BiH Bureau of Statistics registers any company that retails hardware and software as an "IT Service Provider". Again, this deviates from the International Standards Industrial Classification (ISIC) definitions as practiced throughout the EU and OECD nations.

Installation of hardware and software, network implementation

This generally refers to companies that provide services relating to the installation of hardware and software and the setting-up of client networks. This area is where a substantial quantity of reasonable to exceptionally trained personnel can be found.

Software Development

Software Developers are involved in the development or modifications of computer programming. Often, these programs are made to order, and are for the most part, targeted to specialized accounting and inventory applications. Generally, these programs are written either in the DOS® operating languages of BASIC and FORTRAN, or in Windows® operating languages utilizing 'off-the-shelf' databases, such as Microsoft ACCESS and Visual Basic. A negligible amount of programming is performed in the modern languages such as JAVA, JAVA Beans, or Flash. Strikingly, these modern languages are not even regularly taught in BiH universities, while the older languages such as FORTRAN are still being taught in BiH. More sophisticated and specialized software and related programming are simply not even found in BiH (such as Aspect ACD, Blue Pumpkin Management, CTI, or IVR, as only a few examples).

Internet Service Providers (ISPs)

Although a number of private ISPs have been established throughout the urban areas of BiH, all are ultimately under the control of the state-owned PTT monopoly due to the fact that all ISPs must gain access to the international connections exclusively via the PTT network. Some private ISPs have recently attempted to gain independent access to the international networks via unlicensed satellite hook-ups. These non-licensed operations, however, are scheduled to be ceased in 2002 due to the new licensing regulations to be enacted by the BiH Communications Regulatory Agency (CRA).

Generally ISPs are non-regulated, and provide consumer and business connections to the Internet via standard telecommunications lines (mainly copper, but some fiber). Most of the connections are made via standard dial-up and a limited number of the connections are made via leased lines. Due to the lack and stability of the BiH telecommunications infrastructure, connectivity is generally unstable and no BiH ISP presently provides user contracts based on 'quality of service' (the norm throughout the OECD nations). No enhanced bandwidth services presently exist anywhere in BiH (this is the largest growth segment in IP

services in the US). Other services generally offered by BiH ISPs are basic email, web design and hosting services, etc. A negligible amount of true dynamic web programming (ASP services) is performed in BiH. Almost all web pages are static programmed. No bulk dynamic email services are presently provided in BiH. As stated earlier, no 'end-to-end' E-Commerce transactions are presently performed in BiH.

No BiH data presently exists relating to the number of web sites and resulting number of pages. Consequently, no BiH data exists relating to the breakdown of types of web sites and pages created in BiH. In perspective to E-Commerce functionality throughout the OECD nations, the average percentage share of web domains that provide some aspect of E-Commerce functionality is 69%. [20] For additional data relating to the communications infrastructure and various findings relating to specific ISP providers, see the World Bank Consultancy Study [21] and The EU ESIS BiH Report (site: www.eu-esis.org/esis2reg/BAreg1.htm).

The four types of ICT-related companies presently operating throughout BiH are distributed in the following manner (the first chart relates to companies in the BiH Federation, the second chart relates to companies in the Republic of Srpska):

Figure 13 - Distribution ICT Companies: BiH Federation

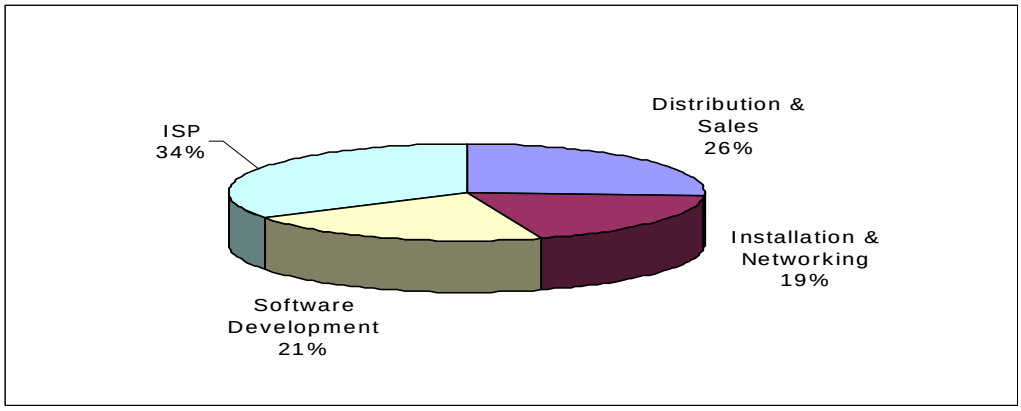
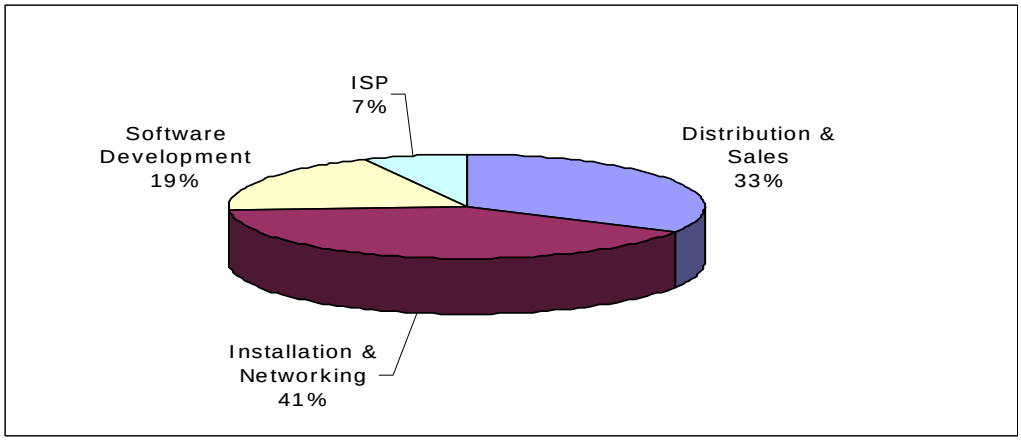


Figure 14 - Distribution ICT Companies: Republic of Srpska



[20] Source: www.netvalue.com
[21] See Appendix ___

3.3 ICT in Relation to Industrial and Business Sectors (users)

No data is presently available regarding ICT-related investments made within the Industrial and Business Sectors. As stated earlier, this lack of industrial and business investment in ICT will increasingly prevent BiH companies to increase productivity and market access. Without increased productivity and market access, negligible economic growth can be expected in BiH. The following general observations, however, should be noted:

1. The vast majority of computer systems purchased in BiH are either IC project related or basic corporate purchases. However, the majority of computers purchased in BiH are deployed as stand-alone terminals, while a small percentage are connected via a network platform, and only a minute number of computers are actually performing shared applications. An example of this can be found in the banking sector: many of the branch bank offices save their daily data to a floppy disk and physically deliver these disks to their main offices. Email is a corporate culture that is certainly increasing, but an exceptionally high number of BiH businesses still utilize the out-dated fax machine as a communications tool.
2. Hence, most computers throughout BiH are being utilized as 'electronic typewriters' rather than knowledge management tools.
3. As stated earlier, no 'end-to-end' E-Commerce activity is presently performed in BiH.
4. As the 3 figures below illustrate, BiH does not effectively exploit even the most simplest of Internet opportunities, such as the administration of the '.ba' IP domain. [22]

Figure 15 - Internet Administration: SEE Country Assessment

		Does a Domain Site Exist?
Slovenia	www.sl	No
Czech Republic	www.cz	Yes
Slovakia	www.sk	No
Latvia	www.lv	Yes
Poland	www.pl	No
Hungary	www.hu	No
Croatia	www.hr	No
Bulgaria	www.bg	Yes
Russia	www.ru	Yes
Estonia	www.ee	Yes
Lithuania	www.lt	No
Romania	www.ro	No
Yugoslavia	www.yu	Yes
Ukraine	www.ua	No
Macedonia	www.mk	No
Georgia	www.ge	Yes
Albania	www.al	No
Bosnia and Herzegovina	www.ba	No
Belarus	www.by	No
Moldova	www.md	Yes

[22] For the complete sampling of domain administration sites presently active via the Internet throughout the SEE region, see Appendix ___.

Figure 16 - Sample Domain Administration Page [23]

Figure 17 - Non-existent '.ba' Domain Administration

5. No sub-contracting 'data centers' presently exists in BiH (the largest growth segment within OECD telecommunications and data companies).
6. Negligible dynamic data security, archival and retrieval applications presently exist in BiH.
7. Hence, most ICT-related personnel employed within the Industrial and Business Sectors are simply in-house network administrators and a few software programmers.
8. Furthermore, as stated earlier in the *Macro-Economic* section of this document, the ICT Sector throughout BiH will require substantial investments, and these required investments are statistically most accessible via FDI, and at present, BiH does not yet possess an effective and conducive investment environment.

3.4 ICT in Relation to Workforce, Education, & Government Affairs (users and supporters)

As stated above, most ICT-related personnel employed within the Industrial and Business Sectors (users) are in-house network administrators and a few software programmers. ICT Sector *providers* employ personnel to buy, sell, program software, or install hardware. The roughly 4,000 ICT-related employees in BiH represent only 0.01% of the BiH population, and this revealing statistic, when adjusted to represent a percentage of the total employed workforce in BiH (est. 64%, Source: BiH Chamber of Economy), ICT-related employment represents only 0.001% of the total employment base of BiH. Whereas, the average

[23] This specific page is an example of one of the more successfully administered domain sites, for the Caribbean Island of Tuvalu. This site generates roughly $50 million of revenue *per month*.

ICT-related employment rate throughout the OECD nations is 3.6% of the total population, or .37 to 1% of the total business (non-agricultural) employment base.

In a published work, "ICT investment and employment: The truth about e-skills", Luc Soete and Bas ter Weel (2001): [24]

> *The IT-revolution is therefore often regarded as a 'skill-biased revolution'. This means that technological advances have favoured the labour-market position of the skilled part of the workforce, while the position of the unskilled deteriorated dramatically. Berman, Bound and Griliches (1994) and Autor, Katz and Krueger (1998), Berman, Bound and Machin (1998) and Machin and Van Reenen (1998) find – for several OECD countries – a substantial positive correlation between skill upgrading and computer investments, employee computer use, and research and development efforts. Greenwood and Yorukoglu (1997, pp. 49-50) argue that "the adoption of new technologies involves a significant cost in terms of learning and that skilled labor has an advantage at learning. Then the advance in technology will be associated with an increase in the demand for skill needed to implement it. Hence, the skill premium will rise and income inequality will widen."*
>
> *Similarly, Caselli (1999, pp. 79-80) tells us that "technological progress has been predominantly incremental in the 1950s and 1960s, and predominantly revolutionary (of the skill-biased variety) in the 1970s and 1980s."*

The unique aspect of ICT Sector employment, however, is that 70% of ICT-related expenditures are related to 'value added knowledge management services' (generally referred to as 'solutions'), these services can be provided to a global market, rather than confined to a local market demand – and more specifically, can often be provided via the Internet or via short-term consultancies (which would assist to secure employment to be retained in BiH). As an example, just prior to the global economic downturn experienced earlier in 2001, OECD accumulated data that reflected foreign demand for ICT-related skills (selected examples):

Figure 18 - Employment Potential

	Total ICT Demand	70% Solutions Demand
Canada	30,000	21,000
Denmark	45,000	31,500
France	25,000	17,500
Germany	75,000	52,500
Norway	35,000	24,500
United Kingdom	80,000	56,000
United States	400,000	280,000
Total Demand	**690,000**	**483,000**

However, as stated earlier, the BiH workforce does not yet possess the level of experience or knowledge (skill sets) that is required to facilitate such Internet-based or consultancy-based employment opportunities. As stated earlier, the BiH curriculum presently being deployed addresses very few of the modern economic and social requirements found in modern cultures. Not only are the subject matters, themselves, of little modern relevance, but the very manner in which subjects are taught, and the technologies utilized to deliver the curricula are, bluntly said: out-dated. In particular, very few of the BiH teachers, representing a cross

[24] See Appendix ___.

section of various specializations, simply do not have access to modern technologies and procedures that are commonly found throughout modern cultures. The BiH Education Sector will require substantial reform and modernization so as to accommodate the impending workforce requirements of both the BiH domestic market as well as the knowledge-based opportunities of the global market.

It should also be noted that it is indeed the Education Sector which is traditionally the first sector to aggressively utilize and develop sophisticated applications of ICT within developing countries. This is expressed in four primary methods:

- Collaborative *Research and Development* (R&D) -- which becomes one of the most significant contributors to national economic growth.
- Increased utilization of *web-based education* throughout primary, secondary, and higher education systems.
- As a result of the Education Sector demanding and utilizing sophisticated applications of ICT, higher education participants have traditionally partnered with national power utility companies to build-out and develop integrated '*academic and research networks'* that operate over the national power utility communications networks.
- As a result of the Education Sector traditionally being the first to embrace and develop ICT initiatives, *governments and the private sector quite quickly follows suit*, and provides the impetus to develop the economic market relating to both ICT as a unique industry as well as a vital component of existing industries, government, and social structures.

It should also be noted that many ICT-related skill sets do not require 4-year higher education diplomas. Vocational training (either classroom-based or via Internet-based local and distance learning programmes) can effectively prepare certain skill sets to be employed within 6 months to 2 years, depending on the complexity of the applications. In 1998, the average age of a professionally employed software programmer in the US was 19, earning a minimum of $56,000 per annum [25]. In the hey-day of the 'dot-com' explosion, literally tens of thousands of teen-agers forwent college to join the workforce, and some ultimately became millionaires (or at least financially independent to the degree that these teen-agers often started their own companies).

Cisco Systems, a global Internet systems company, presently sponsors such a vocational training academy through a local BiH partner, "Centar za Obuku Mostar" (Development Centre Mostar). COB has been effectively supported not only by Cisco, but also by the city of Mostar, which assisted in the procurement and development of the building infrastructure as well as the operations of fiber-based and wireless communications infrastructures. As a result, students and professionals who complete the various courses offered, are issued a certificate which is recognized and accepted world-wide by both ICT providers and users. This international standards commitment is vital, and is required for a 'data-centric' Information Society to effectively and universally communicate through electronic means.

It should be noted that BiH urban areas are quickly establishing 'Internet Cafés' and a few 'Internet Universities.' Although the cafés provide mainly entertainment and some initial learning capacity to citizens, cafés are not effective in preparing the education of a market-based workforce. Additionally, and although the Internet Universities generally provide reasonable access to entry-level ICT skill sets, the certificates and diplomas provided by these 'universities' are not international standards-based, and beyond that, provide negligible access to sophisticated and specialized ICT applications and tools.

[25] Source: Lehman Brothers

As a consequence of an effective development of ICT support within various strata of the Education Sector, the BiH private and public sectors will be better prepared to participate in a modern economy, and hence, will become more economically stable and vibrant.

As mentioned earlier, the BiH Government has yet to focus an aggressive commitment to the development of the ICT Sector in BiH. This can be demonstrated by the following:

1. Specifically relating to promoting 'E-Governance', BiH does generally meets the entry-level standards as outlined by the United Nations [26]:

   Emerging web presence
   A country has a formal but limited web presence through a single or a few independent government websites that generally serve as public information sources. The site(s) provide users with static information on the government and or its ministries, agencies, elected officials etc. Contact information like addresses, phone numbers, office hours, calendars, etc are posted. Special features like frequently asked questions may be found.

   At present, the BiH Federation has initiated a simple web site (listed as www.fbihvlada.gov.ba); however, the data listed is static and not dynamic in any way. Information is extremely limited and of little practical use, calendars are not included, and only the abstracts of recent laws are included, as opposed to full text of laws.

   Strikingly, the state-level BiH Government has not implemented a web site. And the 'official' government site for the Republic of Srpska (listed as www.srpska.org) is actually maintained by a US-founded organization, the Serbian Unity Congress.

   In contrast, the Government of Estonia is recognized by the global community as being committed to ICT Sector development in general and E-Governance in specific. The following figure illustrates the type of data available from Estonia's government site index:

[26] See Appendix ___

Figure 19 - Estonia Site Index

2. Relating more generally to BiH Government focus and support regarding the ICT Sector, the Government has yet to implement the most basic of *Macro-Economic* instruments so as to develop the sector, such as:
    a. Establishing a specialized office within the state government structure focused on the development of an Information Society. The following figure illustrates how Australia has established such an office (the National Office for the Information Economy -- www.noie.gov.au/projects/IndDev/Index.htm).

Figure 20 - Australia Commitment to the Information Society

NOIE The National Office for the INFORMATION ECONOMY

Government Online | Information Economy | Information Industries

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Navigation: Home > Projects > Innovation and Industry Development

Innovation and Industry Development

The industry development activities of NOIE are concerned to facilitate the development of a dynamic information and communications technology sector which underpins the growth of the information economy and which contributes substantially to Australia's economic growth and welfare.

General info: Publications, speeches, media - Contact - Related links

Project Overview

NOIE's role in ICT industry development is primarily aimed at:

- better understanding the structure of the ICT industries in Australia, including areas of strength and weakness, as a basis for policy making;

- identifying impediments to innovation and investment in Australian ICT businesses, in areas such as taxation and venture capital, and where appropriate addressing these in consultation with the responsible departments and agencies; and

- identifying ways of building strengths in areas which underpin ICT innovation, such as support for research and development, and research skills.

These activities include providing secretariat support for the establishment of the ICT Centre of Excellence, funded in *Backing Australia's Ability*.

NOIE works closely with the Department of Communications, Information Technology and the Arts, which has responsibility for certain ICT industry development activities such as the Building on IT Strengths (BITS) program, and the industry development aspects of outsourcing.

Centre of Excellence

NOIE is responsible for establishing the world class Centre of Excellence for information and communication technology (ICT) research, announced in the Prime Minister's innovation statement.....*more*

Industry Development

NOIE's role in ICT industry development focuses on the creation of a business environment which encourages the development of growing, export-oriented, innovative and competitive ICT businesses in Australia.....*more*

Innovation Action Plan

The Government's Innovation Action Plan, *Backing Australia's Ability*, was released by Prime Minister John Howard on 29 January 2001.....*more*

ICT Sucess Stories

NOIE has commissioned a series of case studies of companies in the sector to highlight the strengths and capabilities of the Australian ICT industry.

b. International standards-based statistical indicators (as highlighted in the *Macro-Economic* section).

c. Overall regulatory policy reform and development that recognizes ICT as a vital function of national economic and social development.

d. Overall fiscal policy reform and development that recognizes ICT as a vital function of national economic development. As examples:

   i. Taxes on computer and other ICT equipment are prohibitive for average consumers to purchase.

ii. Fiscal policy relating to private sector incentives for ICT-related expenditures and research and development.
iii. Fiscal policy relating to FDI and capital market investments.
iv. Communications tariffs and fees are some of the most expensive in Europe, which again, is prohibitive for the average consumer to spend quality time on the Internet or to use the Internet in an aggressive and consistent manner.

e. Overall education policy reform and development that recognizes ICT as a vital component of education delivery and of economic development. [27]
f. Overall economic development policy development that recognizes that literally hundreds of new companies and industries which both use and provide ICT-related products (30%) and services (70%) have yet to be established.
g. Overall banking policy reform and development that recognizes that electronic banking is a vital component of economic and trade structures have yet to be established.
h. Overall national ICT-based strategic plan development which details specific goals, objectives, and expectations regarding the development of an Information Society has yet to be established.
i. Overall cooperation with IC to develop an ICT Sector infrastructure and related component aspects on a national scale have yet to be established.

3.5 ICT in Relation to the IC

Finally, the IC has appropriated precious little focus and support of the development of the ICT Sector throughout BiH. As stated earlier, the IC either does not consider ICT Sector development a vital component of economic and social development, or when ICT is indeed considered, it is done so only as an 'after thought' or simply as a technical component of a wider project.

As this and similar reports attempt to illustrate, the issue of ICT Sector development is indeed critical to the development, stabilization, and ultimate integration of BiH into the EU and the larger market economies of the world. This report attempts to establish an economics-based rationale, albeit expressed in laymen's terminology, for considering ICT Sector development as indeed critical and maybe even central to the future of BiH.

The relevance for the IC to elevate ICT Sector development to the forefront of BiH development is five-fold:

- As has been illustrated in this report, the ICT Sector in modern economic and social structures throughout the world is considered a central indicator of development, stability and growth.
- ICT Sector development cuts across almost every conceivable economic and social strata and function; from E-Government to E-Commerce; from E-Education to an Information Society.
- Because of the cross-cutting nature of the 'Information Revolution', economic and social development can no longer be accomplished in a traditionally compartmentalized fashion; the development must follow the nature of ICT itself: convergence. ICT Sector development must be implemented in a convergent manner, each sector engineered to converge with another sector.
- Because of the convergent nature of ICT Sector development, coherent and detailed strategic, implementation, and operating plans will be required – which bring together the IC, the BiH Government, the BiH private sector and the international private sector into a cooperative and collaborative relationship.

[27] See "BIHARNET: A Strategic Overview", a Strategy White Paper written by Michael Byrnes and commissioned by the United Nations Development Programme (UNDP) (2000). The document highlights an estimated $500 million USD will be required to modernize the ICT components of the BiH Education Sector.

- Although these strategic, implementation and operating plans have yet to be constructed, it is most likely that these plans will reveal that ultimate development of the ICT Sector throughout BiH will require considerable funding and technology resources.
    - Regarding the aspect of technology resources, it should be historically noted that 82% of the technology resources provided to post World War II European Reconstruction via the Marshall Plan was non-licensed technology. This non-licensed technology was mainly concentrated on improving productivity output via mass production assembly-line technologies and procedures. However, in today's Information Society, the technology which improves productivity output is no longer non-licensed assembly-line technology. It is now ICT, and today, 97% of ICT is indeed licensed, and is not something that can simply be donated 'off-the-shelf' to BiH. ICT, as stated earlier, requires convergence. And this convergence (and importantly, the knowledge to implement convergence) can only come from the private sector as FDI.
    - Regarding the aspect of funding issues, and recognizing that ICT Sector development will require a substantial volume of investments and IC donor-based funding (grants and loans), the technical and fiscal tool which could be very effective in funding ICT Sector development throughout BiH are Public-Private Partnerships (bringing together shared FDI and IC funding) [28].

4. Recommendations

Based on the above findings and developmental importance relating to the BiH ICT Sector, this Development Study recommends that a four-sided approach be taken so as to most effectively ensure the development of the BiH ICT Sector and the economic development and stability of the nation:

4.1 A BiH Commitment

As has been demonstrated over the past several years of IC development efforts in BiH, either the IC tends to self-create priorities and then attempts to force the BiH community to accept and implement these self-created priorities, or the BiH Government is simply not committed to rebuilding BiH on a state level.

Recognizing these two observations of past ineffectiveness, the development of the BiH ICT Sector will first require that the BiH Government is indeed committed to the ICT agenda, not only in perspective of theoretical and policy 'support', but in tangible actions as well.

From the perspective of an ICT specialist, and as has been demonstrated in this report, the following tangible steps can and ought to be initiated so as to both begin the process of development as well as to demonstrate a commitment to the long-term development process:

1. The BiH Government will require a commitment to 'E-Governance'. As other transitioning nations have experienced, E-Governance begins the process of regulatory and fiscal policy reform with the understanding that as a result of E-Governance, effective and substantial economic and social development follows. This E-Governance can be demonstrated in two tangible manners:

[28] Public-Private Partnerships are policy and fiscal tools employed by and between governments and the private sector so as to implement various municipal or regional development projects, such as infrastructure and real estate development, as examples.

a. The establishment of a state-level ministerial authority specifically focused on the development and coordination of an Information Society (much like the Australian Government example illustrated earlier: National Office for the Information Economy).
b. The establishment of a state-level Internet portal which unifies and converges information, data, programmes and applications from multiple resources and actors.

2. The development of the ICT Sector in BiH will require that the BiH Government implement said development in a manner that is compatible with international standards and operating methods. This includes, as examples:
   a. Initiating the assemblage and maintenance of international standards-based statistical indicators (as highlighted in the *Macro-Economic* section)
   b. Overall policy reform and development from the perspective that ICT is of vital importance in the development of such policies:
      i. Regulatory policy reform and development
      ii. Fiscal policy reform and development
      iii. Education policy reform and development
      iv. Economic development policy development
      v. Banking policy reform and development
      vi. Institutional reform and development

4.2 A Cooperative Approach: Local Leadership Partnered with IC Support & Private Sector

Once the above commitment by the BiH Government is secured and tangible actions can be demonstrated, it is herein recommended that the BiH Government appoint a local institution that can effectively operate as a 'bridge' or facilitator, between and with the BiH Government, the IC, and domestic and international private sector actors. The main objective of the facilitation is more akin to that of a translator: translating multiple policy objectives with implementation and operating plans, and with technology and human resources, and with funding resources.

Specifically, GTZ is working with the BiH Ministry of Foreign Trade and Economic Relations, the European Commission Delegation to BiH, the World Bank, and others to establish four specific Working Groups targeted to serve as the foundational planning for continuing long-term IC donor support. The four Working Groups presently being established within the Ministry are: Economic Transition, Trade and Investment; Modernization of Public Finance; Public Sector Reform; and Social Protection.

It is herein recommended that an independent local institution be appointed by the Ministry so as to facilitate a 'sub working group' specifically tasked to interface with the Ministry's Economic Transition, Trade and Investment Working Group regarding the development of a BiH ICT Sector Development Strategy document to be submitted to a scheduled donor's conference in September 2002.

4.3 A Strategic Approach: Convening a Nation-wide ICT Strategic Planning Working Group

The recommended ICT Strategic Planning Working Group is thought to be implemented in the following manner, based on a Strategic White Paper written by Michael Byrnes, an international specialist in ICT development and knowledge transfer [29]:

1. **Inputs**. The Working Group is organized by input specifications relating to multiple sector inter-connectivity with ICT (users, providers, supporters) and by an over-arching focus on the economic and social development aspects of ICT development. As multi-sector examples:
    a. Industrial and Business Sector (users)
    b. Industrial and Business Sector (providers)
    c. Education Sector
    d. Government Sector
    e. Banking and Finance Sector
    f. Health and Human Services Sector
    g. Transportation Sector
    h. Research and Development Sector
2. **Outputs**. The outputs can be organized into two primary categories of outputs:
    a. Document Formats. The formats of the documents envisaged include:
        i. Technical assessments
        ii. Strategic Opportunities
        iii. Implementation and Operating Plans (including possibly, selected business planning)
        iv. Government Policy Recommendations
        v. Financing and Funding Plans
    b. Document Focus. The focus of the documents envisaged include:
        i. Macro-Economic Development
        ii. Structural Development
        iii. Industrial and Institutional Development
        iv. Workforce, Education & Government Affairs Development

4.4 A Confidence-building Approach: Demonstration Projects

Recognizing that both the BiH Government and the IC can be benefited by short-term demonstrable progress with respect to ICT Sector development over the long-term, it is herein recommended that specific 'demonstration projects' be implemented in collaboration between the BiH Government, the IC, and the private sector. Only for the purpose of illustrating example projects, the following might be effective to consider:

1. The initiation of a state-level E-Government Internet portal.

[29] The LOGOS Plan: A Proposal for the Comprehensive Commitment and Development of a Knowledge-based Society and Economy in Bosnia and Herzegovina. Michael Byrnes (2001).

2. The initiation of an ICT-targeted vocational training academy.
3. The initiation of a multi-participatory research and development collaboration between a BiH institution and/or university and an international counterpart – operated via the Internet.
4. The initiation of a research test bed, in partnership with a BiH entity (public and/or private) and an international counterpart.
5. The initiation of a multi-government agency collaboration so as to implement a demonstration of technology, application, and resource convergence.

As a concluding observation, citizens of Bosnia and Herzegovina have for generations viewed themselves as being 'Europeans'. The IC, also, considers BiH to be a strategic and important member of the European Community, and ultimately a formal member of the European Union. That membership, however, requires from BiH a substantial commitment to embrace the standards and regulations – as well as the benefits – of participating in the market place and social community of Europe. In modern economies, this commitment also requires a substantial financial investment by both the BiH Government and the BiH private sector. The IC is today burdened with an increasing scope of responsibility, including parts of Asia, Western Asia (the former USSR republics and nations such as Afghanistan), Kosovo, Yugoslavia, Africa, Latin America, and other regions. This means that the IC will be required to place a decreasing amount of attention upon – and funding to – BiH. It is herein encouraged that the BiH Government and the IC redouble their efforts to develop an economic and social development strategy that is underpinned by the demonstrable fact that the ICT Sector is a vital and central foundation upon which to construct such a strategy. The world is increasingly being regarded as a global 'Information Society'. BiH not only will be required to function within this new type of Information Society, BiH also has much to contribute to the societies of the world.

End.