FACTORS AND IMPACTS IN THE INFORMATION SOCIETY
A PROSPECTIVE ANALYSIS IN THE CANDIDATE COUNTRIES

REPORT ON BULGARIA

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Preface

The Institute for Prospective Technological Studies (IPTS) of the Directorate General Joint Research Centre of the European Commission contracted the International Centre for Economic Growth, European Centre (ICEG EC) to act as the coordinator of a consortium of 11 research institutes to carry out this project.

The main objective of the project was to provide a series of national monographs studying the development of the Information Society (IS), including both the positive and negative impacts, in each of the candidate countries. These monographs offer an assessment of the strengths and weaknesses of each country regarding the development of IS, and a view on their possible outcomes; both strongly rooted in factual quantitative data. They provide a clear, contextualised, multi-factoral and multi-causal picture of the input factors that contribute to the success or failure of IS developments, and the relevant output parameters that support mid- and long-term impacts on economic growth, employment and other relevant aspects of the future of each country. Each monograph concludes with a set of alternative scenarios for the development of IS in that country.

This report was carried out by the Institute for Market Economics, and aims to study the factors and impacts of the Information Society in Bulgaria. The report reflects the research results, comments and opinions of the team of authors. It does not necessarily reflect the opinion of the European Commission. It is organised around 9 themes – economy, demography, government policies, industrial development and competitiveness, relevant economic activity, IST penetration rates, institutional capacity and regulatory background, education, and culture. The section on each of these themes concludes with a specific SWOT analysis. Finally, a general diagnosis is made of Bulgaria's potential for IS developments, followed by a brief section on possible scenarios for the future and policy recommendations.

A Synthesis Report was also prepared by the Project Coordinator, the International Centre for Economic Growth, European Centre (ICEG EC), on the basis of all the country studies. This offers an integrated and prospective view on the future outlook for the Information Society in the Candidate Countries and can be found on the FISTE (Foresight in Information Society Technologies in Europe) website: http://fiste.jrc.es/

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A1. Background Data

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A2. Introduction

Despite smooth transition to a multi-party democracy (end-1989 – early 1990), the economic reforms in Bulgaria did not get underway until February 1991. Their purported objectives were rather typical in an East European context:

a) Financial stabilization, reduced inflation and control over the budget deficit;

b) Prompt privatization of state owned enterprises (SOE);

c) Fostering pro-market behavior among economic actors;

d) Effective and coherent public governance.[1]

However, the level of political support for meaningful economic changes was markedly different compared to Poland and the other Central European ex-communist countries. While in Poland the pro-reform program figured prominently in the agenda of the political and parliamentary forces, in Bulgaria no political party was willing to push for its implementation.

During the first eight years of Bulgaria's post-communist transformations the only relative success came in 1993 - 1994, when the government – in which some economic experts were co-opted – managed to negotiate with the so-called *London Club of Private Creditors* a reduction of the foreign debt by 47% (the foreign debt ballooned to 130% of the GDP at the beginning of transition in 1991). Only months later, however, this cabinet was forced to resign. The newcomers (*Bulgarian Socialist Party, BSP*) won an absolute majority in the Parliament. The backbone of their economic policy was to continue the subsidies for the loss-making public sector and to slow down reforms.

In 1995 and 1996 most of the state owned enterprises were producing losses (see table A3), with 2/3 of the total losses created by 60 enterprises with combined employment of 85,000. The government subsidized these companies through the budget and the banking system (which consisted mainly of state banks).

Table A1: Financials results at the state owned firms (% of balance sheet's assets)

Year	Industry	Construction	Transportation	Trade	Others
1992	-7.87	0.26	0.08	-1.62	0.00
1993	-12.74	-2.17	-6.99	-1.14	-4.96
1994	-4.89	-2.14	-3.28	0.43	5.37
1995	-4.24	-1.14	-5.23	-1.31	1.10
1996	-5.54	-1.18	-5.85	-1.78	-6.71
1997	2.89	0.99	3.43	2.30	2.50

Reference: Michael Berlemann, Kalin Hristov, Nikolay Nenovsky, *Lending of Last Resort, Moral Hazard and Twin Crises: Lessons from the Bulgarian Financial Crisis 1996/1997*, William Davidson Working Paper 464, 2002

This strategy proved to be unsustainable: by the end of 1996, the financial system of Bulgaria disintegrated, the economy was in a deep crisis and the monthly inflation skyrocketed to triple

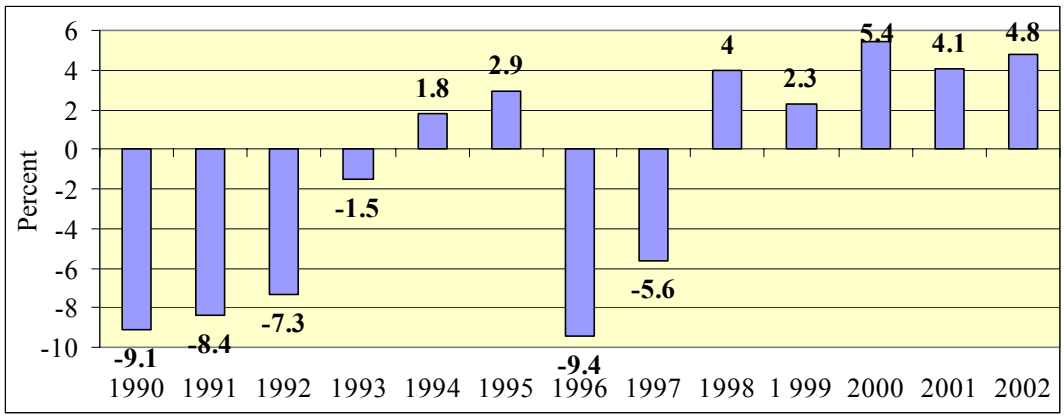
[1] See: Antonov, Ventzislav, Roumen Avramov (Eds.) *The year of the Iron Sheep: Bulgarian Economic Reform in 1991.* Sofia, Agency for Economic Programming and Development, 1992.

digit values (242% in February 1997 alone). In 1997 the *Union of Democratic Forces* won the elections and its government started the real reforms.[2]

A3. Economic Growth and Capital Flows

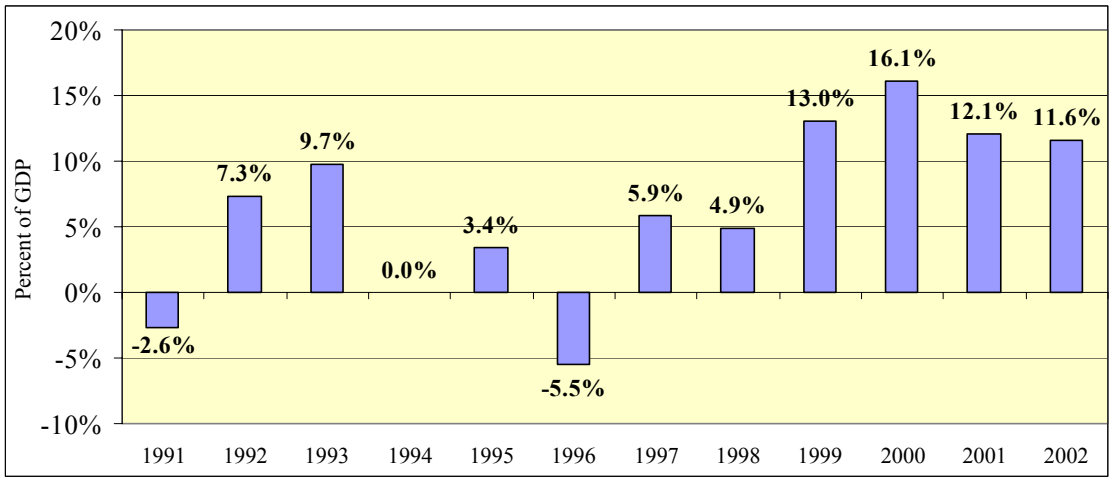
After 1989, Bulgaria faced a post-socialist recession. The GDP shrank by 32% from 1989 to 1997. The net inflow of foreign capital, measured by the financial account balance, was only EUR 83 million. (2% of GDP) on average for the years 1991 – 1996 and the investments were decreasing in most of the years until 1997. Those dynamics can be visualized by two steep recessions – the first one occurred in 1990 – 1993, when the initial liberalization of the economy took place, and the second one happened in 1996 – 1997, when the economy suffered a deep financial crisis combined with a hyperinflation shock.

Figure A1: Real GDP Growth (%)



Reference: National Statistical Institute

Figure A2: Financial Account



Reference: National Statistical Institute

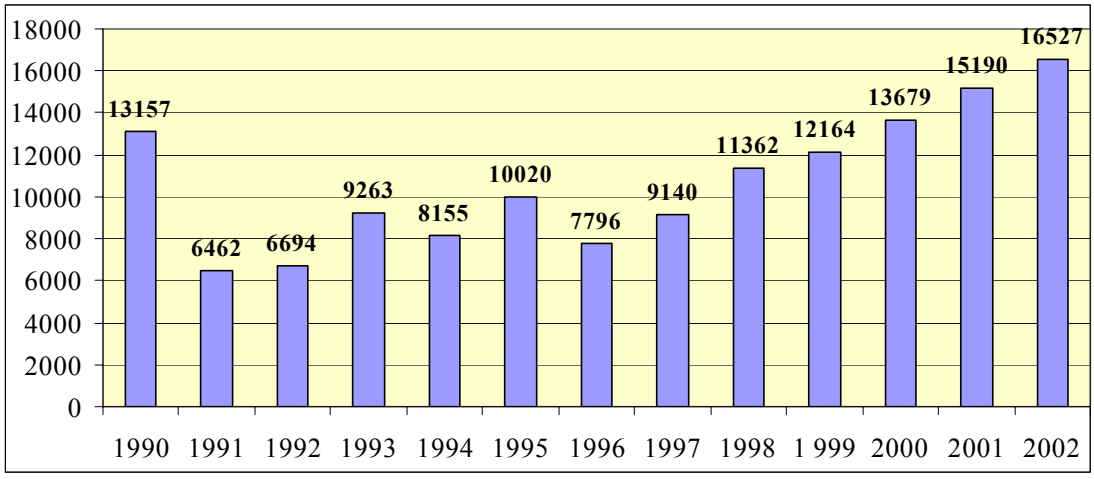
It is generally accepted that the reasons for the initial sharp contraction were the loss of the former COMECON markets and the large official foreign debt (plus 1990 default on the government debt repayments), restricting the overall investment capacity of the economy.

[2] The government of the *Union of Democratic Forces* was called "the most successful reformist government south-eastern Europe had seen" by the *Economist* magazine (November 22-28, 2003).

Indeed such causes may be relevant mainly for the period 1989 – 1993. In 1994 and 1995 the economy registered a modest growth – the first since the beginning of the transition. However, this growth was at the expense of a significant delay in restructuring of the real sector and other economic reforms, large budget deficits and increase of the bad loans to the state owned enterprises.

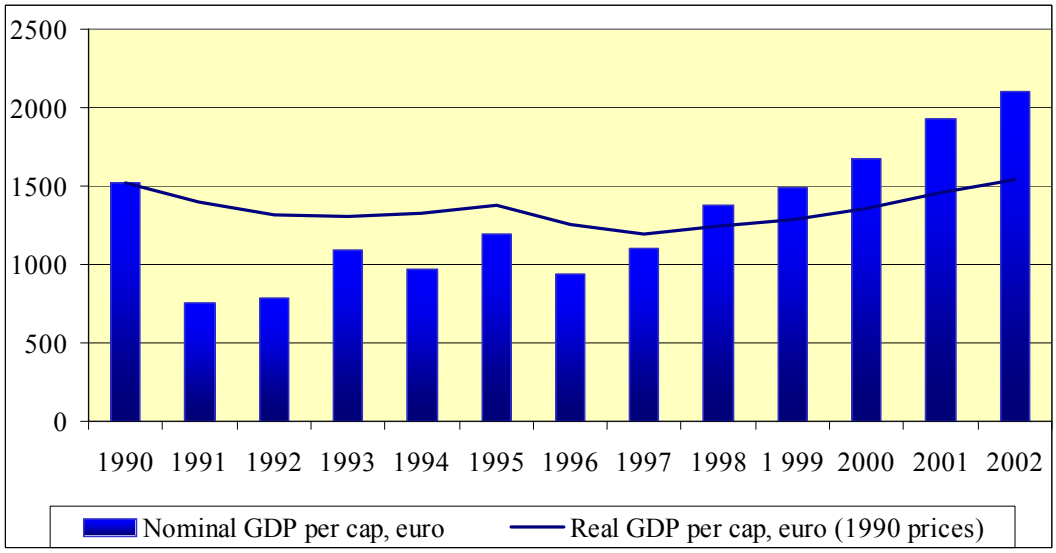
In 1996 the economy turned downward once again. The output declined by 10.1% in 1996, and in the first quarter of 1997 the contraction was as much as 22.7%. In 1998, following the introduction of the currency board and the start of structural reforms, the economy recovered at a growth rate of 3.5%. The net inflow of foreign capital increased to about EUR 1 300 million (10.6% of GDP) per year for the years 1997 – 2002. The investment started rising at a double-digit pace.

Figure A3: GDP (million EUR)



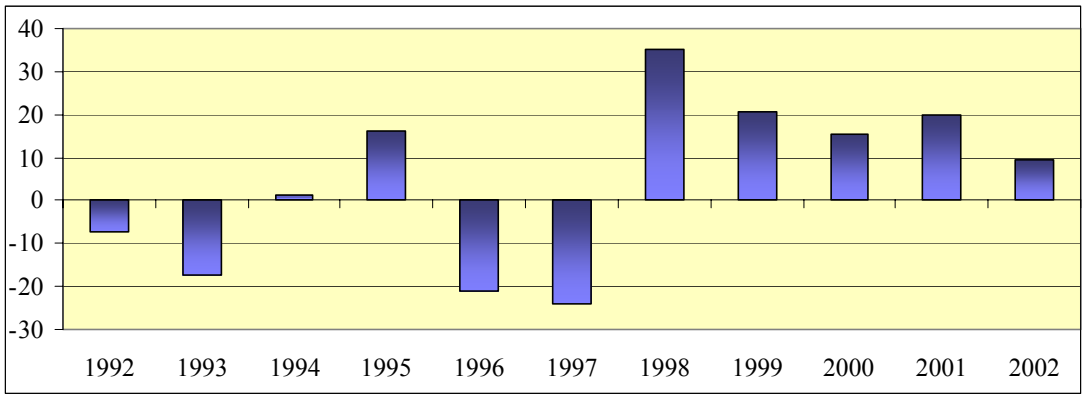
Reference: National Statistical Institute

Figure A4: Nominal GDP per capita, EUR



Reference: National Statistical Institute, and own calculations.

Figure A5: Growth of Investments (Gross Fixed Capital Formation)

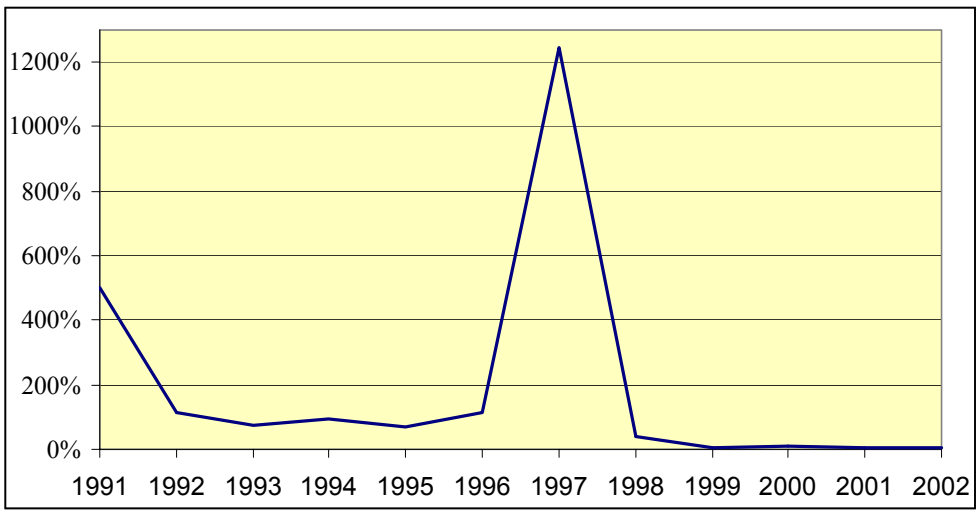


Reference: National Statistical Institute

A4. Monetary Policy and Banking Sector

Until 1997 the monetary policy was pro-inflationary and therefore the yearly inflation was over 317% on average from 1991 to 1997 with a peak recorded in 1997 when the yearly average inflation was 1247%. The government ran budget deficits and urged banks to lend bad loans to technically bankrupt state-owned enterprises (no privatization of banks occurred by that time; the state banks held more than ¾ of the assets of the banking system). The central bank was urged to refinance these loans, because otherwise the banks themselves would go bankrupt. The central bank also tried to stabilize the foreign exchange rate of the Bulgarian lev, which was inconsistent with the high rate of inflation so the foreign reserves of the bank were depleted.

Figure A6: Inflation (yearly average)



Reference: National Statistical Institute, and own calculations.

The central bank and government's policies were unsustainable - eventually the central bank had to stop refinancing the bad loans of the banks and as a result 1/3 of the banks was closed in 1996. In 1997 the Bulgarian lev was fixed to the EUR through the Currency board agreement and the inflation decreased rapidly to single digit rate. The state-owned banks were privatized and the banking system stabilized and started to grow.

A5. Trade

The first domestic trade liberalization happened in 1991. However after 1994 a lot of the price restrictions were reintroduced, because of the belief that this is the way to fight inflation and as a result of the lack of trust in the market. In 1997, a second liberalization program had to be implemented.

Table A2: Share of administered prices in CPI

1991	14%
1992	13.4%
1993	16.5%
1994	18.9%
1995	46%
1996	52 %
1997	14.4%
1998	15.8 %
1999	17.2%
2000	20%
2001	20.6%
2002	21.3%
2003	22%

Reference: EBRD Transition Report 2003, Ministry of Finance and Institute of Market Economics

A6. Privatization

The process of privatization started in 1993, but it was very slow. In 1996 only 7% of the state-owned assets (which is about 10% of all assets excluding the infrastructure) were in private hands. After the crisis of 1996-1997, the Privatization Agency, the ministries and the *Center for mass privatization* began a very fast sale of state assets. As a result the percent of privatized assets increased to 51% in 2000 (77% of all assets excluding the infrastructure). As of September 2003, 54.37% of all assets (82.33% of all assets excluding the infrastructure) were privatized. As a consequence, the share of the private sector in the gross value added increased to 72.7% of GDP.

Table A3: Privatization of state-owned assets

	1993	**1994**	**1995**	**1996**	**1997**	**1998**	**1999**	**2000**	**2001**	**2002**	**2003 ***
All assets	0.37%	1.63%	1.07%	4.09%	18.36%	4.48%	16.96%	4.43%	0.97%	1.16%	0.86%
Cumulative	0.37%	2.00%	3.07%	7.16%	25.52%	30.00%	46.96%	51.39%	52.36%	53.52%	**54.37%**
Excluding infrastructure	0.56%	2.47%	1.62%	6.19%	27.80%	6.78%	25.69%	6.70%	1.46%	1.76%	1.3%
Cumulative	0.56%	3.03%	4.65%	10.84%	38.64%	45.42%	71.11%	77.81%	79.27%	81.03%	**82.33%**

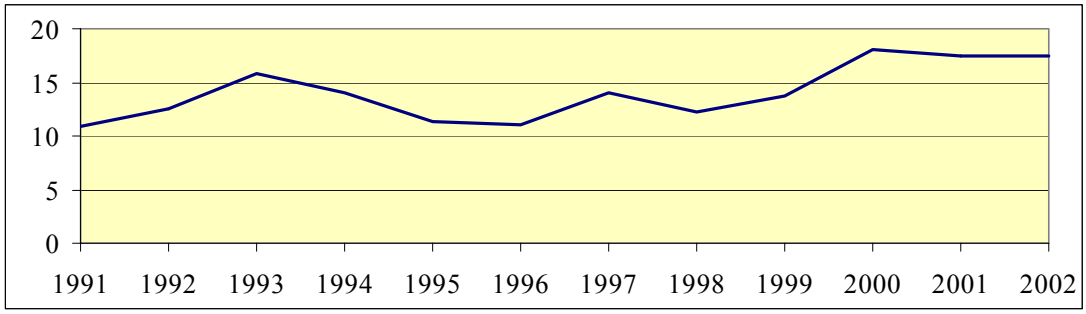
Note: * Until September 30;
Reference: Privatization Agency

For more data on share of private sector in the gross value added and economic sectors share in gross value added see figures A5 and A6 in the Annex.

A7. Labour Market

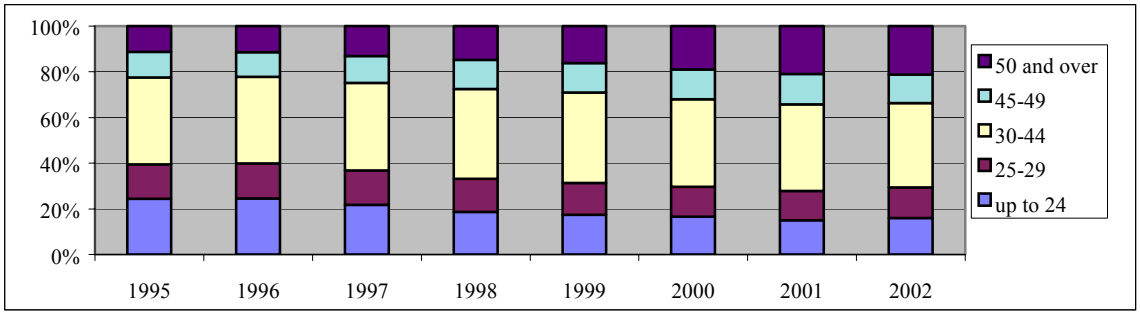
In the first half of the 1990ies the unemployment started rising with the start of the reforms in 1991. In 1995 and 1996, the unemployment was kept at the artificially low level of 11% at the price of heavy losses and large sums of bad loans to the state-owned enterprises, which lead to quasi-fiscal deficits and banking crisis. Because of the artificially high employment the productivity of labour was declining. After the second start of the reforms in 1997 the unemployment went to the market-determined levels; the highest rate recorded so far was 18.1% in 2000.

Figure A7: Unemployment



Reference: National Statistical Institute

Figure A8: Share of Different Age Groups Among the Unemployed



Reference: Employment Agency

For more information about unemployment by regions please see Figure A7 in the Annex.

A8. Foreign Direct Investment

The sum of the foreign direct investment was very small in the years 1992 – 1996. The cumulative foreign direct investments till 1996 amounted to EUR 617 million, which is EUR 123 million a year on average. The reason for this small investment flow was the slow pace of the reform process and the unattractive business environment. However, the situation changed dramatically since 1997: the yearly average FDI flow in 1997-2002 was EUR 730 million and the cumulative FDI reached EUR 4 997 million.

The privatization started to contribute to the foreign direct investments in 1993 and the cumulative effect of it is EUR 1 495 million, which is 136 million per year on average. Before 1997 the privatization was rather sporadic and after the year 2000 the process lost momentum.

The non-privatization FDI flow increased steadily except in 2002 when the amount decreased by 52% (in 2003 the FDI started rising again). The largest flow of non-privatization foreign

direct investments was in 2001 – EUR 885.8 million while the lowest - in 1992 – EUR 26.5 million.

Table A4: Foreign direct investment (millions of EUR)

Year	**1992**	**1993**	**1994**	**1995**	**1996**	**1997**	**1998**	**1999**	**2000**	**2001**	**2002 ***	**Total**
Privatization	0.0	18.8	112.8	19.9	60.2	371.6	139.0	212.7	396.1	21.4	143.3	1,495.7
Non-privatization	26.5	68.7	64.5	104.4	141.7	189.4	414.1	555.4	687.8	885.8	362.7	3,501.1
Total by years	26.5	87.6	177.2	124.3	201.9	561.0	553.1	768.1	1,083.9	907.3	506.0	4,996.8
Cumulative	26.5	114.1	291.3	415.6	617.5	1,178.5	1,731.6	2,499.7	3,583.6	4,490.8	4,996.8	

Note: * Preliminary;
Reference: Bulgarian Foreign Investment Agency

Since 1998, the largest share of FDIs went to the following sectors: financial activities (EUR 919.6 million, i.e. 22% of total investments), trade and repairs (EUR 523.7 million or 15% of total investments), petroleum, chemical, rubber and plastic products (EUR 369.4 million or 9% of total investments), mineral products (EUR 261.3 million or 8% of total investments), telecommunications (EUR 238.3 million or 7% of total investments), metallurgy (EUR 166.7 million or 4.5% of total investments), etc.

The foreign direct investment in 2000 reached 1 084 million EUR. That is a result mainly of increase of the FDI in the financial sector, because of the privatization of the largest bank, Bulbank, to the Italian bank Unicredito for 360 million EUR. Between 1997 and 2003 all state banks were privatized through tender to large international investors. In all cases the majority of the shares were sold to one or more strategic investors. At the end of 2003, 96% of the banking sector is in private hands (there are only two small non private banks – Municipal bank, owned by the Sofia municipality and Encouragement bank, owned by the Ministry of Economy). After organizational restructuring, which still continues, the banks are more capable of finding good projects to finance. The consequence is more lending to the economy (in the last one year the credits increased by 40%).

Table A5: Foreign Direct Investments by Sectors (millions of EUR)

No	Sector	1998	1999	2000	2001	2002	Total	Share
	Total	553	768	1084	965.1	506.1	3876.3	100.0%
1	**Financial activities**	56.9	112	480	127.9	143.4	919.64	23.7%
2	**Trade and repairs**	158	116	96.9	131.5	20.82	523.73	13.5%
3	**Petroleum, chemical, rubber and plastic products**	20.7	13.2	16.1	277.7	41.75	369.48	9.5%
4	**Mineral products (cement, glass, etc.)**	36.6	155	78	-10.6	2.326	261.3	6.7%
5	**Telecommunications**	134	67.4	8.01	30.92	-2.33	238.3	6.1%
6	**Metallurgy**	11.8	67.7	18.5	90.4	-21.7	166.74	4.3%
7	**Mechanical products**	19	16.9	70	14.73	33.3	153.94	4.0%
8	**Food products**	28.1	30.7	12.7	41.74	25.05	138.23	3.6%
9	**Wood products, paper**	3.93	23.5	29.5	64.4	6.025	127.44	3.3%
10	**Hotels and restaurants**	33.3	23.4	41.2	3.237	16.6	117.7	3.0%
11	**Textile and clothing**	23.9	38	22.5	19.98	5.708	110.1	2.8%
12	**Electrical eng., electronics, computers and communication equipment**	10.3	5.53	31	31.47	15.12	93.335	2.4%
13	**Construction**	0.09	13.8	3.03	25.22	42.28	84.416	2.2%
14	**Real estate and business activities**	0	0	20.2	2.679	61.42	84.333	2.2%
15	**Leather and leather products**	5.62	6.1	13.7	19.42	21.35	66.235	1.7%
16	**Electricity, gas and water**	0	0.19	0.32	13.17	11.1	24.781	0.6%
17	**Agriculture, forestry and fishing**	0.62	0	22.9	0.112	0.106	23.785	0.6%
18	**Publishing**	0	2.53	0	5.469	10.47	18.467	0.5%
19	**Transport**	5.53	-11	10.9	6.585	4.545	16.616	0.4%
20	**Mining**	0.09	2.25	7.68	0.558	0.317	10.9	0.3%
21	**Vehicles and other transport equipment**	-0.8	1.59	0	5.692	1.057	7.5409	0.2%
22	**Other**	4.91	83.3	101	62.83	67.34	319.25	8.2%

Reference: Bulgarian Foreign Investment Agency

The FDI in electrical engineering, electronics, computers and communication equipment are EUR 93.3 million (2.3% of total investments).

Obviously, the pure ICT-related FDIs constitute a small share of total investments. That is normal, because all other economic sectors are underdeveloped so they attract investments too. However, the FDI in all sectors include some part of ICT-related investments, because each sector uses ICT in order to be more productive and competitive. It is difficult to say exactly what part of the investment flow is ICT-related. Most of the managerial and logistic improvements can be attributed to modern technologies and are unachievable without them. Part of the increased productivity of labour is also connected with these technologies. As reported in the press, in 2000-2003, the top five privatized banks invested EUR 100 million in computer and software update; the electronics greenfield investment in 2002 were at least EUR 10 million, while that in software was about 30 million.

A9. Economic and Business Climate Overview

The nominal GDP in 2002 was 16.5 billion EUR. As the population of Bulgaria in 2002 was 7.85 million people, the nominal GDP per capita was 4,120 leva (2,107 EUR). By 2003 the government debt as a share of GDP decreased to about 50% of GDP and the rating agencies increased the credit rating of the Bulgarian government several times. At the moment the long-term foreign currency credit rating of the Bulgarian government is BB+ (Fitch), Ba2 (Moody's), BB (Standard & Poor's), BBB- (Japan Credit Rating Agency). Bulgaria is a member of WTO, CEFTA and has free trade agreements with the European Union, EFTA, Albania, Croatia, Estonia, Israel, Latvia, Lithuania, Macedonia, and Turkey. As a result international trade (import plus export of goods and services) reached 124.9% of GDP, which means that the economy is relatively open.

Table A6: Contract Enforcement

Indicator	Bulgaria	Regional Average	OECD Average
Number of procedures	26	25	17
Duration (days)	410	344	233
Cost (% GNI per capita)	6.4	27.9	7.1

Reference: World Bank, http://rru.worldbank.org/doingbusiness

The contract enforcement in Bulgaria is slow. It takes 410 days to resolve a dispute, which is much longer than the regional and OECD average.

A 9.1.Taxation

The tax reforms between 1997 and 2002 decreased the corporate tax rate almost two fold to 23.5%.[3] The top marginal income tax rate was cut to 29%. The value-added tax was decreased from 22% to 20% in 2000.

Table A7: Income tax (2003)

Annual taxable income	Tax rates
Up to 1320 levs	-
1320 - 1800	15% for the amount above 1320 levs
1800 - 3000	72 levs + 22% for the amount above 1800
3000 - 7200	336 levs + 26% for the amount above 3000
More than 7200	1428 levs + 29% for the amount above 7200

Reference: Personal Income Tax Law

The social security (payroll) taxes are 42.7% of gross wage in total. They are applicable for monthly income up to 1,000 leva (510.2 EUR) in 2003. The employer's part of the taxes is 75% and the employee's part is 25%.[4] The social security taxes for the self-employed are 35% (they apply for income up to 1,000 leva in 2003).

The combined social security and income tax burden on the average wage is 41%[5] (the take-home pay of the employee is 59% of the employer's labour expenditures so 41% of the employer's labour expenditures go to the state budget). The top marginal income and payroll tax rate is 53%.[6]

[3] Corporate Income Tax Law.
[4] Social Security Code
[5] IME calculation.
[6] James Gwartney and Robert Lawson, Economic Freedom of the World: 2003 Annual Report, Fraser Institute, Canada.

Table A8: Social Security Taxes

Pension	29
Ordinary illness and motherhood	3
Occupational hazard and professional disease	0.7
Unemployment	4
Health	6
Total	42.7

Reference: Law on the 2003 Budget of the State Social Security

A 9.2 Regulation of Entry

Starting a business is a relatively costly undertaking because of the existence of different regulatory requirements. The process of company registration in Bulgaria is slow and expensive. It costs more than EUR 300 to register a limited liability company and more than EUR 1000 for joint stock company registration. For a number of activities the company (or the sole proprietor) needs licenses and/or permits and to receive them it must present many documents, pay various fees and wait (sometimes without certainty that the license will be granted). In 2002 there were 361 regulatory regimes[7] in Bulgaria (licenses, permits and other types of administrative entry barriers), but the Ministry of Economy announced that it would try to remove 73 and ease 118 of them (the progress is not very fast, however). In 2003 the Parliament passed the Law on Reducing the Administrative Regulation and the Administrative Control over the Economic Activity, which defines the limits of the regulatory intervention, the way the state can regulate the economic activity and the obligatory procedures for obtaining permits, rejection and appeal of the decision.

[7] According to the Interdepartmental Task Force on Counting, Assessing and Reducing the Regulatory Regimes, established by the Minister of Economy in 2002.

Table A9: Expenditures on registration of new business, 2003 (in EUR)

	Sole proprietor	Joint Company	Limited liability company	Joint stock company
Lawyer's fee	25.51	35.71	51.02	127.55
Obtain pre-approval of name	25.51	25.51	25.51	40.82
Notarize documents	-	25.51	25.51	25.51
Deposit paid-up capital in a bank	-	-	15.31	15.31
Court fee	51.02	102.04	127.55	765.31
Publish in the State Gazette	-	-	11.48	22.96
Other fees	2.55	2.55	2.55	2.55
BULSTAT	12.76	30.61	30.61	61.22
Fee for representative making registrations	15.31	15.31	15.31	15.31
TOTAL	**132.65**	**237.24**	**304.85**	**1076.53**

Reference: IME calculations.

A 9.3 Price Regulations

Generally, the prices in Bulgaria are determined by the market and thus by the voluntary contract between the individuals. However, certain prices are still fixed by the government, namely the prices of phone and postal services, cigarettes, medicines, water supply, electricity and central heating. Cumulatively, the weight of the government-controlled prices in the consumer basket is 21%.[8]

A 9.4 Exit regulations – Bankruptcy and Subsidies

According to the World Bank's *Doing Business Database* Bulgaria is on the 63rd place among the 108 countries for which data for bankruptcy is collected – the overall *Goals-of-insolvency* index for Bulgaria is 49 (the highest possible index is 100). The bankruptcy requires long time to be finished (3.8 years on average) and is expensive (it costs 18% of the estate). However, recently some changes in the Commercial Law were made, which are expected to improve the speed, effectiveness and efficiency of the bankruptcy process.

The subsidies for loss-making businesses are another exit regulation – when such subsidies exist the resources stay in low productive sectors and thus they are not used efficiently. The subsidies in Bulgaria amounted to 2.4% of GDP in 2002.

Table A10: Bankruptcy (2002)

Time (years)	3.8
Cost (% of estate)	18
Goals-of-insolvency index	49

Reference: World Bank, http://rru.worldbank.org/doingbusiness

[8] Ministry of Finance, Report on the Implementation of 2002 Government Budget.

Table A11: Budget Expenditures and Subsidies

Year	1998	1999	2000	2001	2002
Budget Expenditures (% of GDP)	38.4	40.6	42	40,4	39,4
Subsidies (% of GDP)	2,1	1,7	1,2	2,4	2,4

Reference: Ministry of Finance

A 9.4 Labour market regulations

The labour market in Bulgaria is regulated to a considerable degree. According to the World Bank the overall level of the regulation of labour in Bulgaria is higher than the OECD-average level. As a consequence the flexibility of the labour market in Bulgaria is lower than Hong Kong, (the global leader with the most flexible labour market) and Czech Republic (the regional leader with the most flexible labour market). However, the level of the regulation of labour in Bulgaria is lower than the regional average.

Table A12: Labour Regulations in Bulgaria (2002)

Labour Regulation Variables	Indicator
Flexibility of Hiring Index	32
Conditions of Employment Index	89
Flexibility of Firing Index	31
Employment Laws Index	51

Reference: World Bank, http://rru.worldbank.org/doingbusiness

A10 Current Status of the Economy

1. Increasing private sector. The share of the gross value added produced by the private sector of the economy is steadily increasing since the beginning of the transition reaching 72.7% in 2002. As the private sector is more flexible and competitive than the public sector this development is favorable to the economic dynamics.
2. Macroeconomic stability. The introduction of the currency board in 1997 established a simple and automatic monetary system that lead to stable exchange rate of the Bulgarian leva to the EUR. The monetary base is backed with foreign currency reserves, which are increasing. The resulting low inflation rate is favorable for the longer-term economic planning made by the private economic agents.
3. Budget prudence. The low budget deficits, financed by privatization revenues, made it possible for the government to avoid the issuance of additional public debt and to constantly increase the amount of the fiscal reserves. Because of the economic growth the government and government guaranteed debt decreased to less than 60% of GDP in the middle of 2003. This development increased the credibility of the Bulgarian government and lead to a higher credit rating. Thus the access to foreign capital was eased.
4. Open economy. Because of the free trade agreements with EU, neighboring countries, CEFTA, and other countries import tariffs are lower and the foreign trade is freer. The foreign trade sector of the economy (the sum of the exports and imports of goods and services) is 112.8% of GDP in 2002 and 118.4% of GDP in the first quarter of 2003. This high openness of the economy is beneficial to the economic development since it allows a further specialization of the local economy in sectors where comparative advantages exist.
5. Expanding investments. The gross fixed capital formation is increasing reaching 18.1% of GDP in 2002. This rise of investments is stimulating the modernization of the productive

assets of the companies thus fostering the productivity growth and lowering the resource intensity of the production. As a result the companies are becoming more competitive, and rise of the productivity of labour allows an increased compensation of labour not hampering the economic prospects.

6. Private banking sector. After the privatization of the government-owned banks the banking sector is completely private (however there is a Municipal bank and a very small Encouragement Bank, owned by the Ministry of Economy). The private ownership of banks and the smaller government interference in the sector were necessary conditions for efficient allocation of resources since in the past state-owned banks tended to grant bad loans to state-owned enterprises. The privatized banks increased the competition in the sector, the diversity of the offered services and the expertise of the personnel. This progress increases the access of the companies to credit and in this way enhances the economic growth.
7. Low labour costs. The relatively lower wages are a result of the low capital to labour ratio. Because of this low ratio, other things being equal, the return on the invested capital in Bulgarian economy should be higher than the other economies thus attracting more foreign and local capital. However, the other things are never equal so this principle holds only partially.
8. High regulatory burden. The burden of regulations, permits and licensing regimes over the private sector is a large impediment to the economic growth. Starting, operating and liquidating business is quite slow and expensive activity and the result of that is slower than possible dynamics of the resources between the rising and declining sectors. The total cost of regulatory burden is around 12% of GDP per annum. Furthermore, the highly regulated (and because of that – rigid) labour market prevents or slows down the flow of workers from the uncompetitive and dying companies to the competitive and efficient companies and activities.
9. High tax burden. The taxation of labour remains high at the level of about 41% (estimated on the basis of the average salary) thus creating a huge tax wedge (the labour costs of the employer minus the take-home pay of the employee). This tax wedge creates stimuli for tax avoidance and increasing of gray economy. It also reduces the incentives for work and lowers the disposable income of the households.
10. The taxation of the middle class is also very high. The direct and indirect taxes, social security contributions, excises, duties and fees that a Bulgarian worker on a free-lance basis or as sole proprietor must pay are about 60% of its income (the calculation is made on the basis of a monthly income of 1,000 leva). The high taxation hampers the entrepreneurship and thus the economic growth.
11. Ineffective judicial system. The slow process of the judicial settlement of disputes increases the transaction costs of doing business and makes the business environment more uncertain. The court system also does not protect to a sufficient extent the property rights of the owners and in this way increases the political risk of doing business in Bulgaria.
12. Subsidies and protectionist measures. The money granted from the budget as subsidies is more than two percent of GDP (2.4% of GDP in 2001 and 2002). These funds distort the efficient allocation of resources in the economy creating incentives for keeping capital and labour in the loss-generating sectors and companies. Moreover, these funds are seized through the taxes from the productive parts of the economy thus establishing disincentives for the investments in these sectors. The results of the protectionist measures are basically the same as subsidies with the addition that they prevent the intensification of the economic integration of Bulgaria in the international division of labour.

13. High redistribution through the budget. The expenses of the consolidated government budget are more than 40 per cent of GDP on average for the last five years. The result is that forty per cent of the economic decisions are taken by some centralized bodies creating in this way strong stimuli for corruption. The distribution of the money is also quite inefficient when made centrally so it also distorts the efficient allocation of resources in the economy.
14. Criminal situation. As in the other post-socialist countries the police (and criminal justice system as a whole) in Bulgaria is not as effective and efficient as the same systems in the developed countries. This is an additional risky factor when the investors decide whether to invest in Bulgaria or not, so it is an anti growth factor.
15. Because of the above-mentioned factors after 1997 the economy grows moderately and in 2002 the GDP per capita reached only 93 per cent of its 1989 level. If we include also some measure of the so-called "shadow" or "gray" economy (estimated to more than 30 per cent of GDP), the GDP per capita is well above the 1989 level. However, there are many possibilities for improvement in the economic performance if some of the negative factors are reduced or entirely removed.

SWOT Analysis of the Economy

Strengths	Weaknesses
✓ Dominant private sector ✓ Macroeconomic stability ✓ Currency board: stable money and exchange rate to the EUR ✓ Rising investments ✓ Privatized banking sector ✓ Robust growth of productivity ✓ Openness of the economy ✓ Decreased state debt ✓ Close to balanced government budget	✓ High regulatory burden ✓ High social security taxes ✓ Slow and ineffective judicial system ✓ High redistribution through the budget ✓ Subsidies to loss making industries ✓ Over-regulated labour market evolving towards rigidity
Opportunities	**Threats**
✓ Deregulation ✓ Privatization ✓ Liberalization ✓ Tax reductions ✓ European Union membership ✓ Creating better business environment ✓ Achieving and sustaining higher (than EU average) growth rates	✓ Possible political discontinuity of the reforms ✓ The pay-as-you-go pension system deficit ✓ Frequent changes in legislation ✓ Unreformed public healthcare and school system ✓ High rise of the state spending ✓ Preferential treatment of some sectors

B. NATIONAL AND REGIONAL INFORMATION SOCIETY POLICIES

B1. Introduction

In the years before 1989, Bulgaria used to have a peculiar place within the so-called "socialist division of labour" in the former COMECON: computers, software and other IT productsDue to various bans on import of newly developed computer technologies from the West, the Soviet block had to either spend resources on research on its own, or to violate the bans and "borrow" technologies that it deemed necessary. In fact, COMECON countries relied on a combination of both methods. Bulgaria was designated a special role to develop microcomputers for use within the entire COMECON. The government invested heavily in research centers and machinery in order to enable microchips and computer production during the late 1970-ies and the 1980-ies. Universities were directed to educate more computer engineers. At the same time, the government established numerous phantom companies in Western countries, which had to deliver those technologies that could not be developed within COMECON. Naturally, as these companies violated the bans on technology export they had to be supported and managed by state security officers; and they required above than usual financing.

The outcome of these strategies was that in the 1980-ies Bulgarian microelectronics and computer industries had the capacity to produce for the entire Soviet block with up-to-date technology. It also meant that a significant number of engineers and software specialists were trained. As a side effect, the central planners started to invest national resources in industries that were technology-dependent (such as specialized transport and industry machinery); after the liberalization of the economy, which coincided with dismantlement of the COMECON, many of these proved to be malinvestments.

The collapse of socialism revealed the "true" – market – value of the huge investment in high tech industries. When bans on technology exports to Eastern Europe were lifted, it appeared that Bulgarian-made computers were worse and more expensive than their rival equivalents. The same held true for the specialized machinery, e.g. fork lifters, which production after 1991 shrank by 50 times.

B2. Chronological description all national and regional IS polices

B 2.1 The period before 1998

In short, there were no specialized government IS policies developed or implemented prior to 1998. The reasons for this are two:

1. The transition from a planned economy to a market one was uneven and marked with political turmoil. From 1990 until 1997 the country had seven governments; market reforms were delayed and in some cases even reversed during the socialist cabinet of 1995-1996. The result was constant macroeconomic instability marked with high inflation, bank bankruptcies and exchange rate fluctuations. In such environment each and every government's priorities followed the immediate problems of economic stabilization and initial market reforms and left behind any commitment to IS development.
2. Most of the so-called "high-tech" activities were managed by the state security services; financing was to a great extent not transparent with few party officials involved who actually knew the status of projects. When the collapse of the old

regime started, these "insiders" had an immense opportunity to siphon funds for their own private advancement. Many of the "new rich" in the transition period received start-up capital from the siphoning of high-tech state funds or R&D organizations. It was therefore politically impossible to gain support for specialized government spending on the very same companies and projects that were commonly believed to have seized public funds in the beginning of the transition.

Development of IST however was not absent from political rhetoric. All major political players included as part of their program documents commitments to revive the long-and-strong Bulgarian tradition in high tech industries. Since such tradition was never tested in competitive market environment, no implementation document or detailed action plan ever materialized.

The government policies in this period were restricted to the maintenance of two specialized state funds:

- The National Science Fund. It was established by Decree 83/1990 of the Council of Ministers, as a separate legal entity with budget funding. The early years of the existence were marked by institutional financing to so-called scientific organizations, most being heirs of socialist era state monopoly research institutes. In fact the operation of the Fund meant that these organizations were sustained. After 1998 The National Science Fund became a self-governing agency of Ministry of Education and Science. It moved from institutional financing to project financing.
- National Fund "Structural and Technology Policy". It was established by the Council of Ministers with the adoption of the implementation rules of the Decree 56 on the Economic Activity of 1989. It was designed as an instrument of government financing to state-owned enterprises, which invested in a certain range of technologies (e.g. technologies to reduce air and water pollution in heavy industries). Prior to 1995 the Fund was managed by the Ministry of Industry, then it was allocated within the Ministry of Education and Science, and it started moving from indirect (institutional) financing of enterprises to project based funding. In 1998 the Fund was closed. Whereas similar activities were maintained by the Ministry administration.

Table B1: Financing through state funds for science and technology policy

Year	National Scientific Research Fund (in mln ECU)	National Fund "Structural and Technology Policy" (in mln ECU)
1992	1,767	2,900
1993	2,553	3,223
1994	2,327	n.a.
1995	2,609	1,821
1996	1,369	1,372
1997	0,358	0,358
1998	0,438	0,439
1999*	0,295	
2000*	0,217	
2001*	0,149	

Reference: Ministry of Finance

Note: * Included in the budget of the Ministry of Education and Science.

B 2.2 The period 1998-2002

The National Strategy for Development of High Technologies.
The strategy was the first document after 1989 that was primarily directed towards IST. The Ministry of Industry with the help of experts from the Center for Economic Development (a non-government research institute) drafted it in 1998-1998. The strategy was adopted by the Council of Ministers in December 1999.
The goal of the strategy was to foster the development of a high tech industry sector in Bulgaria. It was not dealing with the facilitation of technology use in all sectors of the economy.
The document set several priorities for technological development:

- Information technologies
- Telecommunications and communications equipment
- Microelectronics and micro-mechanics
- New materials and components
- Energy generation and energy efficiency
- Automatization and robotics
- Electronic and medical equipment
- Biotechnologies, pharmaceutics, precise chemistry
- Genetic engineering in agricultural products
- Medicine
- Environmental and pollution control.

The areas of government participation in fostering high-tech activities were mainly three:

- Overall conditions – fiscal policy, foreign trade policy, corporate governance, infrastructure, competition policies
- Modernization of the scientific base of the country – through reforms in education, new financing schemes for research
- Transfer factors – facilitation of clustering between companies and academia, facilitation of participation in international programs, etc.

The cornerstone of the strategy was the concept for the establishment of High Technology Parks (HTP). The design of the HTP was the following: separate zones, including land, buildings and infrastructure, and other assets managed by a legal entity with the goal of creating favorable environment for high-tech activity. The space of the HTP would ideally attract joint efforts of scientific research institute, universities, private companies and investors for development and market realization of high technologies.

The concept also provided for special tax treatment of HTP, i.e. the replacement of the profit tax with a tax on gross sales revenues and exemption of real estate taxes on land and buildings within the HTP.

Another specialized instrument were the establishment of two types of funds within each HTP: “Projects” and “Investments” which would have to be financed by park members and would have to support high tech activities and business start-ups.

The strategy also envisaged that the HTP would be the main channel for directing public funds to high tech research and production. The financing would have to be dispersed by both the Ministry of Education and Science and the Ministry of Industry.

The implementation of the Strategy required legislative changes, which were drafted as a special Law on HTP. The draft law was rejected by the Parliament; none of the goals of the Strategy was achieved.

National Strategy for the Development of IS

The Strategy was adopted by the Council of Ministers in October 1999. It is the main document that shapes Bulgarian government's policy and institutional coordination directed at the development of IS.

The document sets the main principles of the IS and the major objectives that the government of Bulgaria will have to achieve.

The goals and priorities include:

1. Development of overall legal framework, rules and procedures, harmonized with EU ones, that allow the functioning of the IS;
2. Ensuring equal access to quality communication and information services;
3. Wide use of ICT in all spheres of social life;

The strategy stated the following sources of financing that would cover the cost of the strategy activities:

- Private and public sector investments;
- Municipal funds;
- International programs financing;
- Funds that are dedicated by specialized legislation towards IS activities (such as redirection of share of privatization proceeds or corporate income tax revenues)

1. The main areas of legislative changes that were foreseen by the strategy were:

- Access to information
- Telecommunications
- Electronic media
- Development of Internet as a global communication environment
- Services of the IS
- Electronic trade
- Data security and personal data protection
- Protection of intellectual property
- Computer crimes

2. The main areas for improvement of communication infrastructure included

- Deregulation of the telecommunications market
- Development of universal communication service

- Internet penetration facilitation

3. The strategy also envisaged the priorities for wider use of ICT into all areas of social life, including:

- Government. The main priorities included the establishment of uniform information and communication environment for all government institutions, introduction of cadastre information system, introduction of ICT's in the defense and security institutions and courts.
- Economy. The main priorities included the introduction of ICT in SMEs, as well as in banking, transport, energy and agricultural sectors, and facilitating the development of electronic commerce.
- Education and scientific research. The priorities included provision of education on ICT's application for all, personalized and ongoing training, new type of development of scientific research, access to global information networks and libraries.
- Social life and culture. The priorities included the introduction of ICT's in labour market institutions, social safety nets, healthcare and culture, as well as in electronic media.

The strategy is the foundation of the **National Program for the Development of IS**. The program was first adopted in October 1999 together with the strategy and was later revised in 2001. The program serves as a work plan for the implementation of the strategy. It assigns responsibilities to different government institutions for legal change and reform of activity.

As part of the National Program, in June 2000 the government adopted **National Strategy for Electronic Commerce**. The goal of the document is to allow the country to participate in the global e-commerce transactions and to be an *e-commerce* leader of South East Europe. The strategy outlined the major legal changes that were necessary for the achievement of the goal and the respective sources of expertise and financing.

Strategy for Electronic Government

This strategy was adopted by the government in December 2002. The main objective is to organize and support at the highest government level a long-term process of e-government implementation.

The strategy outlines the nature of e-government and its significance for the whole society; identifies the strategic goals of e-government, as well as the organization and management of the related processes.

This document has been drawn up as a major element of the overall reform of the Bulgarian public administration including the regional and municipal administrations.

The strategy was developed after the government declared the role of e-government: to meet the general public needs for high-quality and accessible public services; to increase the transparency and minimize the corruption practices in the state administration.
The e-government is also expected to meet the following needs:

- Cut expenditures and enhance government efficiency;
- Meet expectations of citizens and improve interaction environment;
- Improve business climate.

The strategy is based upon the following **vision** for the e-government in Bulgaria:

> *"The Government of the Republic of Bulgaria will provide modern and efficient governance, while using the means of contemporary information technologies in order to meet the real needs of citizens and businesses at any time and any place."*

The strategic objectives set down in the strategies were:

- To provide, through electronic means, high-quality, efficient and accessible public services to citizens and business;
- To expand the technological capabilities of citizens and businesses for participation in the government decision-making process;
- To form organizational, communication and information environment for effective and transparent functioning of the public administration in accordance with the principles, standards and best practices of the European Union.

The implementation of the Strategy would require the elaboration of the following supporting documents:

- National Program for Implementation of E-government in the Republic of Bulgaria.
- Action Plan for the Implementation of the Strategy
- Terms of reference for the development of a Management Information System for the management of the process of development of E-government
- Project Management Methodology (national, interdepartmental and institutional);
- Methodology for the Management of Procurement and Services Contracts;
- Information Security Policy;
- Rules and Procedures for Interdepartmental Information Exchange;
- and Requirements for Information Systems in the Public Architectures Administration

As Indicators for Evaluation of the development of E-Government, the Strategy will use the ones that the European Commission has adopted –12 for citizens and 8 for business.

Public Administrative Services Provided to Citizens

1. Personal income tax: tax returns, notices
2. Job search services at employment offices
3. Social security, Unemployment benefits, Child allowances, Health costs, Scholarships**.**
4. Personal documents (identity cards, passports, driving licenses)
5. Vehicle registration (new, second-hand and imported vehicles)
6. Applications for construction permits
7. Reports to the police (e.g. in case of theft)
8. Public libraries (catalogues, search machines)
9. Certificates (birth, marriage, etc.)
10. Secondary and higher education diplomas
11. Address changes
12. Health-related services (interactive advice on the availability of specific types of services at various hospitals, appointments)

Public Administrative Services Provided to Businesses:

1. Social security for the employees
2. Corporate income taxes: tax returns, notices
3. VAT: tax returns, notices
4. Registration of start-ups
5. Sending of data to the statistical office
6. Customs declarations
7. Environment-related permits (including reporting)
8. Public procurement

The progress of development of those services will be evaluated on the basis of the following four stages:

- Providing on-line public service information.
- One-way interaction – downloading forms form the Internet.
- Two-way interaction – Completing and submitting forms, incl. identification of the person.
- Transactions – executing events, decisions, deliveries and payments.

The financing of the E-Government Strategy is planned to be BGN 115 million (EUR 59 million) for 2004 and 2005. The financing will be provided by the government budget.

In September 2003 the government launched as pilot projects the following e-services for citizens:

- change of permanent address registration;
- inquiries on registration materials of business entities;
- inquiries in the NSSI database on the status of social security obligations due by the employers

The use of this service requires that the user have a certified universal electronic signature. There are two active providers of e-signature certification; the fees are app. EUR 70 per annum for individuals and EUR 155 per annum for legal entities.

B3. The driving motivations of IS policies

In early 1990-ies almost all forms of government projects for financing were used as source of starting capital for politically connected entrepreneurs. As mentioned above, this motivation undermined broad public support for any type of sectoral policy, including initiatives related to the IS. Not a single policy document was elaborated during these years.
The period after 1998 was marked with high level of political and macroeconomic stability. In fact, the UDF government of 1997-2001 was the first government to complete its 4-year term; followed by a relatively quiet and smooth change of power to the NDSV government in June 2001. The cornerstone of the stability was a set of macroeconomic commitments: the fixed exchange rate under a currency board, the absence of monetary policy, the absence of central bank financing of budget deficits, strict barriers to entry on financial markets, neutral tax policy; elimination of direct subsidies to real sector.

B4. Some preliminary conclusion on policy and institutional matters

Politics, expectations and motivations

A change in policy like this inevitably resulted in two outcomes:

- First, the overall stability brought balanced or even surplus government budgets. With some excess funds available, governments could invent new ways of spending.
- Second, the obvious positive outcomes of the macroeconomic stabilization through the measures described above made it impossible for different pressure groups to demand government support for traditional economic sectors.

The effect was that the only area "open" for government initiatives and active policies was the IS development. Moreover, traditional economic understanding of "market failures" points out that scientific research and technological development are a valid realm of state intervention due to market imperfections.

Hence, the motivations behind the policy documents described above can be sorted into the following categories:

- Need for activism on behalf of government to show "concern" with economic development and administrative reform;
- The aspirations of certain interest groups to gain special privilege; this explains the preoccupation of various documents and public forums with the special legal treatment of High Tech Parks.

Apart from the domestic motivations an important driving force has been the international policy of Bulgaria. Accession to the EU has been a major political goal of all governments; the ones after 1997 particularly. EU integration has become a process of crucial importance for all initiatives related to development of IS framework and services.

EU policies shape domestic policies towards IS development in two ways:

- Bulgaria has to harmonize its legal framework including IS enhancing regulations to meet EU requirements, mostly in the deregulation of telecommunications;
- EU is providing financial support to various initiatives supporting the IS development.

B5. The institutional setting behind the policies: general overview

Taking into account the motivation characteristics behind the strategic documents discussed above, typical institutional settings behind IS policies would involve:

1. **Establishment of specialized unit within the administration**. The National Strategy for IS Development was drafted by a Coordination Center on the Problems of the IS; the E-Government Strategy was drafted by the Coordination Center for Information, Communication and Management Technologies. Both units are established as part of the central government administration, the first in 1998, and the latter in 2002.
2. **Active participation of NGOs**. The National Strategy for High Tech Developments was drafted formally by the Ministry of Industry, but with strong expert participation of the Center for Economic Development. The legislation for the introduction of electronic documents and electronic signature was developed with the extensive involvement of legal experts from the Center for the Study of Democracy.

3. **Financing from international donors.** NGO expert activities were almost entirely funded by donor programs of US AID, UNDP and EU. Moreover, the above-mentioned programs provide technical equipment and other financing to the governmental agencies assigned with the task of coordinating and fostering IS activities.

B 5.1 Institutional setting behind the policies: major government structures that are responsible for IS Development

Coordination Center for Information, Communication and Management Technologies at the Council of Ministers was established in 2002.

The goals of the Coordination Center for Information, Communication and Management Technologies are as follows:

- To improve the effectiveness of the state administration through a systematic and coordinated implementation of information, communication and management technologies and introduction of e-Government services
- To increase the efficiency of budget and donor funds invested in information, communication and management technologies in the public sector and to attract new investment
- To establish effective partnerships with the private sector for the implementation of e-Government projects and to encourage the overall progress of technology and enable improved business and social environment.

The above-mentioned goals are to be attained through:

- Coordination of ICMT sector issues of Ministries and other government agencies- strategies, programs, projects, administration, management, environment, etc;
- Coordination with the donors community of ICT initiatives- projects, current and planned activities in the sector
- Coordination and operation as a focal point for the private sector ICT companies and NGOs
- Policy and strategy recommendations on ICMT issues to the government and synergy with institutionalized policy makers in the ICT sector

The Coordination Center developed (and is currently coordinating) the Strategy for Electronic Government in 2002.

Coordination Council on Information Society Problems at the Council of Ministers, established in 1998. The Coordination Council's main role is to assist the Council of Ministers in determining the national information policy. In order to do so, it engages in the following activities:

- develops and submits for adoption by the Council of Ministers the strategy and the national program for development of the Information Society in the Republic of Bulgaria;
- organizes, coordinates and supervises the activities and measures undertaken by the state bodies and organizations with respect to the issues of the Information Society;
- analyses the information on the state and trends of development of the Information Society at international and national level;

- submits to the Council of Ministers projects for amendment of normative acts in connection with the international obligations of the country related to the Information Society;
- gives opinions on draft-laws related to the Information Society;
- proposes to the Council of Ministers the state bodies that are to represent the Republic of Bulgaria in the special committees and working groups on matters related to the Information Society;
- coordinates and organizes the participation of the Republic of Bulgaria on matters of the Information Society, as well as in joint activities in this sphere;
- coordinates the activity on collecting and provision of information related to the creation of the Information Society;

The Coordination Centre developed (and currently monitors the implementation of) the National Strategy for the Development of IS.

Communications Regulation Commission.
It is an independent regulatory body that has the goal to implement the Law on Telecommunications.

Personal Data Protection Commission
Established under the Personal Data Protection Act to enforce and monitor the requirements of the law

Ministry of Transport and Communications.
The ministry is responsible for the overall government policy of commutations' regulation. There is a specific ministerial agency that was established primarily to foster the development of ICT, namely the Information and Communication Technologies Development Agency.

Ministry of Education and Science

- The ministry is responsible for the introduction of ICT in public schools;
- Finances scientific research through the National Science Fund

B 5.2 The institutional setting behind the policies: the role of the NGOs

The constellation of political motivations described above established a special role for Bulgarian NGOs. Among the numerous NGOs involved in IS development initiatives, the following three played an important role:

- The Access to Information Program (Established in 1996). The organization played a key role in drafting the Access to Information Act and the Personal Data Protection Act. It is involved in permanent monitoring of the implementation of the laws and searching for regulatory changes that would improve the framework for IS services and information provision.
- The Center for the Study of Democracy (Established in 1991). The organization maintains a legal program that played a key role in drafting the Law on Electronic Document and Electronic Signature and raising political and general public support for the reform. It is currently involved in drafting enabling regulations that are necessary for the wide application of the law.

- The Center for Economic Development (Established in 1997). The organization played a key role in drafting the National Strategy for High Tech Development and the Law on High Tech Activities and HTP (rejected by Parliament). Currently the organization is conducting occasional research on IS related developments.

B 5.3 Objectives and results. The commitment of private and public actors. Specific important actors

All efforts during the 1998-2002 period, (including the strategies described in this section of the report and the legislative changes discussed in detail in "Institutional Capacities and Regulatory Background" section) were united by the following strategic objectives:

1. Create a legal framework that enhances IS infrastructure;
2. Create a legal framework that allows the existence of certain IS services;
3. Allow the country - citizens, businesses, academia and government – to be eligible for financing from different EU programs for IS development;
4. Introduce sectoral policy for encouragement of ICT industries.

The first objective is at present close to completion. The deregulation efforts on the telecommunications market are underway (see section F2) and the legal framework slowly evolves to allow competition and flexibility in the provision of basic infrastructure.
The second objective required that several pieces of legislation in previously "unregulated" areas had to be adopted, together with some procedural regulations that deal with the organization and work of the government administration. At the moment, the following regulations are at place:

- The Access to Information Act (2000), which provides the scope and procedures for citizens' access to public information.
- The Law on Electronic Document and Electronic Signature (2001) which for the first time in Bulgarian legal tradition acknowledges the legal power of electronic documents and signatures, thus enabling e-commerce and Internet exchange of information.
- The Law on Personal Data Protection (2001), which clearly defines the scope of personal data that the law should protect, thus enabling the exchange of non-protected data while securing the secret of individual data collected by both government and private parties.

There are, however, several crucial drawbacks:

- The secondary legislation for e-documents and e-signatures is not in proper form yet, which in fact delays the effective e-commerce and e-reporting;
- The government still refuses to adopt standard for e-documents and e-signatures acceptable to state agencies, which holds back the electronic communication between government on one side, and citizens and business on the other;
- Government administration is still reluctant to share data between different agencies and registries that in fact means that citizens are often obliged to provide one and the same piece of data or documents to more than one unit of the government.

Commitment on behalf of government administration to reform itself into e-government is however dubious. The understanding of e-government is rather as a technology change than

as a new way of organization of public service. Therefore, most efforts up till now are put into the so-called "physical infrastructure" of e-government, i.e. equipment, software, networks etc. Apart from the legislation on e-documents and e-signatures, there are no initiatives to reform the way the administration is structured and operating.

The progress on the third objective is mainly concentrated in the participation in The Sixth Framework Program of the European Community for Research, Technological Development and Demonstration Activities (2002-2006), which for Bulgaria are funded with EUR 16.5 million.

The fourth objective has to a great extent failed. The reasons for these are mainly three:

1. The general consensus after the 1996-1997 crisis is grounded on strict adherence to non-intervention in real sector on behalf of government. In such constellation, any attempt to initiate industrial policy faces resistance from both local opposition and international financial institutions.
2. Even though the government has not completely abandoned subsidies or indirect incentives, for obvious political reasons they went to areas and activities of vast social (voters') importance. Encouragement of IS development was and still is not a primary political concern given the number of people involved and their social position.
3. Apart from the above, all efforts of the "supporters" of technology policy were concentrated on establishing of special privileges of High Tech Parks. On the other hand, efforts to enable R&D tax credits were non-existent in any meaningful way. The result was that it was very difficult to gain political support for such policy. In fact, the then-majority faction in the Parliament turned down the draft law on high tech activities and high tech parks that enabled such special treatment of HTP.

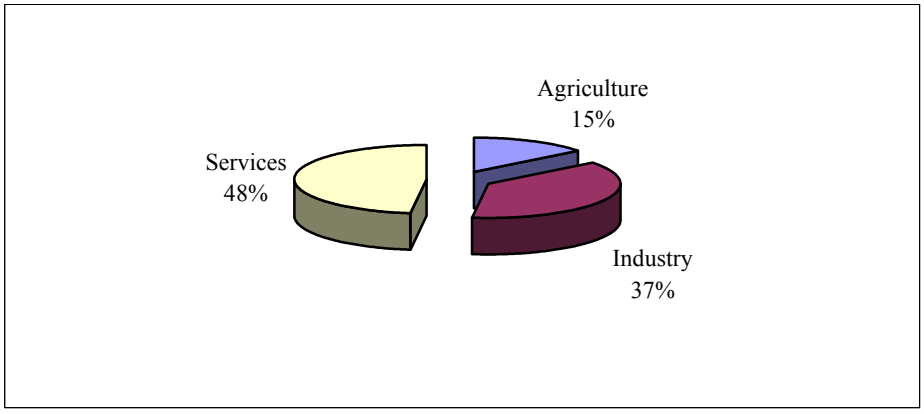
SWOT Analysis

Strengths	Weaknesses
✓ Deregulation efforts on the telecommunications market are underway ✓ Legal framework of new IS activities adopted	✓ Policy formation rests on the mistaken view of Bulgaria as a country with huge high-tech potential (tradition, human capital, etc.) ✓ E-government understood rather as new technology than as way of work ✓ Motivation behind strategies is predominantly biased towards rent-seeking ✓ No efforts to provide market-based incentives to innovation and technological improvement ✓ Driving force behind recent policies is foreign donor money instead of utility
Opportunities	**Threats**
✓ Enforcement of favorable legal framework towards electronic exchange of information and commerce ✓ NGOs have a strong role in shaping new policies ✓ Government may improve significantly public registries and reporting if e-government strategy is properly implemented	✓ IS seen as another "project" that has to be implemented because of EU requirement ✓ Motivation in key players to "capture" state policies to serve private interest, i.e. struggle for government funding

C. INDUSTRIAL DEVELOPMENT AND COMPETITIVENESS

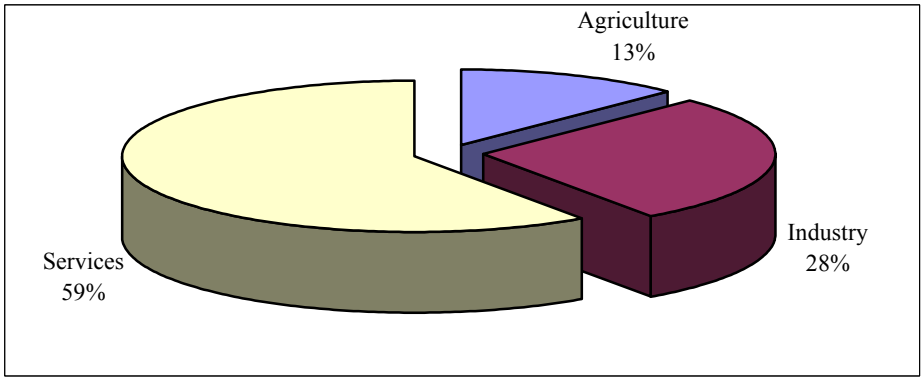
During the transition the shares of the economic sectors in gross value added changed dramatically. The services' share in GVA increased by almost ¼ (form 48% to 59% of GVA), the industry's share decreased by 26% (from 37.4% to 27.8%) and the agriculture's share decreased by 14%.

Figure C1: Structure of GVA, 1991



Reference: NSI

Figure C2: Structure of GVA, 2002



Reference: NSI

For more information on economic sector shares in GVA and economic sector shares in GVA see Table C1 and Table C2 in the Annex.

In 1991 the agriculture had a 15.4% share in GDP. That share decreased over time and in 2002 it was 11%. Under the normal pattern of development, the agriculture's share in GDP decreases due to the fact that there are natural constraints on its growth. Therefore, the growth rate of agriculture is slower than the growth rate of the industry and services. However, in Bulgaria there are additional factors for the relative decrease of the agriculture's share in GDP:

- constitutional prohibition of the foreign ownership of land, that restrict the foreign investments in the agriculture and restricts the land market;
- slow process of restitution of land
- the legal regulations on the property rights over the forests that restricts some of their possible economic uses;

- agricultural subsidies and the policy of protectionism and thus limitation of competition. The subsidies create incentives support the loss-making producers so that they remain in the sector. Therefore, they prevent the efficient producers to increase their share and to increase the total production with the same resources.

These factors are reinforcing each other so the result is an absolute decrease of the production of the agriculture sector. In 2001 the agriculture produced 85.3% of the 1990 level.

Table C1: Agriculture

Year	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001
Volume indices, 1990=100	100	104.5	91	74.3	79.4	92.4	81.5	96.4	95.3	97.2	85.7	85.3
Growth (% of GDP) year on year	-	4.5%	-12.9%	-18.4%	6.9%	16.4%	-11.8%	18.3%	-1.1%	2.0%	-11.8%	-0.5%

Reference: NSI

Within the industrial sector the development is shown on the next table, detailed information by sub-sectors is available in Annex Table C3.

Table C2: Industry

Year	1996	1997	1998	1999	2000ar	Year
Total	100%	100%	100%	100%	100%	100%
Mining and quarrying	5.25%	5.47%	5.27%	5.54%	5.10%	4.68%
Manufacturing	84.62%	83.01%	79.72%	79.24%	79.96%	79.86%
Electricity, gas and water supply	10.13%	11.52%	15.00%	15.22%	14.94%	15.45%

Reference: NSI; Data is available since 1996 only because there was a change in the classification of economic activities

C1 Transport

The sector of transportation started the transition with a huge fall in the volume of the activity. That can be attributed to the large initial drop of the real GDP, which is of course connected with a drop in the needed transport services (less production – less transportation of production). Between 1992 and 1995 the transport grew fast because of the growth in the marine, air and railway transport.

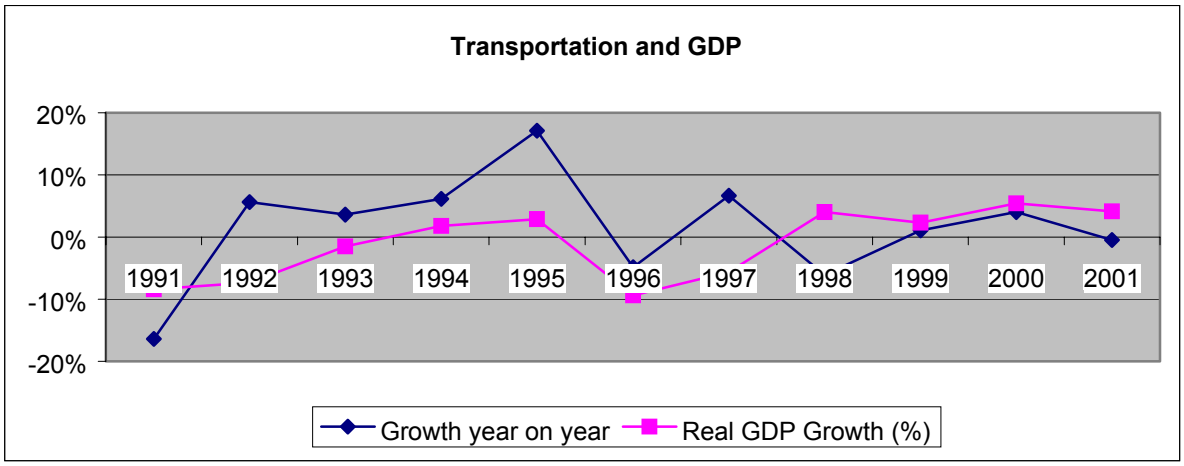
However, despite the large subsidies, the railway began a steep decline both in the passenger and cargo transportation. The 1996 - 1997 crisis left its mark on the transport sector as well as the new start of the reforms in 1997, which resulted in closing of the loss-making state owned enterprises and hence in a decline of the transport activity. After 1998 there is a slow growth, which is result of the overall economic growth, the growth of the private transportation and the continuing decrease of the railway transport. In 2001, due to the bankruptcy of the state-owned *Balkan Airlines* the sector recorded a slight decrease of 0.4%. Besides the bankruptcy, the overall increase of transport services share in GDP is 13.5% compared to 1990.

Table C3: Transport

Year	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001
Volume indices, 1990=100	100	83.6	88.3	91.5	97.1	113.7	108.2	115.4	108.4	109.6	114	113.5
Growth year on year	-	-16.4%	5.6%	3.6%	6.1%	17.1%	-4.8%	6.7%	-6.1%	1.1%	4.0%	-0.4%
Real GDP growth	-9.1%	-8.4%	-7.3%	-1.5%	1.8%	2.9%	-9.4%	-5.6%	4.0%	2.3%	5.4%	4.1%

Reference: NSI

Figure C3: Share of transportation in GDP



Reference: NSI

C2 Communications

In a contrast to the transportation, the communications recorded no single year of negative growth of the real production between 1990 and 2001. In the beginning of the period the increase of the telephone posts and takes off of the private initiatives, which need communications services, slightly offset the consequences of the negative economic growth and the result was a slow growth in the communications. In 1995, when the economy was relatively stable in comparison to previous years, the telephone posts continued to increase and private initiative started to penetrate communications market (the first mobile phone licenses were granted at that time, many private domestic firms started building cable networks, that carry TV signal and later - internet) and as a result there was a 32.4% increase in the sector.

Then the crisis of 1996-1997 came, it resulted in slower growth of communications. In the following pro-reform period the communications experienced high growth rates, mainly as a result of the invasion of Internet and mobile phones.

After 1997 the private sector increased rapidly and its share in the gross output of the communication sector reached nearly 52% in 2001 from 3% in 1995. What should be noticed is that there was no privatization in the sector so the private sector started from scratch and succeeded to outpace the state sector, despite the extensive monopoly rights granted to the latter. That shows that the private sector is much more flexible than the public sector. Between 1990 and 2001 the volume of the gross production of the communications sector increased more than 3 times and the volume index reached 337.8 in 2001 (1990 = 100).

Table C4: Communications

Year	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001
Volume indices, 1990=100	100.0	103.5	103.5	108.9	110.0	145.6	158.7	160.0	197.2	237.6	317.5	337.8
Growth year on year	-	3.5%	0.0%	5.2%	1.0%	32.4%	9.0%	0.8%	23.3%	20.5%	33.6%	6.4%

Reference: NSI

The increase in the revenues of communication services in EUR is precisely 10 times - from EUR 117.5 mln in 1992 to EUR 1196 mln in 2001.

Table C5

Revenues of Communication Services					
Year	1992	1998	1999	2000	2001
Revenues, mln EUR	117.5	452.1	726.4	1034	1196

Reference: NSI

C3 Construction

During the transition years the sector of construction experienced a huge drop in the production. In 1990 and 1991 the cumulative decrease was about 2/3 as measured by the volume index. After that the decrease continued at more moderate rates with the exception of 1999 and 2000 when there was 8% growth. In the year 2001 the production of the construction sector is 31.6% of its 1990 level.

The completed dwellings in 1989 were more than 40,000; just 2 years later their number reduced by half to 19,000. The decrease continued at a high pace (with the exception of 1996 and 1999) and in 2001 the number of the completed dwellings is less than 6 thousand. As far as the population of Bulgaria decreases and the number of the dwellings is almost 3.5 million, the need for new dwellings will decrease thus the construction of dwelling will follow. However, the construction as a whole can grow if there is an increased investment activity on the part of Bulgarian and foreign companies.

Despite the fact that the sector decreases in real terms, the production measured in EUR (nominal price) increases in most of the years. A major reason for this fact is the inflation of the prices caused by the so-called Balassa-Samuelson effect (the growth of GDP increases the wages; the price of services depend mainly on the wages so services prices increase also; the increase of the services prices result in general price increase). Of course, a part of the explanation lies on the better quality of the construction that quality is also more expensive.

Table C6: Construction

Year	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001
Growth year on year	-9.1	-59.3	1.6	-10.4	-6.7	2.4	-14	-4.6	-0.2	8	8	-6.5
Volume indices (1990=100)	100	40.7	41.4	37.1	34.6	35.4	30.4	29.0	29.0	31.3	33.8	31.6
Production, mln EUR	1995	756	819	1045	926	1138	710	813	1068	1282	1437	1418
Completed dwellings	26044	19423	17996	11021	8669	6815	8099	7452	4942	9824	8795	5937
Change in completed dwellings	-	-25%	-7%	-39%	-21%	-21%	19%	-8%	-34%	99%	-10%	-32%

Reference: NSI

C4 Changes in the Structure of Services

The sector of computers and related activities registered the highest growing trend in terms of created value added. It increased by factor of four for five years (between 1998-2002).
Another rapidly growing sector has been the Post and Telecommunications services. It increased in value more than three times, which is indicative for the growing potential of this market. The expected further liberalization of telecommunications will create additional conditions to boost development.

Table C7: Private Sector, Created Value added by NACE (2 Digit); In Thousand EUR

NACE №	Name	1998	1999	2000	2001	2002*
51	Wholesale trade and commission trade, except of motor vehicles and motorcycles	346 126.9	407 363.2	519 614.0	534 783.7	572 018.6
64	Post and telecommunications	258 967.2	409 591.0	542 275.3	732 461.9	917 679.7
71	Renting of machinery and equipment without operator and of personal and household goods	3 315.3	5 895.8	7 722.7	7 853.1	6 925.0
72	Computer and related activities	18 005.9	25 821.1	35 913.2	48 132.2	70 070.6

Reference: NSI
Note: * preliminary data for 2002

Figure C1 in the Annex shows the value added in selected sectors by NACE 2 Digit.

C5 Specific Sectors' Market Size and Value (ICT Industry)

Making a 23.2% growth in 2001 the ICT market in Bulgaria totaled more than EUR 1.3 billion, and in 2002 the ICT sales increased by 13.7 % to EUR 1.47 billion. The share of the telecommunications equipment accounts more than 80 % of the total ICT market volume.

Table C8: The ICT Market in Bulgaria, EUR mln.

Year	**2000**	**2001**	**2002**	**2003***
Servers	21	28	35	37
PCs	54	61	66	71
Office Equipment	18	19	20	21
End-user communications	50	66	68	70
Datacom equipment	188	269	321	335
Software	25	28	33	39
IT services	36	39	43	50
Total IT	**214**	**244**	**271**	**298**
Total ICT	**1,055**	**1,300**	**1,478**	**1,599**
Growth, %		**+23.2%**	**+13.7%**	**+8.2%**

Reference: IDG Bulgaria

The following tables present the data for the market size and the percentage of the total revenues of the Bulgarian ICT companies from the GDP:

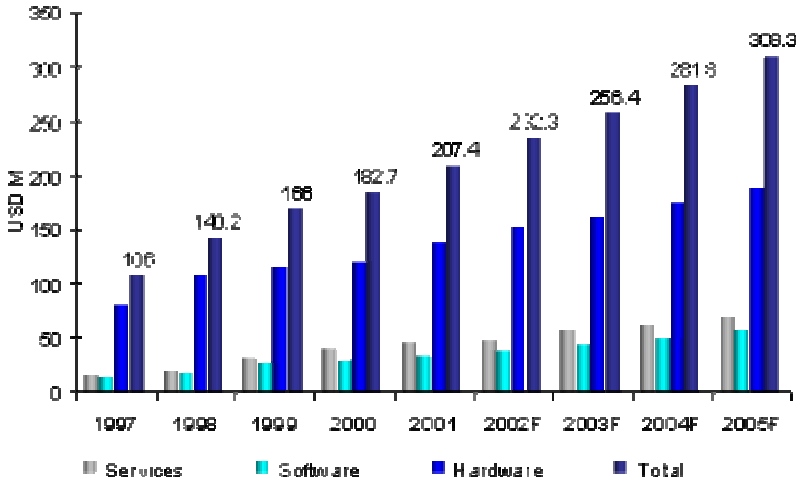
Table C9: Revenues on ICT market

Indicators	**1999**	**2000**	**2001**
Total revenues of ICT companies *(EUR Billions)*	0.770	1.3	1.4
GDP of Bulgaria (nominal)	12.16	13.7	15.1
Total revenues as percentage of GDP	**6.33%**	**9.49%**	**9.27%**

Reference: IDG Bulgaria

We can see steady increase in the revenues of IT companies, which is due mainly to the growing demand for such services and equipment (government structures in relation with E-Government creation, companies that replace the old equipment with modern one).

Figure C4: Bulgarian IT Market by Segments



Reference: www.ict.bg (ICT Sector)

For more data on market shares of ICT industries see Table C10 in the Annex.

The total amount is less than in the list of IDG because some companies didn't specify the concrete activities in their product portfolio.

It is expected, that the sales of computer systems will continue to increase in the future, reflecting the need of replacement of most of existing outdated computer systems. For the time being, the main demand for IT products comes from the government (about 60% of total purchases of computer systems).

Bulgarian IT market is concentrated in the biggest towns. The five regions with the biggest market share cover about 80 % of the market. The biggest IT consumer is Sofia with about 58% market share and this is mainly because the capital accumulates the big foreign companies.

Table C9: IT Market share by region

District Center	Market Share (%)
1. Sofia	57.5%
2. Varna	11.1%
3. Burgas	4.9%
4. Stara Zagora	3.3%
5. Plovdiv	2.8%
TOTAL:	79.6%

Reference: CBN. Chronoanalysis: Bulgarian IT Business Analysis

Specific Sectors Overview

1. **Telecommunications** are experiencing significant expansion over the last decade. It has a leading market share of about 68% in ICT industry.
   It should be mentioned, that Bulgaria started its transition with relatively high telephone density (30 main lines per 100 people in 1992) compared with the former socialist countries in CEE. This penetration rate grows over the next ten years, reaching 37 lines per 100 people in 2002. In the households segment of the market, the tele-density has reached 84 lines per 100 people. However, a big portion of these lines is analogue. By 2002, the rate of digitalisation reached 20 %. Currently, 100 % of international connections and 85 %

of internal long-distance connections are digital, while the digitalisation of local connections is only 18.5 %.
The services are the biggest share and the big holdings are opening the road to new players that are focused in delivery of equipment for telecom operators. These are the main trends seen in the Computerworld Top 100 for 2002. The high competitive market, along with the unclear mergers and acquisitions change the case in the Bulgarian IT market.
Mobile phone services are the most rapidly growing segment of the telecommunication services market. There are 3 mobile operators: 2 digital GSM operators (Mobiltel and Globul) and one analogue mobile network (NMT - 450i)- Mobicom. The total number of mobile subscribers is close to 2 million people (or about 22,6 % of population in mid-2002). The biggest market share is held by Mobiltel with 1.4 million subscribers in 2002, followed by Globul with 330 000 subscribers. The number of subscribers to the Mobikom were 130 000 in 2002. For the period 1999-2000 the mobile lines density grew by almost 265 %.
Cable access is a very popular service and its penetration is seen as basic prerequisite for broadband connectivity to lots of end users (63% of households in 2002 reported to be passed by cable). At the moment, only 3.3% of cablelized people use it for Internet because of the higher modem costs, but the trend is for increased usage for this purposes.

The three telecoms have total revenues of $690 mln that is 10% increase, compared to 2001. BTC has 7, 9% increase, Globul – 489% after starting operation in 2001, and Mobikom register decrease of 36%. Mobiltel that is again in process of change of ownership has reported 800 mln BGN increase in 2002 that should place it in second place after BTC (with annual incomes from services are 1, 025 billion BGN).
According to EITO, the Bulgarian telecom services market is estimated to 1.38 billion EUR; the forecast for 2003 and 2004 is for increase up to 1.66 billion EUR for 2003 (increase 19.8%) and 1.94 billion EUR for 2004 (16, 7% increase).

Table C10: Telecommunication Sector Indicators

	1999	mid-2002
Total lines per 100 people	34	39
Mobile lines per 100 people	6.2	22.6
Level of network digitalisation	19 %	22 %

Reference: UN Economic Commission for Europe

2. **Software market**[9] experience stable growth and positive trend in development according to financial statements of the companies in this segment of telecommunication market. There is a big increase in the export of program products revenues. Despite unfavorable economic situation worldwide and the limited number of clients in the country, the leading players in the sector maintain steady growth and improving of their share abroad.
3.

The sector reported 43.6 mln BGN (including VAT) incomes for 2002. The opportunity to finance development of program products by their own is major advantage. Most of the leaders rely on domestic capital for operation (in the Top 10 biggest companies, 7 are financed by Bulgarian capital).

Concerning export profile, the revenues of software companies in 2002, generated from export are almost 14 mln BGN which is 27.5% of the total revenues. For comparison, in

[9] The following section analysis is based on Computerworld information for Top 100 software companies in Bulgaria for 2002.

2001 export revnues were 7.3% (the growth of export is 58.6%, compared to 64% for 2000/2001). We see the positive trend of strenghtening Bulgarian software companies position abroad. In the area of distribution, there is one major actor in the market – ACT Soft has 25% of the market share. Top 10 companies generate 74% of the distribution segment (52 mln BGN revenues for 2002).

As a whole, the development and distribution market of program products in Bulgaria amounts to approximately 110 mln BGN in 2002.

We can formulate the following conclusions: the applied software in Bulgaria generates more incomes than the infrastructure one; the small and medium enterprises are the main goal for software companies.The future of the players in the market depends on the ability to find and explore specific market segments; the possibilities to generate enough investments for research, development and improvement of the software products. Starting of E-government and EU accession are among the main factors for development of domestic software market. Developers of applications for customer relations management (CRM) and human development have good perspective for the future. There is a demand for electronic education software, supply chain management (SCM), analitical and mobile applications, too.

Table C11: Top 10 software suppliers in 2002

Company	Revenues form software supply, thousand BGN
ACT Soft Ltd.	18 425,0
Kontrax Holding	8 620,0
CAD R&D Center PROGRESS Ltd.	8 200,0
Kontrax Sofia	6 845,0
Prosoft Group	4 173,4
Information Services Plc	4 100,0
Stemo Ltd.	3 900,0
Prosoft Plc.	2 012,1
Risk Electronics Ltd.	1 500,0
Paraflow Communications Ltd.	1 244,0
Total:	59 019,5

Reference: Computerworld

4. **Printer market is** 13% of the hardware suppliers' revenues. The distinctive feature in 2003 is the increase of retail sellers Metro, Technomarket, Technopolis, Office 1 Superstore. Leading suppliers are HP, Epson (ink-jet printers) and Lexmark (laser printers). The biggest commission was for the National Health Insurance Fund, BTC and Ministry of Defence. According to IDC, the reasons for slower development in printer market are the unstable economic situation, decrease of foreign investments for the period, privatisation delay, limited IT budgets of enterprises.

Table C12: Printer market in 2002

Printer types	Numbers	Amount in mln USD
Total	*66 201*	*13.06*
Laser	17 852	7.69
Ink jet	40 422	3.12
Martix	7 882	1.96

Reference: IDC

5. **Monitors' market is** experiencing faster growth in 2002, compared to previous year. The LCD (liquid crystal display) monitors turnover is increased with 220 %, which is remarkable. Still the share of CRT (cathode ray tube) monitors is prevailing but the trend is LCD monitors to replace them.

Table C13: Main characteristics of monitors' market (2002)

Monitors	Number	Amount in mln USD	% of total revenues in monitor market	% of total turnover in monitor market	Change in revenues	Change in turnover	Distributed by distribution channels	Distributed by OEM (original equipment manufacturer) companies
LCD	8 000	3.4	22%	8.5%	185%	220%	4 800	3 200
CRT	84 900	12.2	-	-	- 14%	- 4%	68 500	16 400

Reference: Computerworld

Information on CRT monitors and LCD monitors (major dealers and share) see in Annex – Table C11 and C12 and Table C13.

C6 International Cooperation and Competition

According to a USAID global research, conducted in March-April 2003 approximately 84% of the foreign firms (representative offices in Bulgaria and those who have been working with Bulgarian firms by distance) said that Bulgarian IT specialist have a sound experience and potential for development. The same search shows that about 36% of IT companies worldwide are familiar with the Bulgarian IT industry. Among the main reasons are the professional skills, language knowledge and specialization in software development. If this trend remains, Bulgarian IT industry will keep its leading position in this area.

Bulgarian IT products and services import and export

According to National Statistics Office the import of IT products for the period of January – November 2002 is approximately $ 79.45 mln which is around 76% (EUR 84 mln) of the total declared revenues of hardware suppliers (EUR 110 mln.). The difference consists of the import in December (the busiest month of the year) and the reserves in the warehouses. The printers and keyboards accounts to 16% of total IT products because the demand for them abroad is relatively high and stable.

Table C14: IT export (January – November 2002)

Product	Number	USD
Digital machines for data processing	473	303 263
Printers	11 392	938 073
Keyboards	11 392	26 843
Hard discs	10 840	932 093
Central memory units	110	50 861
Band memory units	230	197 066
Optic units	3 918	96 227
Total IT products	73 677	6 341 978

Reference: National Statistics Office (www.nsi.bg)

Table C15: IT import (January – November 2002)

Product	Number	USD
Digital machines for data processing	62 093	8 939 654
Printers	148 256	12 567 437
Keyboards	178 142	736 525
Hard discs	95 532	7 109 887
Central memory units	282	94 886
Band memory units	673	751 370
Optic units	65 421	1 748 341
Total IT products	1 254 549	79 452 640

Reference: National Statistics Office (www.nsi.bg)

With less than 20 pure IT distributors and over 800 dealers (differ from distributors in offering more than one exclusive trade mark), the Bulgarian IT market grew 15% in 2002, while the revenues of the top 5 distributors rose 39% in the advantage. Among the leading companies are ACT Soft, Argus Computers, Cantek, Computer 2000, Kontrax, Most Computers, NDB, PolyCamp, Reset, Risk Electronics, Solytron etc and the local offices of such regional companies as Asbis, Flamingo Computers, and Tornado Systems etc.

Table C16: Sales revenues (Top 10 Distributors in Bulgaria in 2001, in EUR)

Company	Sales Revenues (in mln)	Increase from previous year
Polycomp	12.18	44.30%
Solytron	9.67	45.57%
Most Computers	7.6	28.67%
Asbis Bulgaria	6.6	39.93%
NT CHS	5.5	40.63%
Act Soft	4.3	31.99%
Cantek Group	4.0	12.16%
Computer 2000	3.3	37.25%
WESTech	3.1	n.a.
Tornado Systems	2.8	103%

Reference: IDG Bulgaria, Computerworld

The Bulgarian distribution market (including dealers) shows a stable growth and development in spite of the worldwide problems with overproduction, falling prices, global trend of warehouse stock reduction and economic recession. In order to survive and reduce expenses most of the distributors changed their market approach: put marketing on the web (Argus, Asbis, Most), extended product lines (Argus, Computer 2000, Solytron, Tornado) and either focused on a particular segment as communication and networking (Freenet, Act Sofia) or targeted resellers focused on IT solutions in a specific industry – banking, finance, etc. The demand for security products is growing rapidly, but the big vendors prefer to partner with system integrators rather than with distributors. The banks in Bulgaria prefer will count on Utimaco's PKI system.

The Bulgarian market has potential to accept new players. Usually vendors prefer to give distribution rights to regional companies rather than to local ones.

Compared to hardware distributors, the software distributors in Bulgaria are fewer. ACT Soft, NT CHS, ProSoft, Global Consulting are well known in Bulgaria. The software company Microsoft has two authorised distributors in the country – ACT Soft and PolyCamp and a representative office – Microsoft Bulgaria.

Table C17: Bulgaria's Regional Trade Agreements

	Albania	Bosnia-Herzegovina	Croatia	FYR of Macedonia	Romania	FR Yugoslavia	Turkey	Greece
Bulgaria	Applied from 01/01/2003	Under Negotiation First Meeting 14/15 Nov 2002	Applied 01/01/ 2002 Revised	Applied 01/01/00 Revised	CEFTA - Both countries are members	Under Negotiation	Applied 01/01/99	EU accession agreement

Main Sectors of Innovation Activities

After 1990, the innovation activities in Bulgaria have been facing several challenges:

- Lack of financial resources for implementation of innovation projects resulting in low level of R&D intensity;
- Low level of private sector interest and involvement in supporting R&D and science. In 2000, the business spend on innovation just 0.11 % of GDP. This is explained by the low level of long-term investment in enterprise;
- Lack of specific government innovation policy.

In these constellations, the overall level of innovation supply in Bulgaria is rather low. The main innovation activities are concentrated in pharmacology, chemistry (herbicides, pesticides) and electronics (processing and electric cable connections). It is considered, that Bulgaria has certain innovation potential in these sectors, as well as in the areas, related to the ICT infrastructure development[10].

Trade Balances of ICT

Table C18: Exports and Imports by NACE (2 Digit), EUR Thousand

	Export	Import	Export	Import	Export	Import	Export	Import	Export	Import	Export	Import	Export	Import
NACE*	**1996**	**1996**	**1997**	**1997**	**1998**	**1998**	**1999**	**1999**	**2000**	**2000**	**2001**	**2001**	**2002**	**2002**
30	14926	58557	18320	59439	10153	77891	10177	124103	15113	139931	15229	166493	25112	158432
31	15275	11024	15610	8650	15015	12895	9919	21374	21930	34584	23750	56410	22712	61340
32	16401	36156	20453	37703	10780	42649	15753	76406	25296	92860	32583	135217	64158	177861
33	6604	37599	7230	34838	10607	35432	12322	44823	14521	46770	19202	67182	24117	85542
72	-	-	-	-	-	-	-	-	-	-	-	-	397	5135

Reference: NSI

Note: NACE codes:

30 - Manufacture of office machinery and computers

31 - Manufacture of electrical machinery and apparatus n.e.c.

32 - Manufacture of radio, television and communication equipment and apparatus

33 - Manufacture of medical, precision and optical instruments, watches and clocks

72 - Computer and related activities

[10] See: European Trend Chart on Innovation, Country Report.: Bulgaria, 2002, European Commission

Table C19: Balance of Trade by NACE 2 Digit, Thousand EUR

NACE №	1996	1997	1998	1999	2000	2001	2002
30	-43631	-41119	-67737	-113925	-124817	-151264	-133320
31	4251	6961	2120	-11455	-12654	-32660	-38628
32	-19756	-17250	-31869	-60654	-67564	-102635	-113704
33	-30995	-27608	-24825	-32501	-32249	-47980	-61425
72	-	-	-	-	-	-	-4738

Reference: NSI

C7 Major Actors of ICT industry

More than a thousand companies operate on the Bulgarian IT market. About half of them are software developers and the other half consists of companies that assemble computer systems and companies that sell computer systems (dealers). The number of assembling companies increased with more than 1.5 times during the period 1996 –1999 mostly because it is easier to start operating as assemble PCs – it is easier because the required qualifications are less than those for software development, the best experts in the field of software are abroad due to higher salaries and fringe benefits; last but not least – the increased demand for computers in the country for that period. In comparison the number of software developing companies and companies that sell computers increased with about 23% for the same period.

In the last ten years there were almost none mergers and acquisitions, the services to the sectors (financial advice, marketing, etc.) remained underdeveloped. The situation is changing after 2001 since then.

Bulgarian branch of IDG International presented a list of top 100 Bulgarian companies in telecommunications, Information services and production sector in Bulgaria for 1999, 2000 and 2001.

According to these results, the situation is the following.

1. The biggest company in ICT is BTC Plc (Bulgarian Telecommunications Company) but with a decreasing market share – from 54.23 % in 1999, to 46.80 % in 2000 and 42.5 % in 2001. The revenues of BTC have increased for the period 1999 – 2001, with a relatively constant rate of 15%.

   Until January 1st, 2003, BTC used to have exclusive rights to provide the stationary telephone service, as the main element of the universal service obligation, until end of the year 2002. Thus, no other operator had the right to provide a public telephone service between fixed points in Bulgaria, unless the particular service offered is liberalized by specialized regulation.[11]
2. The second company in the list of the top 100 companies of IDG Bulgaria is MobilTel with an increase in revenues of 97% in 2000 compared to 1999 and 63 % in 2001 compared to 2000. The market share of MobilTel in 2001 was 28.41% of the Bulgarian ICT market.
3. The third company in the list is ProSoft, with a slightly decreasing and relatively constant market share of approximately 3.4 %. This is the only one company in the top three of the IDG list, which is exporting approximately 4 % of its production this year (2000). ProSoft is the only one company in the IDG list, listed on the Bulgarian

[11] The BTC monopoly was legally dismantled but adoption of key rules of the game has been delayed beyond mid-2003 - a deadline set by the legislative program of the government.

Stock Exchange (BSE - Sofia) with a registered bond emission (the first Bulgarian corporate bond emission).

The following table presents the above-mentioned results:

Table C20: Major players, revenues in EUR thousand

Year / General Information:	1999	2000	2001
Total revenues	688782.3	926865.3	1169802.9
Change from the previous year	-	34.57%	26.21%
Major ICT companies:			
1. BTC Plc	373540	433785.7	496766.1
Change from the previous year	-	16.13%	14.52%
2. Mobiltel	104544	205540	332340
Change from the previous year	-	96.61%	61.69%
3. ProSoft	25689	33290	38419
Change from the previous year	-	29.59%	15.41%

Reference: IDG Bulgaria and own calculations

It is worth mentioning that in 1999 and 2000 BTC and MobilTel had only one activity – telecommunication and the latter was the only GSM operator in the country. In 2001, BTC expands its activity with 1 % Internet Service Providing (ISP) and 9% exports.

The Presence of Foreign a/o Multinational Companies and Their Contribution to IST-related Developments

Despite the limitations of the Bulgarian market in terms of its size, almost all major international companies (mainly North American and European) are present in Bulgaria. The most significant registration of foreign companies have been registered in mid-1990s, when companies like Microsoft (through its local subsidiary operating since 1999), IBM, Hewlett Packard, Cisco Systems (since 1999), Nexcom, Intel, Compaq, Dell, etc. entered the market by establishing local subsidiaries or by using authorized dealers. Epiq Electronic Assembly (a member of Epiq Group) was established in 1997.

In 2000 the Austrian company EuroproNet bought majority share of the leading Bulgarian ISP Spectrum Net. This is considered as one of the biggest deals, which took place in Bulgarian ICT industry in recent years.

25 of the Top 100 IT companies (ranked according to turnover) are foreign owned. In 2001 they generated 17.8 % of the total IT turnover (or about US $45.225 mln), registering 40 % average growth[12].

The biggest share of the activities of the foreign companies is directed to providing services to the government administration, including Ministry of Finance, General Tax Directorate, Customs administration, Ministry of Interior, Ministry of Education, etc. Most of them provide IT services to the banks, mobile operators, and the biggest Bulgarian companies (such as Lukoil Neftohim, Union Minier, etc.).

Some of the foreign a/o multinational companies develop certain educational activities in Bulgaria, contributing to the overall quality of ICT related education. For example, there are

[12] Computerworld, 21/2002

38 CISCO Academies and 5 Microsoft Academies, most of them affiliated with some of the main Bulgarian universities. In 2001, Microsoft has trained 1200 students and another 509 students in Cisco Academies. The role of the multinationals in education is discussed in details below.

SWOT Analysis: Industrial development, Innovation and Key players

Strengths

- ✓ Increase of productivity of labour in all industrial sectors
- ✓ Fast growth of the communication sector
- ✓ Bulgarian ICT companies collaborate successfully with world-wide known ICT corporations;
- ✓ Most of the companies have diversified activities, which makes them flexible in respect of the market changes;
- ✓ Bulgarian ICT companies are flexible in terms of applied marketing strategies;
- ✓ Bulgarian ICT companies participate in research and development in pharmacology, chemistry, electronics; sectors with potential in Bulgaria.

Weaknesses

- ✓ Slow development in the agriculture sector because of protectionism and the ban on sales of land to foreigners
- ✓ There are some state-owned monopolies
- ✓ BTC is still state owned[13]
- ✓ Bulgarian ICT market is highly concentrated (i.e. two companies – BTC and M-Tel hold more than 70 % of the ICT market);
- ✓ Most of the Bulgarian IT companies are small, oriented to a particular geographic region, which makes them risky and non-attractable to foreign investments;
- ✓ The IT companies in Bulgaria very often offer relatively identical IT products and services;

Opportunities

- ✓ Liberalization of monopolized sectors (e.g. energy sector, telecommunications)
- ✓ Privatization of the state-owned companies
- ✓ Increase of competition between ICT companies after the telecommunication market liberalization;
- ✓ The ICT market in Bulgaria has potential to accept new players.

Threats

- ✓ Lack of financial resources for implementation of innovation projects resulting in low level of R&D intensity;
- ✓ A possible delays of reforms may disrupt the development of the economy and thus of the ICT

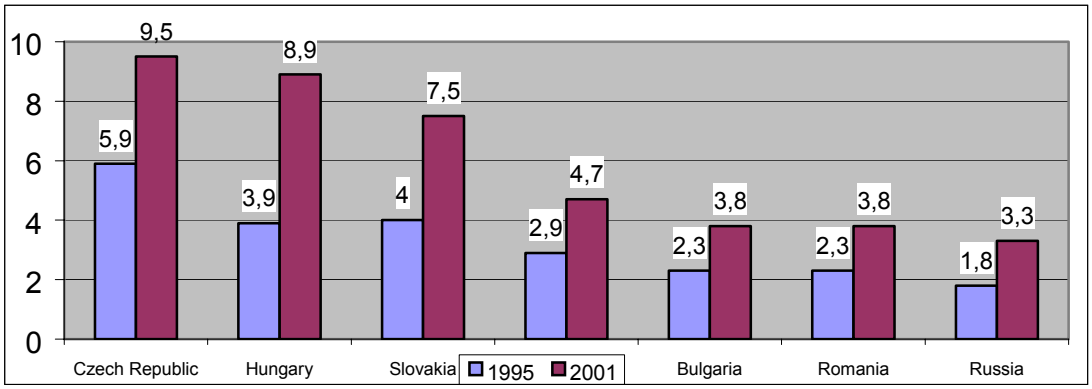
[13] Privatization is scheduled for the fall of 2003, by mid-August the procedure is in quite advanced stage; the winner in the bid, VivaVenture, negotiates with the government the sale contract.

D. PRESENCE OF MOST RELEVANT ECONOMIC ACTIVITIES FOR IST APPLICATIONS

D1 Bulgaria's Comparative Position to Other Transition Countries

We consider the indicator - IT Expenditures as % of GDP as a possible cross-country measurement of IT development. During the last years IT expenditures related to GDP increased across European countries in transition. However this trend was uneven. The most significant growth and development have been registered for the Czech Republic, Hungary and Slovenia. These countries perform better in terms of catching up with the EU. Despite some registered improvement, Bulgaria together with Romania and Russia continues to be lagging behind of the so-called leading group. The main reasons consist in postponed and/or insufficient reforms in the 90 ties[14].

Table D1: IT Expenditures as % of GDP



Reference: World Bank IT Statistics (http://www.worldbank.org/data/countrydata/countrydata.html)

D2 Spillover Effects of ICT in Bulgaria

Bulgaria is not at all different from other countries, and we can observe some typical effects:

a. The availability of appropriate infrastructure, including modern communications networks, is an important consideration in business (both foreign and domestic) entities orientation where to invest. As communications costs continue to fall, geographically and distance are increasingly less important factors in production place selection.

b. ICTs attract high-tech industries seeking to service new and rapidly growing markets in the developing world and invest significant resources. Developed ICT infrastructure is an important pre-condition to attract foreign investments.

c. The process of privatizing state owned telecom companies and other related ICT[15] sectors and liberalization of the regulatory and tax environments in which they operate has also increased FDI into developing countries[16]. In Bulgaria this is not the case with fixed telephone lines as BTC, the Bulgarian Telecom, is in a procedure for privatization, with unclear prospects for the final outcome.

[14] See for instance - Balkan Network, 2001, Obstacles to Trade, Growth, Investment and Competitiveness: Ten Case Studies on Balkan Businesses

[15] For instance there are only two licensed mobile operators in Bulgaria.

[16] See - Grace, J. et al, 2001, Information and Communication Technologies and Broad-Based Development: A Partial Review of the Evidence, p. 1-15

Below we divide the spillover effects into two groups – general ones and industry related ones.

General spillover effects

1. Reduced transactions costs of business and individuals. The e-commerce case.

A good example for lowering transaction costs within ICTs is the e-commerce case. E-commerce is expected to benefit economic development in several ways: through allowing local businesses' access to global markets; by providing new opportunities to export a wider range of goods and services etc.

Most electronic transactions in Bulgaria currently fall within the category of business-to-consumer, while business-to-business share of e-commerce is only negligible[17]. Approximately 130 companies, usually small and known to tiny consumer segments, could be considered as e-retailers. Opportunities for online business transactions are available through ePay.bg and BGPay.bg and their use is increasing at a stable rate.

ePay.bg was developed in 1999 and allows each cardholder after registering his card to pay for services or goods via Internet. By the end of 2001 there were 56 electronic shops and companies offering goods and services connected to ePay.bg and 24,754 transactions of EUR 567,989 were made in 2001 through this system[18].

Table D2: E-commerce indicators

	1999	2000	2001	2002
Number of issued credit and debit cards	279,929	560,934	990,414	1,614,105
Number of ATMs	279	420	642	829
Number of POS terminals	497	1,087	1968	2554
Total number of transactions e-pay.bg	54	8,533	24,754	36,441
Amount in EUR of payments through Internet	65.4	187.2	567,989.1	822,544.7

Reference: Borika

The e-commerce market is rapidly growing, which is expected considering its *status nascendi*. This growth will continue due to (mostly) catching up effects with the EU and Central Europe. The underlying presumption for this statement is that trade openness is providing for application of existing technologies.

E-commerce and its preceding technologies can create digital marketplaces to manage supply-chains and automate transactions, increasing efficiency and opening previously closed markets to firms in developing countries. These outcomes are to be enhanced in the future with e-commerce development in Bulgaria.

ISTs (e-commerce) not only open up more trade in physical goods; they also present new opportunities to benefit from trade in services.

2. ICT facilitate faster intra firm payments

Internet applications make it possible to connect processes such as logistics, manufacturing, and human resources and improve coordination among them.

[17] See for instance – Applied Research and Communication Fund, 2002, Bulgaria ICT Infrastructure and E-readiness Assessment, p. 11-19

[18] Reference: BNB

Relevant example in this context is Bankservice Bulgaria. By 2003, the banking sector in Bulgaria is completely privatized and considering the specific nature of banking services it is rational that ICTs are rapidly implemented in this sector. The outcome is improvement in services and better logistics. For this purpose Bankservice developed software products for automation of the bank services (http://www.bsbg.net/en/default.htm). Such an example is the development of the national interbank payment system – BISERA (Banking Integrated System for Electronic Transfers). This system has two basic functions – transfer of electronic messages with instructions on interbank payments and settlement of payments. It is a fully computerized system. Paper-based documents are neither accepted nor processed. The data are received from and transmitted to the bank branches via telecommunications links. The system provides settlement on a T+1 basis.

Table D3: Payment instructions handled by selected interbank funds transfer systems: volume of transactions in BGN thousands

	1997	1998	1999	2000	2001	2002
BISERA	**10 182**	**11 951**	**15 037**	**19 394**	**23 785**	**24 626**
Paperless credit transfers	8 783	10 509	13 779	18 083	22 227	23 080
Direct debits	1 093	1 275	1 211	1 247	1 468	1 420
Card payments	304	154	34	56	82	111
Cheques	neg	neg	neg	0	neg	neg
Letters of credit	neg	neg	neg	neg	neg	neg
DVP	nap	13	13	8	7	15
Concentration ratio	**0,68**	**0,63**	**0,63**	**0,63**	**0,61**	**0,53**

Reference: BNB

Currently, the Bulgarian National Bank launched new Real Time Gross Settlement System (RINGS), providing the final settlement of all payments in Bulgaria. The introduction of the RINGS system is a precondition for the future integration of the Bulgarian payment system with TARGET, following Bulgaria's accession to the EU and the EMU. The spillover of ICTs to all related sectors is prompter services and decrease in transaction costs in operation with banks.

3. Reducing inventory costs

Electronic interchanges can help firms better manage their inventories. This is particularly relevant in the age of "just-in-time" approaches to inventory management.

An appropriate example is the created System for integration of the sales and distribution for Coca-Cola (Bulgaria) by Acsior Ltd.

ICTs are considerably improving logistics' capacity and are facilitating management. That is even of higher relevance for large firms, which are optimizing their work according to series of criteria.

4. Cost savings in information.

ICTs allow for a more efficient mechanism for buyers and sellers to find each other and agree on price.

According to "Bulgaria: ICT Infrastructure and E-readiness Assessment" (produced by the ARC Fund in 2002) "as of March 11, 2002 the number of hosts in the ".bg" domain was 1860. In addition there are about 2,500 Bulgarian sites under ".com", ".net", and ".org" domains and hundreds of others (about 800 in expert estimates) which use free hosting

services offered by Bulgarian portals such as www.hit.bg, www.dir.bg, www.online.bg, www.search.bg".

D3 Level of ICT Investment in Industry (sectoral spillovers)

During the last five years 1998-2002 Bulgaria's economy registered economic growth. The currency board arrangement (CBA) of 1997 restricted the governmental discretion in the monetary policy and eventually brought financial stability and fiscal prudence.

In 1997, the reforms gained momentum and about 73% of the privatizable assets[19] have been transferred to private hands for the past 6 years. For the period 1998-2002 the growth of created value added in private sector on average is 8.8% per annum.

That is why it was not unexpected that ICT investments in the Bulgarian economy were intensified after 1998. Due to the privatization and transformation of property structure, the technological change is more rapidly happening in private enterprises.

Bulgarian statistics provide little information on pure ICT investment as such and by industrial sectors (where this information is totally missing). This investment is reflected in what NSI calls in English "projection and research" while Bulgarian meaning is "design, planning, project development and research". In order to obtain some idea about industrial enterprises we group the information on this item into categories of industrial, service and agriculture enterprises and, where possible, show some case studies.

During the period 1998-2001 expenditures on acquisition of projection and research assets in industry increased by factor of eleven. Marginally, the highest growth is revealed to be in 1999 (more than 3 times).

Table D4: Expenditures on acquiring fixed assets, reported by industrial enterprises projection and research (in EUR thousands)

1996	1997	1998	1999	2000	2001
4 305.655	11 181.36	12 098.15	39 555.59	49 850.45	49 511.97

Reference: NSI

Table D5: Share of R&D, Software and Patents in the Balance sheet of Lukoil Neftohim (in EUR thousand)

	1999	% of total assets	2001	% of total assets
Research and Development products	83.4	0.02	168.7	0.05
Software products	317	0.08	1 249.1	0.35
Patents, licenses, consignments, know-how, firm and trade marks	35.3	0.009	239.8	0.07
Total Assets	404 123		357 447.6	

Reference: NSI

[19] Remaining sectors for privatisation are: Bulgarian Tobacco Holding, Bulgarian Telecommunication Company, Electric Utility Companies etc.

Table D6: Share of R&D, Software and Patents in the Balance sheet of Bulgartabak Holding (in EUR thousand)

	1999	% of total assets	2001	% of total assets
Research and Development products	53.2	0.32	30.2	0.11
Software products	14.8	0.08	26.6	0.1
Patents, licenses, consignments, know-how, firm and trade marks	850.8	5.05	850.3	3.1
Total Assets	16 837.6		27 224.7	

Reference: NSI

Table D7: Share of R&D, Software and Patents in the Balance sheet of Elcabel (in EUR thousand)

	1999	% of total assets	2001	% of total assets
Research and Development products	12.8	0.08	343.08	1.4
Software products	14.8	0.1	9.7	0.04
Patents, licenses, consignments, know-how, firm and trade marks	1	0.007	0.5	0.002
Total Assets	15,320.58		25,028.12	

Reference: NSI

See case study D1 in the Annex.

D4 Level of ICT Investment in Services

The genuine large-scale penetration of ICTs in services actually happened after 1999. This is mainly due to the stable macro environment and to the momentum gained in privatization[20].
The table below confirms this observation as expenditures on acquisition of projection and research tangible assets doubled in 1999 compared to 1998.
During 1996-1998 these expenditures are declining while in the next period 1999-2001 the trend is reversed.

Table D8: Expenditures on acquiring fixed assets reported by service enterprises as projection and research (in EUR thousands)

	1996	1997	1998	1999	2000	2001
Services	12,179	5,895	5,969	10,965	15,919	16,055

Reference: NSI

See case study D2 in the Annex.

Table D9: Operational indicators of the national payment system BISERA

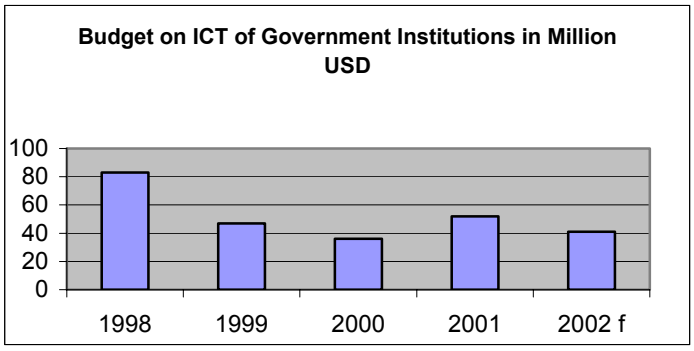
	1999	2000	2001
Number of banks included in Bisera as of 31.12	36	38	38
Number of interbank payments	15,037,333	19,393,835	23,784,570
Value of interbank payments (mln EUR)	23,036	28,372	32,858
Peak daily number of interbank payments	183,205	254,282	326,307
Average daily value of interbank payments (mln EUR)	91.4	112.6	129.9

[20] See for instance: Krassen Stanchev (IME) and Ivailo Georgiev (CED), Information Technology, available at: www.competitiveness.bg

History: Massive Investment in IST

The largest IST investments in Bulgaria are government projects and purchases[21]. This is due to both the EU accession process and the improved financial stand of the government after 1998. Because of this, market entities in Bulgaria pay special attention to ICT public projects.

Figure D1: Budget on ICT of Government Institutions in Million USD



Reference: CBN

More information about largest ICT projects can be found in the Annex – Table D1.

D5 ICT Investment in Public Administration

E-government strategy

The government of Bulgaria elaborated an e-government strategy. The cabinet signed a memorandum last November committing it to the launch of e-government system by the end of 2005. The ultimate goal of the project is to decrease costs of dealing with government for businesses. The e-government covers four major aspects of communication and services: Administration – Citizens, Administration – Business, Administration – Administration and Internal Institutional Efficiency and Effectiveness.

As stipulated in the e-government strategy the basic guidelines for the attainment of e-government objectives are:

- Provision of e-services through available information technologies and resources in the institutions.
- Development of a meta-information system, ensuring an information environment for integrated administrative services.
- Implementation of Internet-based technologies for informing, communicating and providing services to citizens and organizations.
- Development of the technical infrastructure.

ICT in Public Administration

The achievements in this respect for the time being are the following:

a. A National Asynchronous Transfer Mode (ATM) Network is in a process of development.
b. An integrated optical communication network linking ministries and other state agencies in Sofia is already in operation. The network consists of: intranet/VPN solution, open to the public with its own security system; optic-fibre channels for high speed; systems that secure public access to national registries and support of

[21] See – CBN, IT Public Procurement in Bulgaria, link

internal management system for documents; and a two way Internet connection of at least 2 Mbps. It is expected to cover the whole country in 2003.

c. Over 70 national registers and information systems have been developed and implemented. Some of them are electronically accessible but the major drawback of the national information resources is the lack of integration among them.

IDC IT Research & Analyses and the Council of Ministers have recently conducted a survey among central and local administrations on IT equipment and human resources. According to it nearly 80% of workplaces in central and 20% of workplaces in local government are equipped with computers.
Web presence in public administration has grown although there is still significant room for improvement. In 1997 there were only two sites while in 2002 this number is more than 130 (meaning that around 90% of state institutions have their own sites).

Trends in innovation

With respect to patent applications[22] there are basically two trends. From 1990 to 1997 the total number of these applications is declining although in the next period 1998-2001 the trend is reversed for patents issued according to foreign (international) procedure. Despite the rising dynamics in the second period the total number of patent applications per annum is still far away from its initial level in the beginning of the 1990s.

Foreign patent application means that the application is submitted according to international procedure[23]. Bulgarian means that the application is submitted according to the national procedure. This procedure might be initiated by firms operating on the territory of Bulgaria.

During the transition period when the economy is experiencing profound restructuring it is expected that innovative activity will face difficulties resulting in less applications for new patents. The registered trend of moderate increase in the number of patent applications after 1998 is an indicator that major reforms have already occurred and business entities have a new strategy intensifying investments, which is basically preceding the increase in innovative endeavors. After 1998 there is a constant growth in new foreign applications (following international procedure). This reflects larger interest to invest and operate on the territory of Bulgaria.

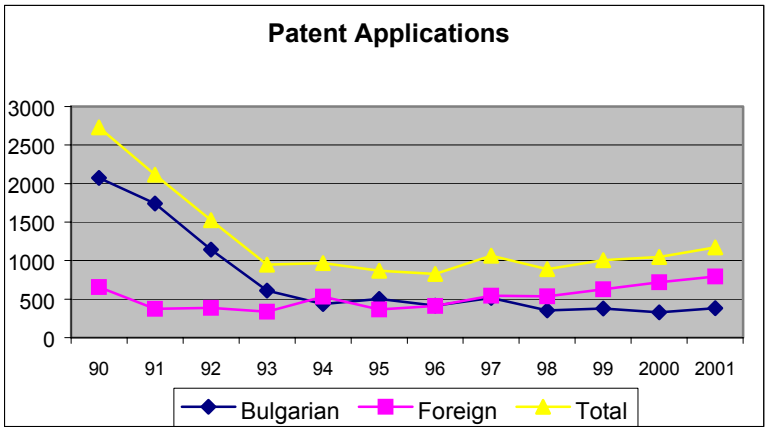
Table D10: Patent Applications

	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001
Bulgarian*	2072	1740	1141	612	437	503	415	517	354	380	329	381
Foreign**	657	374	385	335	532	365	413	545	535	626	718	792
Total	2729	2114	1526	947	969	868	828	1062	889	1006	1047	1173

Reference: Patent Office of the Republic of Bulgaria
Notes: * Bulgarian means that the application is submitted according to the internal (national procedure)
** Foreign means that the application is submitted according to the international procedure

[22] We envisage both patents issued to private and public companies
[23] For instance a given firm can submit a patent application in Belgium that is also covering Bulgaria and Croatia.

Figure D2: Patent Applications



Reference: Patent Office of the Republic of Bulgaria

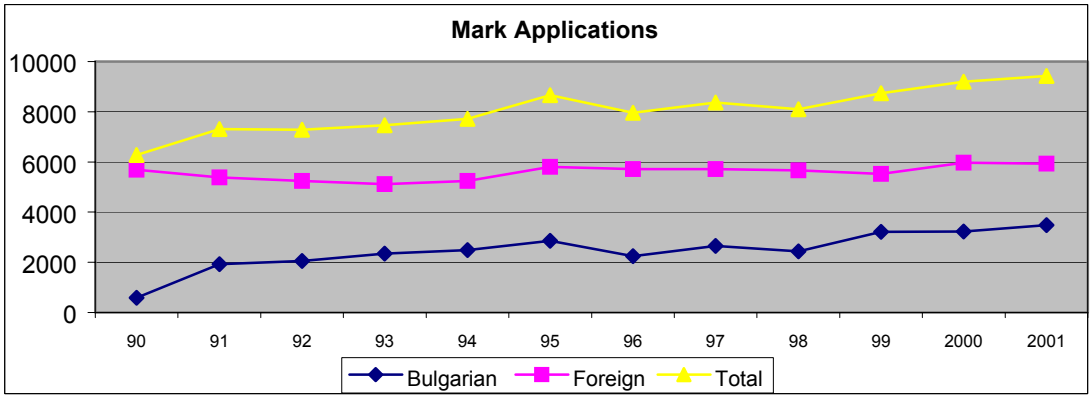
The applications for new marks differs from the previous indicator as economic logic because it is to some extent natural passing through socialist system to market-oriented system to have an increase in marks starting from a very low level. So, our understanding is that when this increase is progressive within a given period it could be considered as intensification of the overall economic activity. This is partly happening after 1998.

Table D11: Mark Applications

	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001
Bulgarian *	593	1927	2049	2348	2481	2860	2250	2652	2431	3212	3229	3488
Foreign**	5687	5378	5238	5118	5240	5803	5713	5711	5663	5523	5970	5936
Total	6280	7305	7287	7466	7721	8663	7963	8363	8094	8735	9199	9424

Reference:: Patent Office of the Republic of Bulgaria
Notes: * Bulgarian means that the application is submitted according to the internal (national procedure)
** Foreign means that the application is submitted according to the international procedure

Figure D3: Mark Applications



Reference: Patent Office of the Republic of Bulgaria

D6 R&D Expenditures

During the period 1993-2000, the gross domestic expenditure on R&D (GERD) as a percentage of GDP declined from 1.18% to 0.52% (relying on Eurostat data for Bulgaria – see the table bellow). Comparing Bulgaria to Romania, we reveal a common development pattern as GERD in Romania (as a % of GDP) decline from 0.91% to 0.37% within the same period. If compared with the more advanced in terms of economic reforms Slovenia, both countries are lagging in terms of this indicator. The difference comes, on the first place, from the better

initial position of Slovenia (1.6% in 1993) and on the second, is resulting from better performance of Slovenia afterwards.

Table D12: GERD (Gross domestic expenditure on R&D) as a percentage of GDP

	1993	1994	1995	1996	1997	1998	1999	2000
Bulgaria	1.18	0.88	0.62	0.52	0.51	0.57	0.56	0.52
Romania	0.91	0.77	0.8	0.7	0.58	0.49	0.4	0.37
Slovenia	1.6	1.76	1.7	1.44	1.42	1.48	1.51	1.52

Reference: Eurostat

Financing by abroad of GERD as a % of GDP significantly increased after 1997 despite some inter year fluctuations in the case of Bulgaria (see the table below).

Table D13: GERD (Gross domestic expenditure on R&D) as a percentage of GDP Financed by abroad

	1995	1996	1997	1998	1999	2000
Bulgaria	0.04	0.25	5.69	3.85	4.07	5.31
Romania	-	2.66	2.93	1.74	2.46	4.9
Slovenia	2.94	2.69	8.25	6.72	5.63	6.21

Reference: Eurostat

The highest relative share of expenditures on R&D is concentrated in the South West region of Bulgaria (between 80% and 85%). This is mainly because the central administration, and most of the higher education and research institutes are allocated in the capital city.

Table D14: R&D Expenditures by regions in Bulgaria (EUR mln)

	1997	1998	1999	2000
Total	46.4	64.7	68.7	71.2
North West Region	0.2	0.4	0.5	0.4
North Central Region	1.2	2.2	2.0	2.1
North East Region	1.1	3.3	3.5	3.7
South East Region	2.2	2.4	2.7	2.1
South Central Region	2.2	3.0	3.0	4.0
South West Region	39.5	53.4	57.2	58.9

Reference: NSI

Non-financial enterprises[24]

Bulgarian government statistics is proving data on non-financial enterprises separately. This data is useful for acquiring better notion on R&D expenditures performed by enterprises producing and trading with goods and non-financial services.

We focus on the following items in the non-financial enterprises' balance sheets: research and development products, software products and patents, licenses, consignments, know-how, firm and trade marks.

The period 1998-2000 is characterized by significant increase of the value in respective balance sheets of research and development products and patents, licenses, consignments, know-how, firm and trade marks.

[24] Non-financial corporations are entities whose principal activity is the production and/or trade with goods and/or nonfinancial services.

Software products are a different case. There were several attempts to enforce firms to fight against piracy either by augmenting sanctions or strengthening control. This policy appears to have decisive importance for the partial legalization reflected by the increase in value of this item in the aggregated balance sheet of the non-financial enterprises.

Table D15: Share of R&D, Software and Patents in Non-financial Enterprise Balance sheets (in EUR mln)

	1991**	1992**	1993	1994	1995	1996	1997	1998	1999	2000
Research and Development products	1,2	4,1	4,3	3,4	3,1	0,9	0,8	6,4	7,7	8,0
Software products*	0,0	0,0	0,0	0,0	0,0	5,6	4,9	14,1	31,4	45,6
Patents, licenses, consignments, know-how, firm and trade marks	9,8	7,5	22,4	14,4	32,9	13,0	11,3	92,6	93,1	145,3
Total	12806,4	24038,4	29912,4	19145,6	18358,0	17410,6	13358,4	17119,5	19975,9	24480,1

Reference: NSI
Notes: * Calculated together with patents for the period 1990-1995
** Public, municipal and cooperative enterprises only

Private and Government Contribution to R&D

Bulgaria is characterized by the highest government participation in financing GERD among all transition countries in 2000 (according to Eurostat data http://EURpa.eu.int/comm/EURstat/Public/datashop/print-product/EN?catalogue=E). This is due to significant increase in government financing after 1997. Compared to Romania and Slovenia, government participation in GERD is almost twice higher in Bulgaria in 2000. The obvious conclusion is that the private sector in Bulgaria has a smaller relative share in gross domestic expenditure on R&D financing than any other transition country (according to Eurostat data).

Table D16: Percentage of GERD (Gross domestic expenditure on R&D) financed by government

	1992	1993	1994	1995	1996	1997	1998	1999	2000
Bulgaria	27.19	32.3	35.32	39.09	35.14	67.76	69.66	69.7	69.18
Romania	-	-	-	-	54.87	42.4	52.91	46.66	40.8
Slovenia	49.25	48.32	45.29	40.62	43.4	37.05	39.91	36.75	40.03

Reference: Eurostat

Data provided by NSI (National Statistics Institute) by institutional sectors reveals that the share of the government sector in gross R&D expenditures is slightly declining between 1999 and 2001. Meanwhile, the contribution of the higher education is constantly growing between 1997 and 2001.

The share of enterprises (both financial and non-financial) is far below the government participation level (despite the growing tendency registered between 1997 and 2001).

Table D17: R&D Expenditures by Institutional sectors (million EUR)

	1997	1998	1999	2000	2001
Enterprises	10.6	12.1	14.1	15.2	14.5
Government	32.1	48.9	50.3	48.9	47.5
Higher education	3.4	3.3	4.2	7.0	8.7
NPOs	0.3	0.4	0.1	0.1	0.1
Total	46.4	64.7	68.7	71.2	70.8
R&D exp. In % of GDP	0.51	0.57	0.57	0.52	0.47

Reference: NSI

According to NSI (National Statistics Institute) data, the total R&D personnel is diminishing between 1997-2001. This holds true for all institutional sectors as classified by NSI. The sharpest decline is registered for the Enterprises sector (49%). The smallest stagnation is revealed for the government (15%).

Table D18: R&D Personnel by Institutional sectors (number)

	1997	1998	1999	2000	2001
Total	21,908	21,766	18,451	16,853	16,671
Enterprises	3,909	3,751	2,806	2,273	1,972
Government	12,990	13,409	11,544	11,353	10,974
Higher education	4,821	4,449	4,020	3,166	3,616
NPOs	188	157	81	61	109

Reference: NSI

Another illustration of private and government contribution to R&D is the Share of R&D, Software and Patents in Non-financial Enterprise Balance sheets in Public sector and in Private sector. Data are for the period 1993-2000 as 1993 is the first year, for which the National Statistics has figures for the private sector.

In both cases the major growth of investigated items is observed for the period 1998-2000.

Table D19: Share of R&D, Software and Patents in Non-financial Enterprise Balance sheets in Public sector (in EUR mln)

	1993	1994	1995	1996	1997	1998	1999	2000
Research and Development products	4,1	2,6	1,8	0,7	0,6	1,5	2,6	2,5
Software products*	0,0	0,0	0,0	3,1	1,8	5,2	9,4	15,3
Patents, licenses, consignments, know-how, firm and trade marks	10,4	6,2	12,2	2,8	2,1	4,2	4,6	23,7
Total Assets	28 649,7	17 344,7	15 514,4	12 557,4	8 192,9	8 985,2	8 636,2	8 023,0

Reference: NSI
Note: * Calculated together with patents 1993-1995

Table D20: Share of R&D, Software and Patents in Non-financial Enterprise Balance sheets in Private Sector (in EUR mln)

	1993	1994	1995	1996	1997	1998	1999	2000
Research and Development products	0,2	0,9	1,3	0,2	0,2	5,0	5,1	5,5
Software products*	0,0	0,0	0,0	2,5	3,1	8,8	22,0	30,3
Patents, licenses, consignments, know-how, firm and trade marks	9,5	5,6	20,7	10,2	9,2	88,4	88,5	121,6
Total Assets	1 182,2	1 711,4	2 843,7	4 853,1	5 165,5	8 134,4	11 339,7	16 457,1

Reference: NSI
Note: * Calculated together with patents 1993-1995

Further development (the government projection)

According to the innovation strategy in the pipeline[25], total expenditures on R&D are expected to increase from EUR 89.6 million in 2003 to EUR 349.6 million in 2013. Public participation is planned to grow up from 0.42% (EUR 69.7 million) of GDP in 2003 to 0.56% (EUR 170.3 million) of GDP in 2013. Government's expectation on private financing presumes an increase from 0.12% (EUR 19.9 million) of GDP to 0.32% (EUR 97.3 million) within the same period.

Table D21: Forecast of R&D Expenditures in 2003-2013

	Expenditure on R&D	Expenditure on R&D from the public sector	Expenditure on R&D from the public sector	Expenditure on R&D from the private sector	Expenditure on R&D from the private sector
	Million EUR	% of GDP	Million EUR	% of GDP	Million EUR
2003	89.6	0.42	69.7	0.12	19.9
2004	111.7	0.43	75.1	0.13	22.7
2005	136.3	0.44	81.0	0.14	25.8
2006	155.4	0.45	87.9	0.15	29.1
2007	175.9	0.46	95.2	0.17	35.2
2008	198.3	0.48	105.8	0.17	37.5
2009	222.9	0.49	115.0	0.2	46.9
2010	249.9	0.51	127.5	0.23	57.5
2011	280.1	0.52	138.7	0.26	69.4
2012	313.3	0.54	153.8	0.29	82.6
2013	349.6	0.56	170.3	0.32	97.3

Reference: Innovation strategy of the Republic of Bulgaria

D7 Investment levels in the ICT sector

The table below is a more detailed presentation of expenditures on acquisition of tangible assets by kind projection and research. The NSI started compiling these data in 1996. For some years data are not available because of changing software and restructuring the whole system during the transition period.

All investigated ICT sub sectors registered growth, as this trend was particularly intense for Manufacture of electrical machinery and apparatus n.e.c., Wholesale trade and commission trade, except of motor vehicles and motorcycles and Post and telecommunications.

[25] The Bulgarian government is in the middle of adopting of – 'Innovation Strategy of the Republic of Bulgaria'

Table D22: Expenditures on acquisition of tangible assets by kind projection and research (in EUR thousands)

	1996	1997	1998	1999	2000	2001
30.Manufacture of office machinery and computers	1,7	13,5	0,2	*	n.a.	n.a.
31.Manufacture of electrical machinery and apparatus n.e.c.	5,6	4,8	108,0	27,6	23,0	200,9
32.Manufacture of radio, television and communication equipment and apparatus	0,6	0,6	15,9	n.a.	9,7	27,1
33.Manufacture of medical, precision and optical instruments, watches and clocks	0,9	0,2	0,7	*	*	*
51.Wholesale trade and commission trade, except of motor vehicles and motorcycles	719,6	436,7	1 303,4	2 077,4	5 248,4	2 689,4
64.Post and telecommunications	50,2	550,3	98,5	197,9	298,1	1 488,4
71.Renting of machinery and equipment without operator and of personal and household goods	n.a.	n.a.	18,9	n.a.	*	n.a.
72.Computer and related activities	0,7	n.a.	0,4	29,7	4,1	17,4

Reference: NSI
Notes: n.a. – not available
* - According to the Statistics Law, the National Statistics Institute is not allowed to disclose information when requested data is aggregated data from less than three persons and/or when the relative share of one person is more than 85%.

Role of specific sectors in take-up

The most rapidly growing ICT sector in Bulgaria is the Telecommunications one. The value added within this sector increased from 2.85% of GDP in 1996 to 7.57% of GDP in 2002[26]. This remarkable growth raised this sector ranking from the 11th place in 1996 to the 4th place in 2002 in terms of created value added[27].

Looking beyond figures the situation is somewhat complicated, especially for the fixed line provider – BTC. Its privatization got stuck somewhere between the Supreme Administrative Court and the Supervising Council of the Privatization Agency (this is the situation as of July 2003).

The first mobile operator started in 1993 - Mobikom, relying on non-digital technology. The first digital operator (Mobiltel) became operational in 1995 followed by a second in 2001 (Globul – OTE). In 2002 the two mobile operators had around two million clients.

Conclusion

The genuine development of the ICT sector in Bulgaria started after 1998. The conventional indicators that we have envisaged pointed out that after this year the ICT related investments are rapidly growing. Further illustrations of this hypothesis are the patent applications, which also register increasing trend during the last five years.

The fastest growing sector within the ICT is the telecommunications despite the postponed and problematic privatization of BTC.

[26] For more information see ChronoRank' 2002, web site http://www.cbn-bulgaria.com
[27] The first three sectors in 2002 are: Petrol and Gas Production, Electricity Producing and Transport and Forwarding.

Despite registered growth e-commerce is still in *status nascendi*. It is a clear indication that restructuring takes time, skills, organizational change and perseverance. However if the current growing trend is sustained perspectives for this business to develop look optimistic.

SWOT Analysis - Presence of Most Relevant Economic Activities for IST Applications

Strengths	**Weaknesses**
• Investments in R&D are steadily increasing after 1998, although still in a low level as a share of GDP; • ICT investments in industry gain momentum after 1996. The same happened in services after 1999; • Increase in patent applications after 1998 (mainly foreign, following international procedure)	• Despite registered growth e-commerce is still in *status nascendi*; • Postponed privatization (BTC and others)
Opportunities	**Threats**
• Sustaining and augmenting current investments in ICTs. It will create positive spill over for development of related businesses; • The e-government strategy in the pipe line is a huge opportunity to decrease transaction costs for businesses to deal with government;	• Further delay in privatization deals (mainly BTC);

E. IST PENETRATION RATES – TIME SERIES ON INFRASTRUCTURES, EQUIPMENT, USAGE[28]

E1. E-Government

Bulgaria has made its first steps in the field of e-Government, which includes the use of ICT by central and local administrations for the services they provide in order to achieve greater efficiency and higher quality. Given the lack of official statistics on the availability of computers in central and local government, experts interviewed by Vitosha Research assess that about 18 percent of all workplaces in public administration are presently computerized. Internet connectivity is widely varied: 80-100 percent of computers in regional authorities, 70-80 percent of these in ministries and less than 20 percent of those in municipalities are currently hooked up to the Internet. On average, about 20 percent of computers in public administration have access to the Internet.

Bulgaria's public administration has made a remarkable progress in terms of its Internet presence. While in 1997 there were only two government websites, this number grew to 130 in 2002. Over 90 percent of central government agencies and public institutions have websites, as well as 4-5 regional authorities, and about 30 municipal administrations. A couple of comprehensive government websites are currently available to the public. In most cases, however, the information is static and not regularly updated. A few websites (e.g. www.taxadmin.government.bg) provide some degree of interactivity, mostly downloading of forms. The implementation in practice of the new law on electronic signatures is expected to create new possibilities for processing of forms and online payments. As things stand now, the public administration websites are visited by a small number of people – about 4.3 percent of the population and about 6 percent of companies, according to Vitosha Research.

E2. ICT`s penetration in education

Basic ICT education was introduced to Bulgarian secondary schools in the 1999/2000 school year. A general course on Informatics and IT is currently taught at ninth through eleventh standard grades at all schools nationwide (for more details please see section G in the report).

Most Bulgarian universities are connected to the Internet but this capacity is very limited and Internet resources are not integrated into the learning process. With the exception of a few technical and engineering schools, Internet is rarely used for education or research. Practically all universities have registered Internet sites. ICT education in mid 1980s to early 1990s was well developed in specialized schools – mathematical schools, foreign language schools and some technical secondary schools, but it covered less than 5 percent of the students.

Information about the use of ICT in Bulgaria's educational system is fragmented and often simply unavailable. The Ministry of Education keeps a record of the number of computers used in schools but it has little information about connectivity. It is also hard to make an assessment of the situation in higher education – the existing 48 colleges and universities providing training to 216 926 students have academic autonomy and no government agency collects comprehensive information about them.

[28] The sources of the following statement is "BULGARIA: ICT INFRASTRUCTURE AND E-READINESS ASSESSMENT", ARC Fund 2002, www.ict.bg, www.idg.bg, www.investor.bg

The penetration of ICT in Bulgarian schools is relatively low, compared with EU countries. On average, Bulgarian schools have one PC for 66 students. The situation is somewhat better at the secondary school level where a mix of government support and local community efforts have brought computers to the classrooms over the past 4-5 years. In January 2001, the Ministry of Education reported that around 50 percent of the secondary schools (514 out of 1023) were equipped with at least a single computer laboratory with at least 5 networked PCs (486 or Pentium).

There is no data on the number of computers used in primary and elementary schools but the situation is generally much worse.

Most Bulgarian universities and colleges also have a paucity of computer resources, although the necessary investments in hardware and connectivity are becoming more common, mostly though international programs and donor support. Experts assess the number of PCs at the universities in Bulgaria to be about 20 000. Penetration is highly uneven. For example, the American University in Bulgaria (AUBG) reports around 550 PCs for 700 students (an almost 1:1 ratio), while other universities have one computer for over 100 students. In many cases this equipment is used only in administration (e.g. in accounting) and not for education or research. With the only exception of AUBG no other university in the country currently offers its students free access to computer labs with Internet connections.

A more advanced (optional) course is offered to twelfth-graders. Although the state-designed curriculum provides a solid first step at introducing secondary school students to computers and IT, the courses are largely theoretical since infrastructure is still lacking or inadequate, and teachers are ill-prepared and often unaware of the latest developments in the field. Teacher access to computers is available in few or no schools.

Overall the level of integration of ICT in education outscores that measured in other categories of e-readiness but it remains unsatisfactory as a whole. There is a sense that Bulgarian education is declining somewhat in quality and is subject to further erosion. One of the possible steps in improving the quality is schools and universities to be wired to the Internet in a matter of urgency that may prevent most of the reasons for this tendency; new curricula must be developed that integrate ICT in the learning process and promote group work via computers, WWW research, and so on.

E3. Consumer Access to ICT

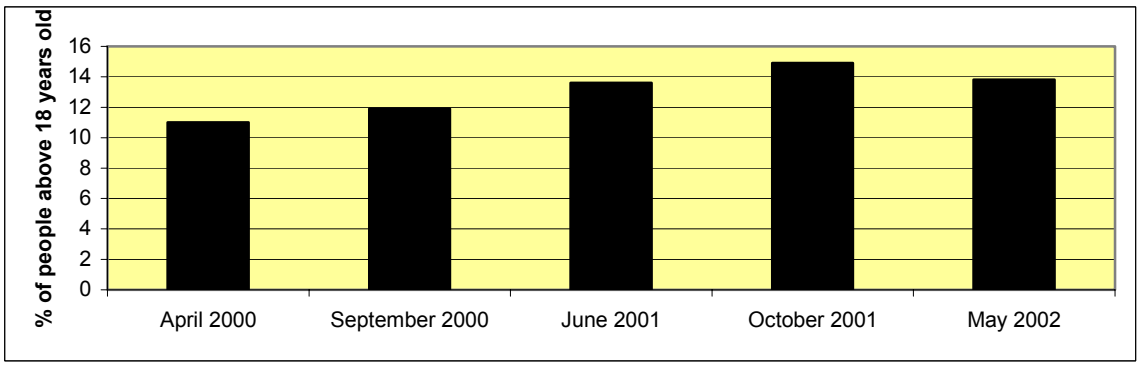
An accurate and reliable assessment of the number of Internet users in a given country is a complex task. Difficulties arise on account of the dynamic expansion of the Internet, as well as of a viable methodology for collecting such data. The present analysis largely draws on data from national representative surveys conducted by Vitosha Research agency in the period 1998-2001. A statistical data from Eurostat “Statistics in focus”, Theme 4 – 17/2002 is also used.

1. Access to computers

Survey findings indicate a low level of penetration of information technologies in the daily life of Bulgarians. The roughly number of people who have access to PC above 18 years of age in May 2002 is about 886,000 people (13.8% of the adult population). The main socio-demographic conclusions from the survey, conducted by Vitosha research are as follows:

- The people with higher education make up the largest share of those having access to computer – in May 2002 49% of the representatives of this group had computer access;
- The highest level of PC usage is observed among the 18-40 age group;
- Whereas in 2000 there were practically no gender differences in terms of computer access, in May 2002 the share of women with computer access was nearly 5% higher than that of men;
- Computer access is concentrated in the bigger cities and mainly in Sofia.

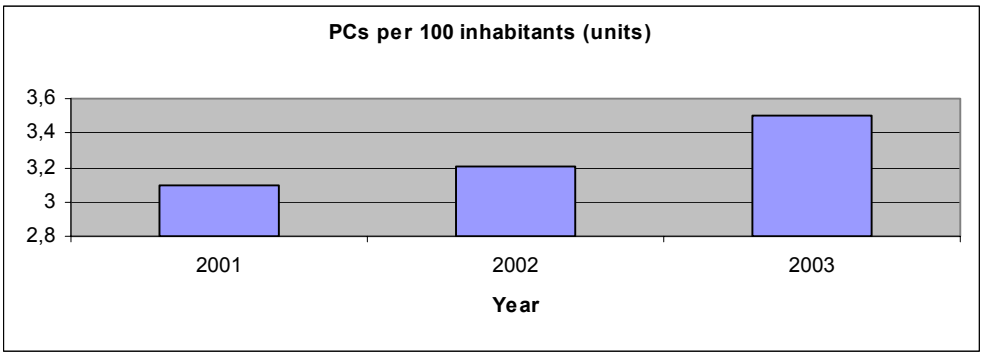
Figure E1: Share of People with Access to Computers



Reference: Vitosha Research

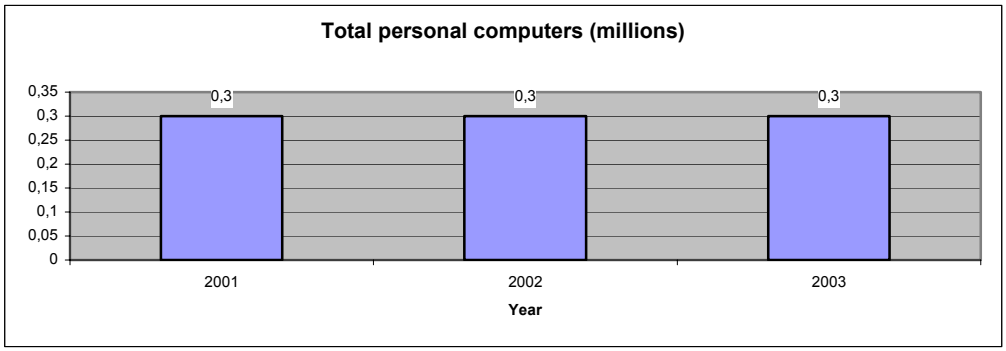
The Eurostat data for numbers of computers shows stable tendency. However, we can assert (based on data per units) that in time people tend to buy personal computers more frequently because of the many opportunities offered by IT companies and big retail chain stores. The consumer credits granted almost immediately ease the access to such facilities nowadays.

Figure E2: PCs per 100 inhabitants (units)



Reference: Eurostat, Communications (theme4/coins/telecom/t_acces1)

Figure E3: Total personal computers (millions)

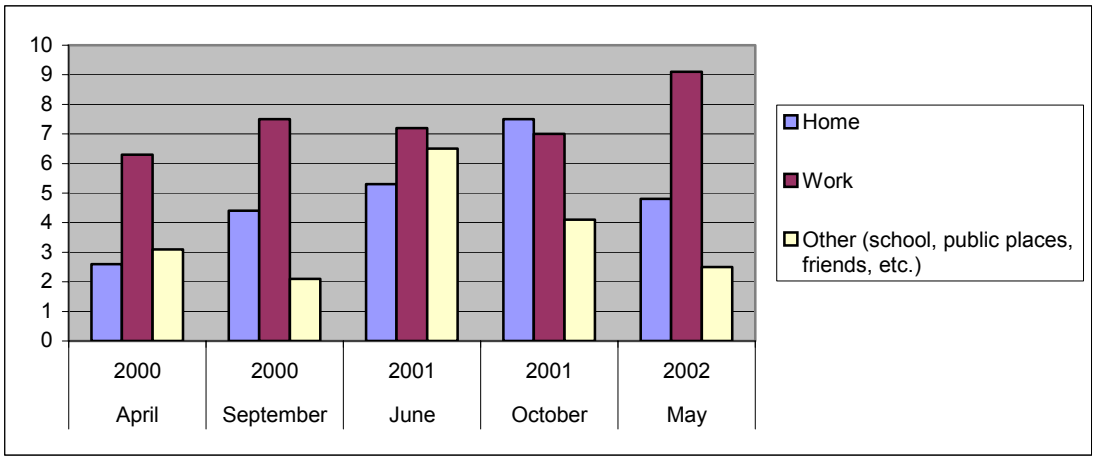


Reference: Eurostat, Communications (theme4/coins/telecom/t_acces1)

2. Penetration of computers in households

The main assumption made is that every computer, even if it is not so modern, is capable of Internet access. This figure is important since it confirms that the majority of Internet users in Bulgaria are not home users but access the Internet from other places (e.g. Internet cafes, public access points, schools and universities, etc.). The main reason for this distribution of Internet access points is again the overall economic situation which makes an investment of more than four average monthly salaries for a modern computer still impossible for the great share of Bulgarian households. As a whole, about 4.9 percent in June 2001 of the households are reported to have a computer at home and is growing through 2002 as seen from the Figure below.

Figure E4: Computer access location (%)



The table shows the locations where Bulgarians typically have access to computers:

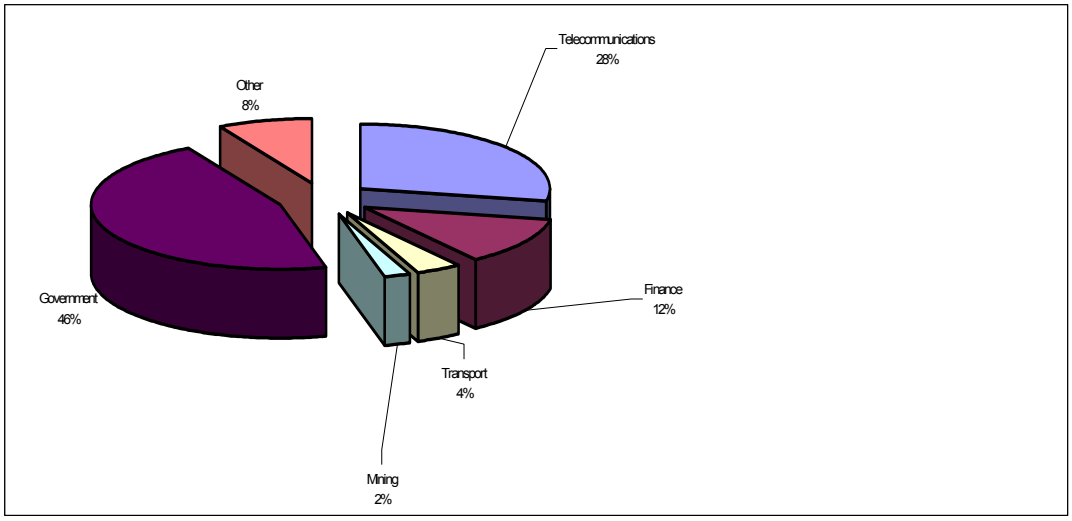
- The largest part of those with access to computers performs this in their workplace.
- The share of PC home users increased steadily in the period 2000-2001. In 2002 this tendency did not continue eventually because of the trend of increasing the work access with relatively high share.

3. Computers in business

Unfortunately, computer and Internet usage in business has not been studied systematically and by representative samples. Nevertheless, a few specialized studies targeted at different types of companies could serve as a starting point for analyses.

At the end of 1999 around 23% of SMEs had computers and 5.7% had intranet. A study of the innovation potential of Bulgarian SMEs in third quarter of 2000 found that 40 % of the companies used electronic networks, databases and Internet. According to Vitosha Research estimates, around 30% of the active companies in Bulgaria use computers in their daily work. Computers in business are not uniformly distributed and are not effectively used. Only 7.3 % of workplaces have PCs installed, and only 20% of companies with computers have built their own intranets. New computers in private business (excluding finance and telecom sectors) are rarely shipped. The reason is because in the majority of companies, computers are being used for document processing, accounting and legal information systems. Fax machines and telephone, as well as personal contacts, are perceived as key to doing business.

Figure E5: Shipment of new computers by sector



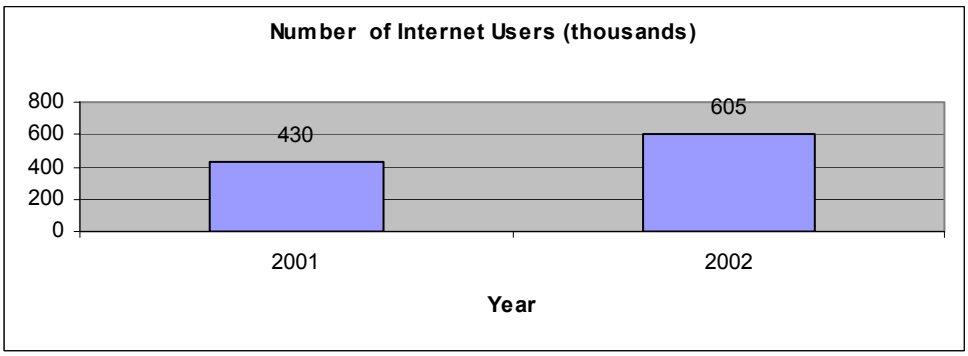
Reference: IDC 2000

Private business and home users segment altogether account to only 14%of all new shipments. The government has the largest share of new computer imports – 46% of the total volume.

E4. Access to Internet

There is a lasting and clear tendency towards increased use of the Internet by those who have access to PCs. In the past few years the number of people declaring they have access to the World Wide Web and have been using it ever more frequently, has increased several-fold

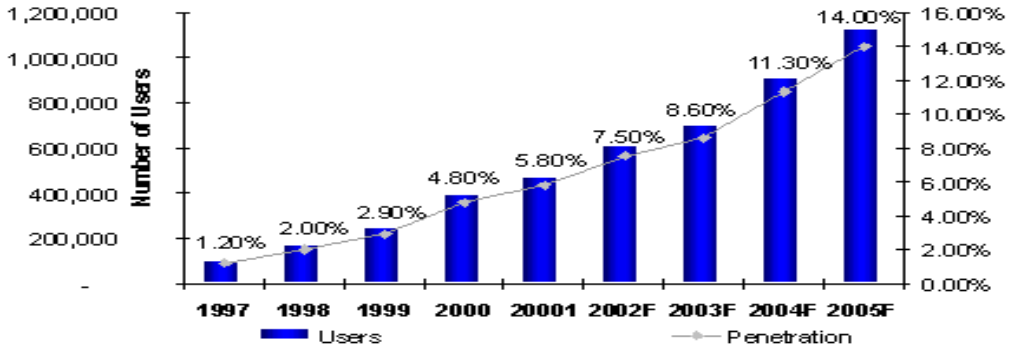
Figure E6: Number of Internet Users



Reference: Eurostat, Communications (theme4/coins/telecom/t_acces1)

We can assert from the trend that people with access to PC are definitely using it to "surf the web" in the last years. This is a result partly from the increasing number of websites, developed through recent years. They offer greater possibilities for access to information and services that facilitates working process.

Figure E7: Internet Penetration Rate per 100 inhabitants



Reference: www.ict.bg (ICT Sector)

Internet consumption in Bulgaria is increasing which is worldwide tendency. It is realized more and more that this is efficient way of communication and recreation. More importantly, there are websites that provide information that cannot be found anywhere else.

Table E1: Place of Use of Internet

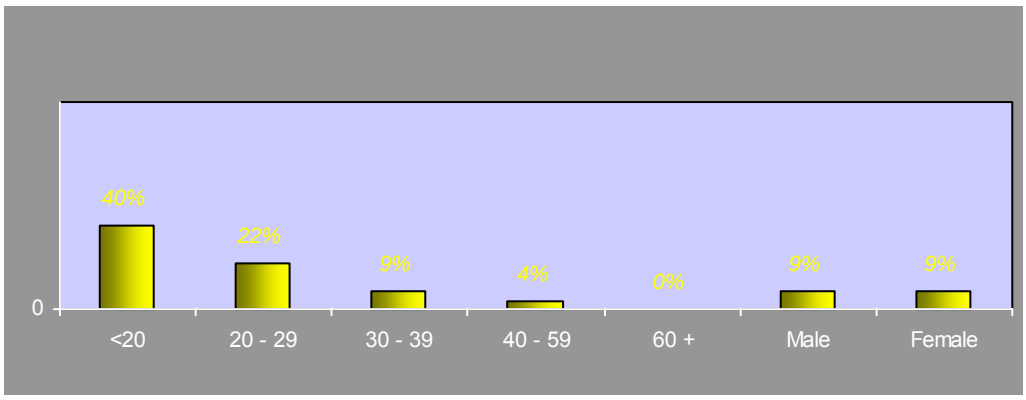
Place of use (% of population –2002)	At home	At work	School / University	Elsewhere	Mobile
Internet users	2 %	2 %	1 %	5 %	0 %

Reference: Global Electronic Report from Taylor Nelson Sofres

Investment in PCs is still not affordable for many of the households and small enterprises and the computer clubs and hubs are the cheapest option. Bearing in mind that most of the Internet usage is related to recreation (i.e. games online, chat), this is not a surprise since it demands gathering of people.

Often, the access to Internet is the alternative for young people for social activities and since they are the bigger Internet user group, we can expect such a distribution.

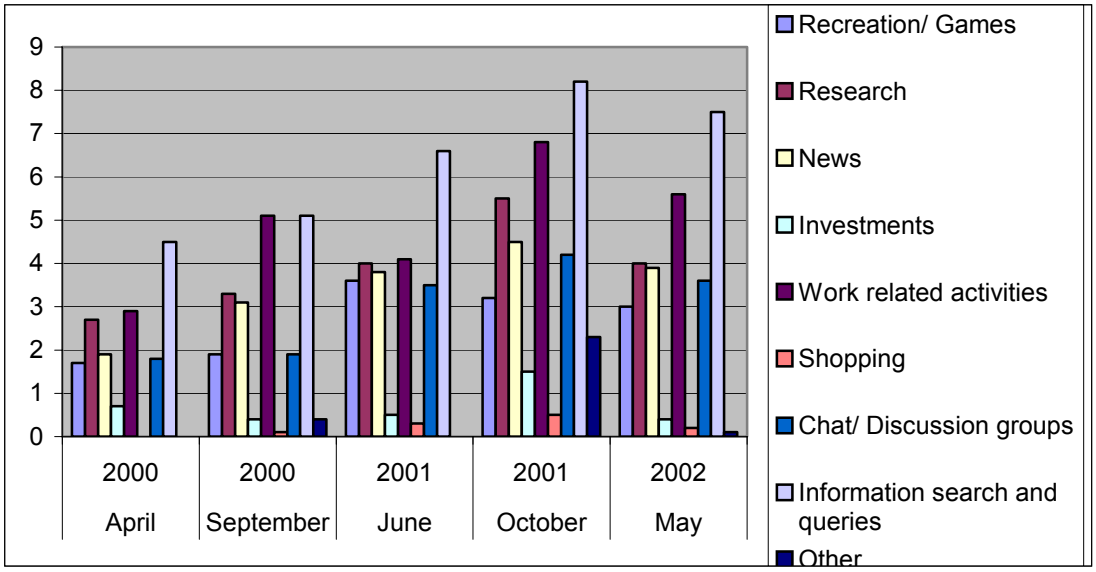
Figure E8: Internet users by specific groups and gender, percentage (2002)



Reference: Global Electronic Report from Taylor Nelson Sofres

Younger people are the bigger group of users among all. They enter in Internet mostly for chatting, online gaming and communication with the rest of the world. Because of the demographic trends (international migration outside Bulgaria is the main tendency in recent years due to unfavorable economic conditions and access to better education), there are almost 177,000[29] emigrants and communication with their relatives is facilitated by Internet. The civil society in Bulgaria is activating its activities and Internet is viewed as a major information and discussion channel.

Figure E9: Structure of Internet use (%)



1. Public institutions and organizations on the Web

The diffusion of ICT in public institutions and public organizations constitutes an important indicator both as regards their general level of development and the readiness of Bulgarian society to adopt the new information and communication technologies.

Table E2: Public institutions website distribution

	October 1999	**April 2000**	**September 2000**
Elementary and secondary schools	1.9 %	2.3%	3.6%
Higher education	88.1%	92.7%	95.1%
Government	81.3%	85.7%	92.9%
Local government bodies	13.1% (38 out of 28 districts and 262 municipalities)	14.5% (42 out of 28 districts and 262 municipalities)	18.3% (53 out of 28 districts and 262 municipalities)
Hospitals/clinics	0.6% (22 out of 300 medical centers and 3,579 polyclinics and consulting rooms)	0.7% (28 out of 300 medical centers and 3,579 polyclinics and consulting rooms)	0.9% (36 out of 300 medical centers and 3,579 polyclinics and consulting rooms)
Museums	4.4%	6.2%	12.2%
Libraries	0.3%	0.3%	0.5%

Reference: Reports by the European Survey of Information Society

[29] According to National Statistical Office for the period 1992 – 2001(www.nsi.bg).

2. Online media

The first news portals appeared in Bulgaria around late 1996. These included Bulgaria Online (www.online.bg), News.bg (www.news.bg), Netinfo (www.netinfo.bg) and others, which provided relevant news and information on a wide variety of topics of local and international concern from sources including "conventional" media, radio, TV, news agencies, and others. This development was followed by online presence of nearly all daily and weekly editions of national newspapers – *Sega, Monito*r, *Demokratsi*a, *Novinar, Standard*, *Capital* and others. Popular magazines, radio and TV stations, and the national information agencies are also available online. The only exceptions to this pattern are the largest-circulation dailies, *24 Chassa* and *Tru*d, owned by the German media company Westdeutsche Algemeine Zeitung, which do not yet have electronic editions for purely commercial reasons.

More recent developments have included the launch of the information portal – Mediapool (www.mediapool.bg), an electronic news agency (www.bgnes.com), as well as specialized portals providing economic, business and financial news, such as Econ.bg (www.econ.bg) and Bulgarian Business Advisor (www.bba.bg). During the latest parliamentary elections (in June 2001) and local elections (October 2003) some web sites introduced direct monitoring of election results, including through multimedia applications.

At present Bulgarian Internet users are able to choose among a wide array of web resources, most of them still for free, including nearly all of the national news institutions, as well as a number of local media, which offer reviews and analyses online. Many sites include fully searchable archives of news dating back 5-6 years. Some of them register over 3-4,000 visitors daily.

Certain sites of "conventional" media also maintain open discussion forums, which generate further user interest and serve as a secondary source of information, reflecting popular opinions and attitudes on the hot topics of the day. Good examples in this respect are the sites of *Sega*, *Dnevni*k, and *Standard* dailies.

The increasing number of online users has triggered competition among various information portals. As a result they are expanding their databases and adding new services, search options and links.

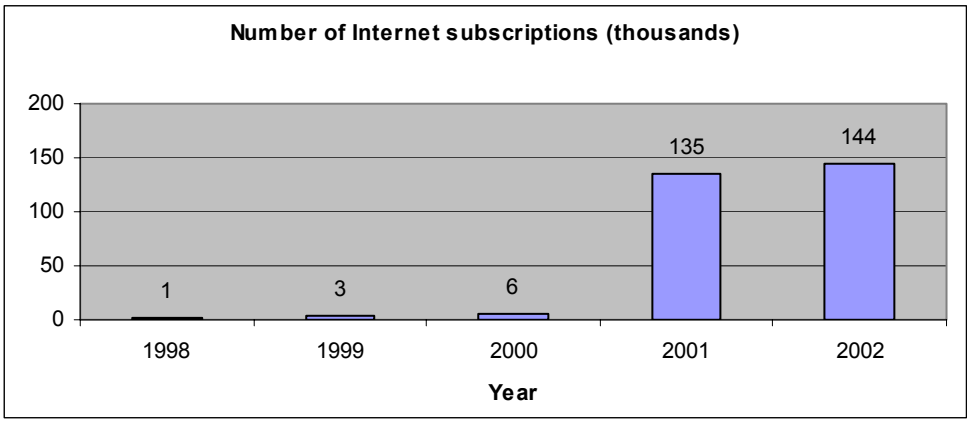
3. Internet and web use in business

Around 40% of companies having computers, or 12% of the active companies, are connected to the Internet. Only 3.85% of employees have access to the Internet, which is predominantly used for email communication. This fact could be explained by two factors – (a) a large amount of outdated computers (prohibiting effective use of the Internet) and (b) lack of understanding among business managers about the role of Internet as a driving force for business development.

There was an initial boom of launching Internet sites by companies in 1999 and 2000. The general pattern was to leave the site very simple and not updated. 2001-2002 marked a slight change of the migration of companies to Internet. New sites tend to be more sophisticated and regularly updates. The growth is rather linear than rapid exponential development (as is the global trend). According to optimistic estimates 5% of Bulgarian companies have Internet sites.

Company sites present mainly basic, static and rarely updated information, often limited to a short company profile, address and brief description of products and services. Expert estimates suggest that 75 percent of company sites fall in this category. The interactive sites and detailed corporate presentations with actual and dynamic information are mostly sites of financial institutions, IT companies and online stores.

Figure E10: Number of Internet subscriptions (thousands)

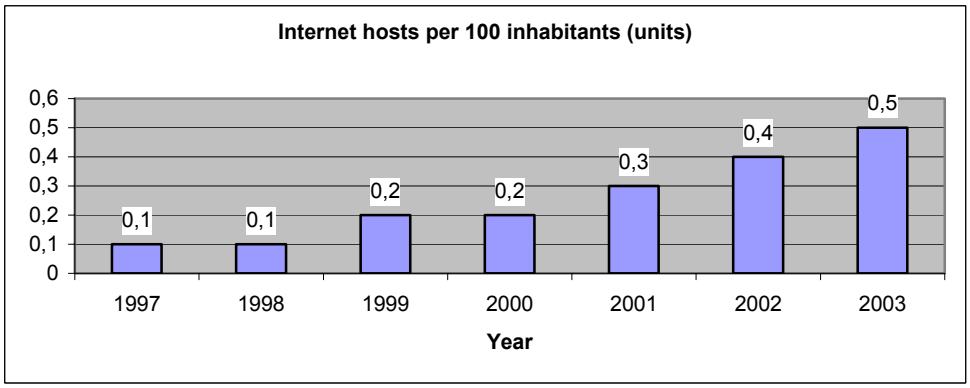


Reference: Information Society Statistics, Data 1997-2002, European Commission, Theme 4

4. Number of domains registered under the country's TLD

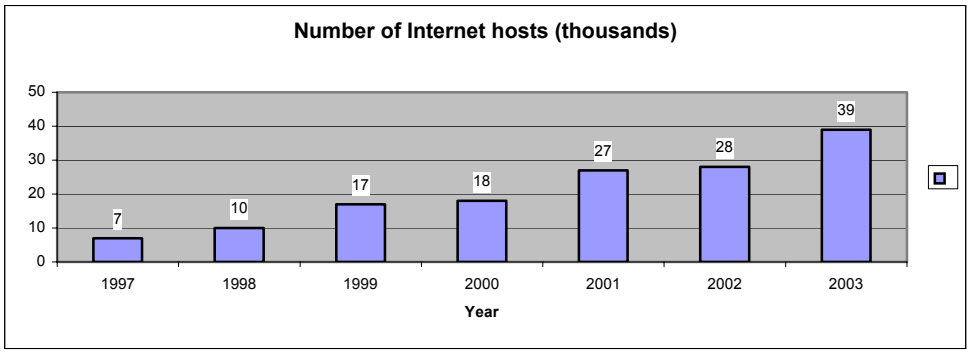
The number of domain names under the country's top-level domain (TLD) has grown by more than 50% in the 2003. Although twice as high compared to 2000, it is still lower that the growth rate reported in developed countries. The main obstacles relate to the slow development of online B2B and B2C solutions, as well as the high price charged by the only country's TLD manager (i.e. the annual subscription fee is about 2.5 times higher that for a .com domain name). The monopoly position, long registration procedure and the lack of online registration are also serious obstacles.

Figure E11: Internet host per 100 inhabitants (units)



Reference: Information Society Statistics, Data 1997-2002, European Commission, Theme 4

Figure E12: Number of Internet hosts (thousands)



Reference: Information Society Statistics, Data 1997-2002, European Commission, Theme 4

5. Average price of unlimited dial-up Internet access

Since the unlimited (flat fee) Internet access is the most common subscription option available in Bulgaria, it is interesting to keep a record of the market dynamics. Currently, the average price in absolute terms has dropped even below the level in Western countries This can be explained with the increasing competition among Internet Service Providers, but also with the overall economic situation, in which most consumers prefer to pay less for lower quality than *vise-versa*.

However, it should be noted that for the past year and a half the average price has dropped about twice and has reached the minimal feasible value from an economic point of view. In large cities the price of unlimited access is currently about 10-12 USD per month (and was 20-25 USD a year ago). A significant drop is not very likely to occur. The country average is 14,5 USD.

When compared with the minimal monthly wage, the ratio (30%) seems high due to the low level of salaries in Bulgaria (this does not include the telephone call). However, a year ago the same comparison yielded a result of 67%. The decrease seems to make the instant Internet access at least more affordable to home users.

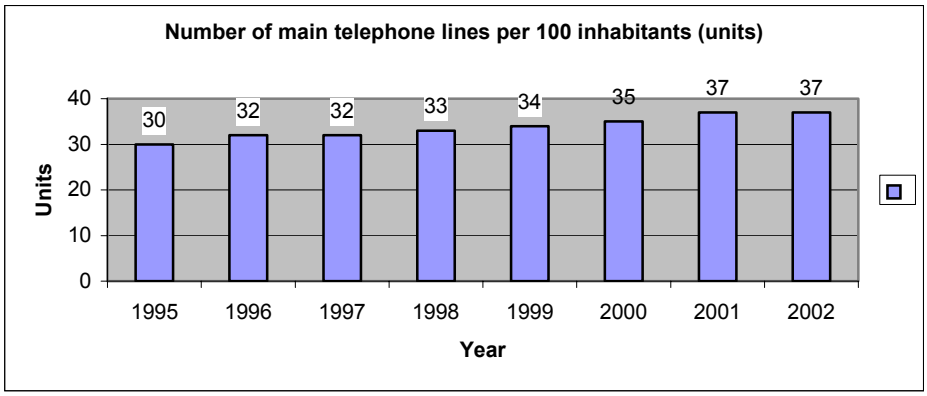
E5. Basic Telephony

1. Tele-density (number of telephone lines per 100 people)

Tele-density is an indicator with the longest observed values. A decade ago Bulgaria had the highest tele-density among the former COMECON countries with a level of about 30 PSTN (main) lines per 100 inhabitants. These lines were entirely old-fashioned analogue connections designed exclusively for voice transmission and did not permit high-speed network access. Often even the quality of voice transmission was poor. Currently, the connection speed over these lines reaches maximum 28.8-33 kbps. According to Bulgaria Online in two-thirds of the cases the speed does not go beyond 19.2 kbps.

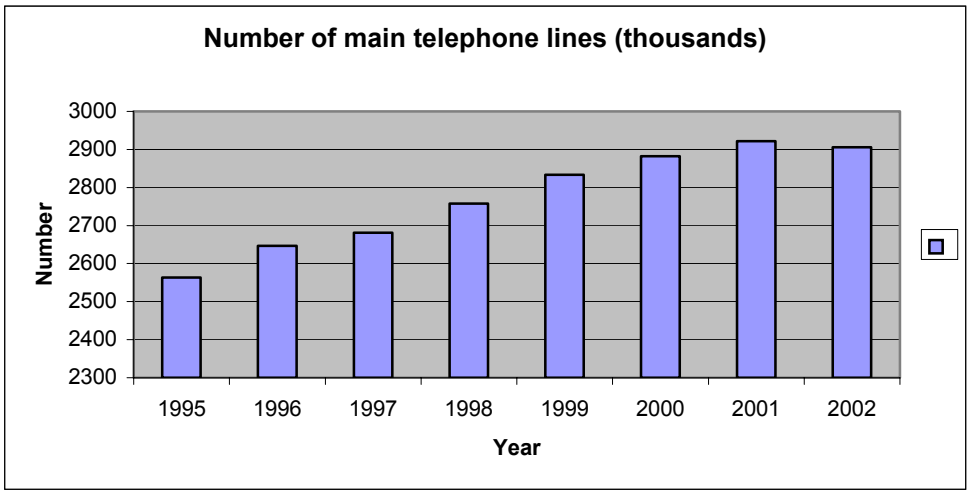
The number of PSTN lines has increased by about 25 percent in the last decade reaching the tele-density of **37 lines per 100 people**, the newly build up lines being all digital, 56 kbps capable lines.

Figure E13: Number of main telephone lines



Reference: Information Society Statistics, Data 1997-2002, European Commission, Theme 4

Figure E14: Number of main telephone lines (thousands)



Reference: Information Society Statistics, Data 1997-2002, European Commission, Theme 4

2. Penetration of phone lines into households

Table E3: Fixed lines

	Dec 31, 2001	Dec 31, 2002	Change
Number of connected fixed lines	2 912 806	2 906 067	- 0.23%
Residential	2 452 636	2 431 621	- 0.86%
Business	460 170	474 446	+ 3.1%
Public	21 512	21 573	+ 0.28%
Penetration per 100 inhabitants	36.53%	36.45%	- 0.22%
Penetration per household	84%	83%	-0.83%
Digitalization rate	15%	20%	+32.8%

Reference: Bulgarian Telecommunication Company (www.btc.bg)

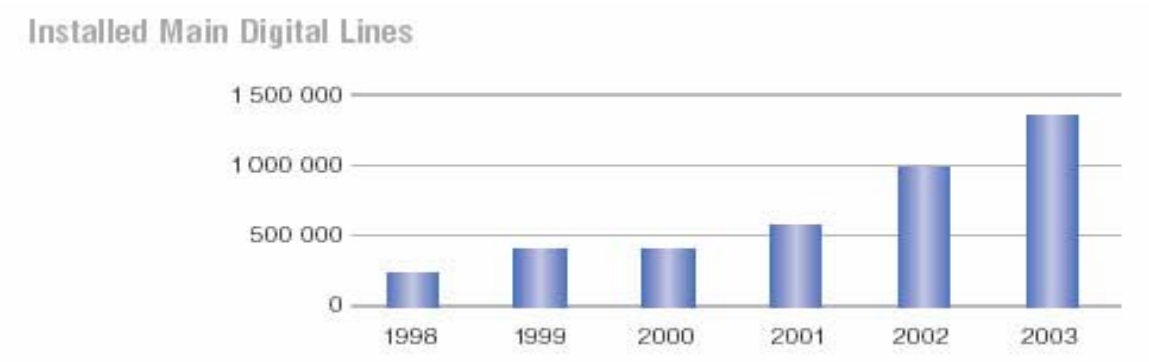
Since most dial-up Internet connections are still made over classical PSTN lines, this is another important aspect of telephony availability. In Bulgaria the number of the operational residential PSTN lines (about 2,453 mln) is close to the number of households (2,956 mln) in year 2001, amounting to density of 84 lines per 100 households. However in representative surveys by Vitosha Research and other sociological agencies households that reported telephone lines are less. Still, Bulgaria proves to have a significant level of PSTN penetration for home and office use, which provides an important communication medium to ¾ of the population. As a comparison, there are 460,170 (according to BTC numbers) main business

lines, although this number refers to officially registered lines. The difference of 5-8 % in favor of residential tele-density against business lines above could be explained by the fact that many companies use residential lines for their everyday business.

3. Penetration of digital phone lines

"Digital" here refers to phone lines that have tone dialing and are 56 kbps capable. The ration of "digital" lines to all lines, as reported by Bulgarian Telecommunication Company, 20 % in 2002, suggests important characteristics of fixed telephony. All new lines are digital and some of the old analogue lines are replaced with digital.

Figure E15: Installed digital lines by BTC



Reference: BTC

4. Penetration of ISDN phone lines (2x64 kbps capable)

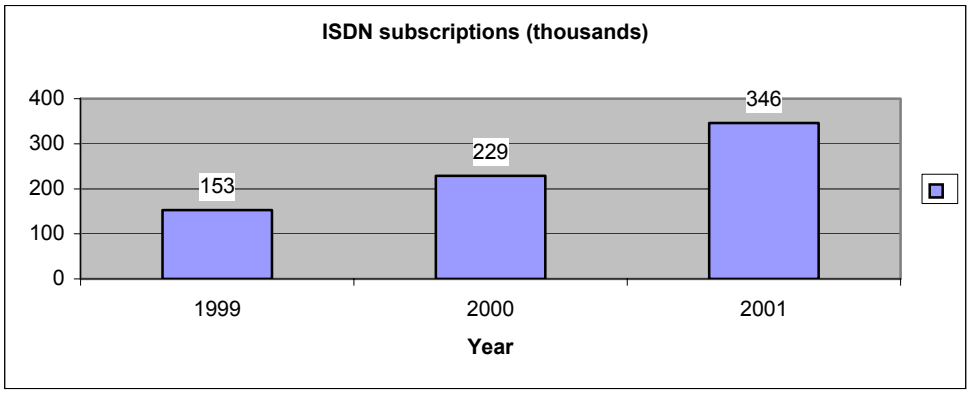
ISDN services were introduced in Bulgaria only about 4 years ago. The short period, together with the higher setup and maintenance fees in comparison with digital phone lines, are the main reasons for the extremely low level of ISDN penetration, reaching only 0.34 percent in measured by numbers, compared to total phone lines. However, we can see from statistics that the penetration of ISDN is accelerating in the past two years and this is mainly due to the highest quality of the connections and fast transmission of data which is see as crucial for the business. More and more firms in Bulgaria are investing money in technology renovation.

Table E4: ISDN lines in Bulgaria

	Dec 31, 2001	**Dec 31, 2002**	**Change**
ISDN BRI (basic rate access)	**9 864**	**17 028**	**+ 72.63%**
ISDN PRI (primary rate access)	**21 210**	**26 640**	**+ 25.6%**

Reference: Bulgarian Telecommunication Company (www.btc.bg)

Figure E16: ISDN subscriptions



Source: Information Society Statistics, Data 1997-2002, European Commission, Theme 4

5. Average price of 1-hour local telephone call

It is hard to estimate the price of a local telephone call. It is dramatically different if depending on the line – digital calls are paid per time, while analogue are flat rates. Depending from various factors the quality of the analogue line could allow for one hour call without a single drop-out or several calls would be required to have one hour call. The prices of local calls were cross-subsidized by international and long-distance calls. The competition (both current - trough IP telephony and expected - after the monopoly ends in 2003) forced Bulgarian Telecommunications Company to reduce the prices of the long distance calls and to increase local calls. While most of the other prices have dropped (in both relative and absolute terms) during the past year, local telephone calls increased by 0.5 to 0.6 percent.

6. Average price of 1 hour Internet access through mobile service

Although there are not yet many users of mobile network access, due to both technological (low speed of connections) and economic (significantly higher fees of 1,6 USD per hour) reasons, the popularity of this service will increase in the future of new technologies. However, if compared with Western Europe, it can be seen that the price for network access via mobile devices in Bulgaria is several times higher, while the connection speed is limited by the single provider – Mobiltel – to just 9,600 bps. A comparison between the absolute figure and the average monthly wage shows clearly that the cost of mobile network access is still too high.

7. Percentage of the telecom expenses in the overall expenses for Internet (ISP price + telecommunications price)

Bulgaria Online experts assess that around 70 percent of the total expenses for Internet access are telecommunication costs. This situation seems quite abnormal, compared to Europe reality, but with the rising telecom charges and dropping network access expenditures, it cannot be expected to dramatically improve before the beginning of 2003, when the state monopoly over telecommunications will end.

E6. Mobile Communications

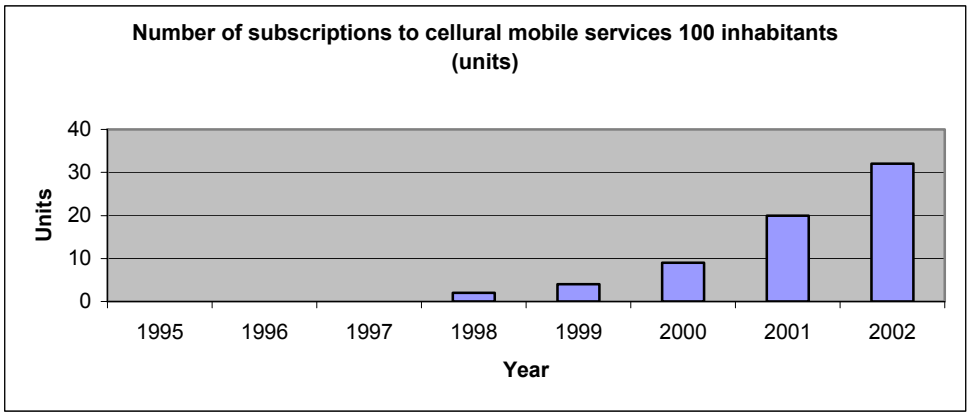
1. Penetration of mobile phones

Bulgaria's first mobile operator, *Mobikom*, appeared in early 1993 as a joint venture between the state-owned Bulgarian Telecom Company and Cable&Wireless of the U.K. In 1996, the first GSM operator *MobilTel* launched its services. Currently, these two operators cover more than 95 percent of the population of the country, while a second GSM operator under the name *GloBul* was launched in late 2001.

Although the high cost of the mobile service has been an obstacle for some time, in the past two years the number of mobile service subscribers has increased more than 5 times. As of June 2002, **25 percent of the population was reported to use mobile telephones**.

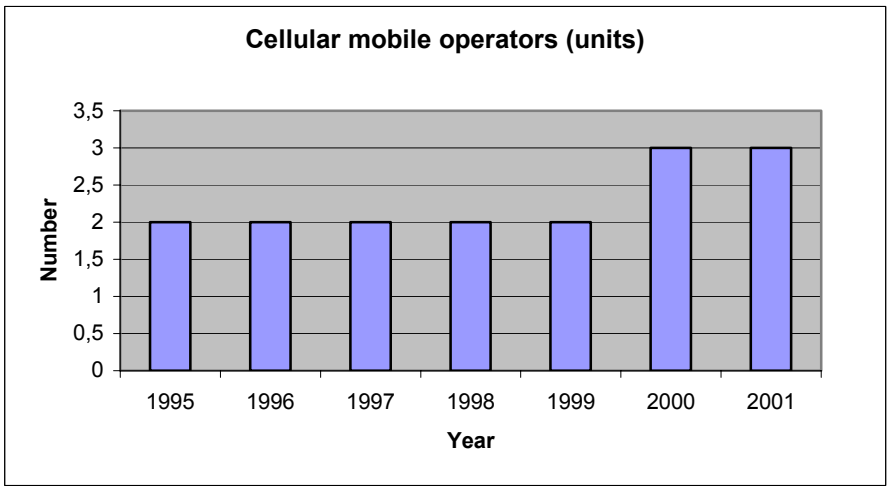
With the popularity of mobile services increasing rapidly over the past two years, the mobile phone has turned from a luxury "high-tech gadget" to a mass product with about **¼ of the households possessing at least one mobile device.**

Figure E17: Subscriptions to cellular mobile services



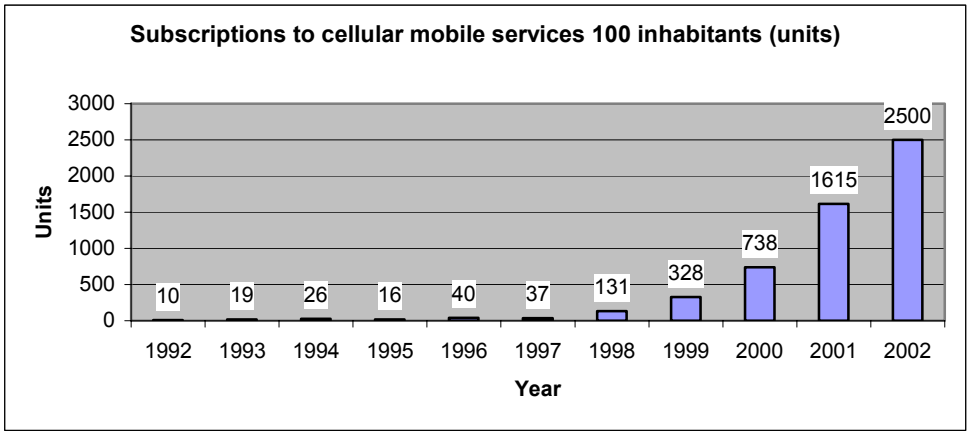
Source: Information Society Statistics, Data 1997-2002, European Commission, Theme 4

Figure E18: Cellular mobile operators (units)



Source: Information Society Statistics, Data 1997-2002, European Commission, Theme 4

Figure E19: Subscriptions to cellular mobile services



Reference: Information Society Statistics, Data 1997-2002, European Commission, Theme 4

2. Shares of different mobile services

This issue is important in analyzing the progress in implementation of the latest mobile technologies. While some two years ago the share of the NMT (Nordic Mobile Telephony) operator, Mobikom, was twice the share of the then-only GSM operator. About a year ago, they became equal in number of subscribers and today the GSM technology definitely prevails with two GSM operators.

3. Mobile Internet access.

We believe that only insignificant number of people uses mobile Internet access due to at least two reasons: the relatively high price (more that 3 times the price of regular dial-up access) and the low connection speed (currently the GSM network of Mobiltel only supports connection speeds of up to 9,600 bps).

E7. Cable Access

1. Home access to cable TV

Cable TV started developing in Bulgaria more than 10 years ago. Being an inexpensive alternative to terrestrial broadcast while offering much more entertainment opportunities, it quickly becomes a widely popular service. The penetration of cable TV is considered important for the overall network connectivity because Internet access via cable was introduced not until early 1999 and since then has become a network service with increasing importance. According to IDC, 2002, only 0.7% of cable connections are used for Internet (or 7 000 out of 1 020 000 people).

Cable is the cheapest way to bring broadband connectivity to lots of end users (according to Second Report on Monitoring European Candidate Countries, Telecommunication Services Sector, December 2002) 63% of the households are passed by Cable TV operators as of June 2002) and currently more and more cable network operators are introducing two-way transmission channels that will make their services interactive in the future.

2. Internet access via cable TV

Due to the late development of interactive services over cable networks the percentage of their users is still low, especially when compared with the overall penetration of cable services – the interactive services share in overall cable services is only 3.3 % The main

reasons are the huge number of suppliers and cost of upgrade. Another obstacle to growth remains the high price of modems.

SWOT Analysis: ICT Penetration

Strengths	**Weaknesses**
✓ Enactment in May 2001 of an electronic signatures law will facilitate the e-commerce and Internet exchange of information; ✓ Liberal entry regime for Internet service providers, resulting in strong competition and decreasing prices of Internet access ✓ Some Bulgarian Internet websites provide some degree of interactivity, downloading of forms; ✓ Cable TV penetration is higher which is prerequisite for the growth of broadband connectivity; ✓ The increased number of online users has triggered competition among various information portals.	✓ Low level of ICT penetration with significant geographical disparity; ✓ Large proportion of out-of-date technology (PCs in private sector); ✓ Some of the websites of Bulgarian companies are updated rarely and contains mostly static, basic information; ✓ Quality of voice transmission is still poor.
Opportunities	**Threats**
✓ Development of B2B e-commerce (if the costs decrease and efficiency of companies increase); ✓ Investments in IST infrastructure; ✓ Development of financial services of the Investment Intermediaries in on-line trade on the BSE and on international stock exchanges. ✓ Amendments in the Bulgarian Corporate Income tax that allow accelerated depreciation of computers and software – with yearly depreciation rate 50 %.	✓ Low level of trust between the actors, Internet security problems that are still not surmounted with the introduction of Electronic signature; ✓ High price of modems.

F. INSTITITONAL CAPACITIES AND REGULATORY BACKGORUND

F1 Definitions and background

Define IST industries. Sticking to the EUROSTAT (implicit) definition of IST industries[30], we consider the following products as major criteria to distinguish those industries:

- Personal computers
- Internet services provision and hosting
- Information and communication technologies (equipment and the related services for data processing and communications)
- Mobile communication

Identify major markets that affect them. In the terms of the NACE classification of economic activities,[31] the IST industries include the following (number shows the NACE code of the respective industry):

Table F1: IST industries and their NACE numbers.

30.01	Manufacture of office machinery
30.02	Manufacture of computers and other information processing equipment
64.20	Telecommunications
72.10	Hardware consultancy
72.21	Publishing of software
72.22	Other software consultancy and supply
72.30	Data processing
72.40	Database activities

Which types of regulations are we interested in? We are looking exclusively at the *public regulation of certain markets*. Here we do not include the common-law rules that govern the unhampered functioning of markets in general, such as the property rights (including copyrights) and contract enforcement rules. By public regulation, we mean those acts, both of the parliament and of the administration, that impose barriers to competition in the market, such as price controls, entry and exit barriers, subsidies, state ownership of assets, etc.[32]

In Bulgaria, there is a public regulation of the telecommunications market (broadly defined), which generally includes four major groups of products and thus their markets: (a) provision of fixed telephone service, (b) provision of Internet, (c) provision of access to the telecommunication networks to telecom operators and Internet providers, (d) provision of mobile telephone service.

For the rest of the markets listed in the table above, there is no special public regulation that applies to the activities in those industries. Therefore the rest of this subsection focuses on the regulation of the telecommunication in Bulgaria.

[30] See for example the following EURSTAT paper: Richard Deiss, "Information Society Statistics", *Statistics in Focus: Industry, Trace and Services*, Theme 4-37/2001.

[31] NACE revision 1.1 of 2002.

[32] The most straightforward way to distinguish public regulation is to look for the following components: (1) justification of the regulation, normally some market failure is taken into consideration; (2) aiming at certain allocation of (certain) resources that allegedly maximizes efficiency; (3) involvement of special executive agency, which is normally a legal mixture of legislative and enforcement powers. Whenever at least one of those components is present, we talk about public regulation of the market.

F2 Public regulation of the telecommunications markets

The Telecommunications Act of 1998 (latest amendments made in 2002) is viewed as the most important step towards the adaptation of the Bulgarian normative basis in the field of telecommunications to the requirements of the EU. The formal goal of this act is "to create the necessary legal and regulatory framework for the development of telecommunications and for the satisfaction of the public needs of telecommunications services."[33]

According to the Telecommunications Act until 31 December 2002 state monopoly is established over the following activities:

- provision of any fixed voice service between terminal points of the fixed telephone network,
- provision of leased lines, and
- real-time trans-border voice transmission for the purpose of the provision of international voice services by public telecommunications operators.[34]

The act has delegated the execution of this state monopoly till 31 December 2002 to the state-owned *Bulgarian Telecommunication Company* (BTC).

1. Licensing regimes

According to the act there are three regimes under which provision of telecommunication services is possible: (1) individual license, (2) registration under general license, and (3) free regime.

Individual licenses are required for individually assigned scarce resource, for building public telecommunications networks, and for provision of some voice services. Registration under general license is required when telecommunications are carried out for proprietary needs through the use of radio frequency spectrum for general use and access to global satellite systems.

However the act allows for the minister of transport and communications to specify the concrete activities that are subject to licensing.[35] This is done by the Ordinance of the minister of transport and communications on the telecommunications activities subject to individual licensing, general licensing and free regime (adopted on the 2 July 2002).

2. Scarce resources: radio frequency spectrum, numbering plan, and geo-stationary orbital positions

The recent practice of the Council of Ministers shows that each successive update of the National plan for allocation of the radio frequency spectrum extends the range of frequencies allocated for civil needs.

The Communications Regulation Commission – a state body, which is independent of the ministry of transport and communications – develops the management policy and manages the radio frequency spectrum allocated for civil needs, co-ordinates radio frequencies and frequency bands for civil needs.

[33] Cf. Ministry of Transport and Communications, "Telecommunications Sector Policy", May 2002.

[34] According to § 10 of the Transitory and Concluding Provisions of the Telecommunications Act. The provision is based on Article 18 of the Constitution, which allows for certain activities to be state monopolized by law.

[35] This is stipulated in Art. 39, line 6, of the Telecommunications Act.

The convergence of the existing wireless telecommunications services to global services is supposed to come about not before the same harmonized radio frequency spectrum is used in all countries. This refers particularly to the Universal Mobile Telecommunications Systems (UMTS), also known as third-generation mobile telecommunications. Frequency resource for 3G wireless networks is to be released by 1 June 2003.

Regarding the National numbering plan, the minister of transport and communications has delegated the powers of primary assignment, reservation and revocation of numbering capacity to the Communications Regulation Commission. The Commission has developed and adopted Rules for allocation of the National numbering plan.

The Council of Ministers has approved a Memorandum of Understanding between the Republic of Bulgaria, the Republic of Greece and the Republic of Cyprus for common use of a satellite at geo-stationary orbital position 1.2°W for radio and TV broadcasting. Presently, the following regimes for licensing satellite networks and stations exist:

- individual licenses – installation, maintenance and operation of public or professional telecommunications networks of the fixed satellite service, utilizing individually assigned radio frequency spectrum; use of geo-stationary orbital positions, allocated to the Republic of Bulgaria under international agreements;
- general license – operation of networks and stations of the satellite services for proprietary needs and utilizing radio frequency resource for general use; provision of the public telecommunications service - access to global satellite systems;
- free regime – use of mobile satellite terminal equipment for proprietary needs.

3. Prices and tariffs

During the period of state monopoly in the sector, the government maintained a policy of price regulation. This is manifested in both formal regulations (decrees) and the price policy of the state-owned BTC. For instance, in 1998 the Council of Ministers adopted a Methodology for regulation of the prices of the ordinary telephone service, provided via the fixed telephone network of BTC, and for the provision of leased lines.

Meanwhile the fiscal side of this public regulation of the telecommunications has been of some importance. Formal justification to the amendments to the size of the license fees has been twofold:

- adapting the fees to the dynamics of the telecommunications market;
- simplifying the method of calculating the fees .[36]

Deregulation underway

The process of liberalization of the telecommunications market in Bulgaria started in 1992. According to the governmental telecom sector policy, reflected in the Telecommunications Act, *full liberalization* will is supposedly in place 31 December 2002. This applies to the fixed voice service, the leased lines and the trans-border real-time voice transmission. Generally, the introduction of full liberalization implies – according to the definitions of Directive 96/19/EC - that any entity, intending to provide any service on the market, has *the right to be granted the relevant permit depending on the type of the service*. This of course is far from the common-sense definition of *free* or *liberalized* market because "the right to be

[36] E.g. in 2001 the Council of Ministers amended the Tariff of fees collected by the Communications Regulation Commission with this exact justification.

granted the relevant permit" itself implies permission regime, thus some degree of restriction. However, it is important that rejection is allowable only under publicly known conditions specified in a regulation.

The government foresees the following as basic principle in the process of telecom market liberalization: "Competition in the sector could be strengthened by:

- establishment of principles for licensing regimes based on balanced rights and obligations;
- absence of whatever restrictions to access to the market, except on grounds of objective, transparent, proportional and non-discriminating criteria, relating to the use of scarce resources (frequencies, numbers, orbital positions and rights of way);
- application of objective, transparent and non-discriminating procedures and criteria for assessment of tenders on the part of the national regulatory authority;
- efficient management of scarce resources aimed at the provision of impartial treatment of the various market players."[37]

The formal conditions for *full liberalization* are related to the following future legislative actions:

- implementation of Directives 90/388/EEC, 94/46/EC, 95/51EC, 96/2/EC;
- adherence to the guidelines of the EU regarding the competition policy in telecommunications, appended with the rules for access agreements;
- establishment and adherence to the agreements for interconnection;
- clear conditions for access to the infrastructures of the telecommunications operators competing with each other on the market;
- established schemes for funding of the universal service;
- normatively arranged access to the rights of way through state and municipal property;
- legal arrangement of the common ownership over the different networks and the shared provision of networks and services.

According to the governmental commitments[38], the introduction of full liberalization in telecommunications in Bulgaria will follow to a large extent the European experience, but will also take into account some national peculiarities, such as not fully upgraded infrastructure of the fixed telecommunications network, as well as the low consumption of services on the part of the residential subscribers. The introduction of full liberalization is related to:

- voice telephone service - local, long-distance and international;
- public fixed network services (for example, interconnection, network access, leased lines).

These services will be provided on a national and regional scale, as well as in each individual settlement, after they become legally arranged.

According to the National program for the adoption of the *acquis*, envisages:

- "establishment of the regulatory framework for the so-called "last mile", i.e. local loop unbundling (LLU);

[37] Sector Policy
[38] Ibid.

- ensuring stability of the regulatory framework, improvements being feasible on the basis of public consultation on any particular case that turns out to be insufficiently clarified by the legal framework."[39]

1. Licensing

The general regulatory framework for the issuance of licenses for telecommunications activities in Bulgaria follows the regulatory framework outlined by the EU in Directive 97/13/EC.

In the present Ordinance on telecommunications activities subject to individual licensing, registration under a general license and free regime the individual licenses are prevailing. The formal reason for this is "the early stage of self-regulation and the inefficiently acting competition mechanisms."[40]

2. Significant market power

The term "significant market power" (SMP) is formally defined in Directive 97/13/EC. SMP is present when:

- a telecommunications operator has SMP if, alone or jointly with others, he takes advantage of the position of economic power, expressing itself in the possibility of following a behavior which is to a significant extent independent of competitors, buyers and users;
- a telecommunications operator has SMP on a certain market, it may be suggested that it has significant influence on the market and on closely related markets, when the links between the two markets are such, as to allow the market influence on one of them be felt as an advantage for the other market, at that, the operators' influence on the market becoming stronger.

The regulatory obligations imposed on the telecommunications operators with SMP are defined in Directive 97/33/EC[41], Directive 98/10/EC[42], and Directive 92/44/EEC[43], and they are based upon the following principles:

- transparency;
- non-discrimination;
- separate accounting;
- access to the network infrastructure;
- control over prices, including in terms of cost orientation and in terms of accounting systems.

The Bulgarian Competition Protection Act stipulates that a telecommunications operator has a dominant position; he can hinder competition on the corresponding market, since he is independent of his competitors, suppliers or buyers. In the general case, an operator is assumed to have a dominant position if he has a market share higher than 35 per cent of the corresponding market.

[39] National Program

[40] Sector Policy

[41] on interconnection in telecommunications with regard to ensuring universal service and interoperability through application of the principles of open network provision (ONP)

[42] on the application of ONP to voice telephony and on universal service for telecommunications in a competitive environment

[43] on the application of ONP to leased lines

Future legislative actions in Bulgaria will include:

- legal arrangement of the specific obligations of the telecommunications operators with significant market power;
- approval of "Methodology for market analysis and determination of telecommunications operators with significant market power";
- determination of the existence on the market of telecommunications operators with significant market power;
- provision of conditions for entry of new telecommunications operators on the market.[44]

3. Co-location

Though the government seems to recognize that "in principle, the contracts for co-location are a matter of commercial and technical negotiations between the interested parties"[45], there is a tendency for public regulation of those contracts too. For example, a regulatory agency can determine conditions for co-location of telecommunications operator, so that:

- third parties are given access to specific network elements;
- access that has already been given is not deprived;
- resale of certain services is offered;
- open access is given to technical interfaces, protocols or other key technologies that are vital for the functional interoperability of the services;
- possibilities are offered for co-location, including co-location of underground ducts, buildings or towers;
- specific services are offered, necessary for the provision of functional interoperability of the services from end to end for the users, including possibilities for intelligent networks or roaming for mobile networks;
- access is offered to systems for operational support or other similar software systems, necessary for ensuring fair competition in service provision;
- interconnection or network capacity are offered.

4. Interconnection

Presently, based on the Telecommunications Act, interconnection exists between the fixed public telecommunications network of the state-owned BTC and the networks of the mobile operators. These requirements are stipulated in the license of BTC, which even after the introduction of full liberalization, will most likely continue to provide most connections as an operator with SMP. Thus there a re two major regulatory initiatives lying ahead. First, development and adoption of an Ordinance on the terms and procedures of interconnection, that will make easier the provision of new services from the new market players to a wider circles of users. Secondly development and adoption of an Ordinance on terms and procedures for the provision of leased lines under the conditions after 31 December 2002 (liberalized market).

5. Local loop unbundling (LLU)

This refers to providing access of more telecommunications operators to the subscribers on the basis of the deployed *local loop* of the former monopolistic telecommunications operator. According to Regulation No. 2887/2000 of the European Parliament and the Council of the EU, unbundling of the local loop implies full or shared access to the subscribers through their

[44] Sector Policy.
[45] Ibid.

subscriber lines, which are owned by the operator with SMP. The Bulgarian government will stick to this regulation in its future regulation of the LLU. However the only clarity on the issue so far is that "telecommunications operators with significant market power are obliged, after co-ordination with the national regulatory authority:

- to publish and update Reference offer for unbundling of the local loop;
- to provide local access at cost-oriented prices."[46]

Privatisation Policies

By mid-2003 *Bulgarian Telecommunication Company (BTC)*– the monopoly agent of the government during the time of monopolized telecom market – remains state-owned. Although there is an outspoken political will for the privatization of the company, all the procedures opened so far have failed. The last attempt was made in 2002 and the current procedure is still with uncertain prospects.

Important about *BTC* and its privatization are the following features:

- The company owns and runs the physical infrastructure for provision of fixed-lined voice service and Internet. Virtually all other service providers use its infrastructure. It is most likely that the future telephone service providers will use at least the last-mile of the *BTC* infrastructure. The currently ongoing privatization procedure envisages keeping the infrastructure as property of *BTC* even when it is privatized.
- The privatization will not lead to any delay in the telecom market liberalization. Although the negotiations for the company have been going through such ideas – e.g. extension of the period of monopoly – there is little evidence that the government will stop the ongoing liberalization.
- The state will keep a certain control over the activity of the company, thus having another tool for telecom market intervention. This would come through two channels: (1) the state will most likely keep a "golden share" in the company giving the right to block certain decisions, (2) the privatization contract will be far from just an ordinary sale, i.e. there will be a lot of so-called "social clauses" regarding things such as employment, prices, etc.
- *BTC* would be privatized together with a license for a third GSM operator.
- It is unclear when the privatization procedure will be completed. The tradition shows that this may be another failure, after two unsuccessful attempts. The administrative court has taken an active position in the process; a possibility for that was provided in the general law governing the privatization practices of the administration. The latest administrative court decision finds the deal consistent with the law.
- While the government is trying to privatize its telecom company, there are already two approved applications for a fixed-line telephone service provides. There is no evidence that the regulation of the market is somehow dependent on the privatization prospects of *BTC*. It seems that the most significant economic implications of the telecom market may be channeled by increased competition rather than by the transfer of property rights over a set of state-owned assets.

F3 Regulation / Deregulation of IST-Based Public Information and Services

In this subsection, we review three major public services that are related and/or based on the IST:

[46] Ibid.

- personal data protection in the telecommunications
- electronic signature and documents
- provision of public information

1. Personal data protection in the telecommunications

The Personal Data Protection Act provides the general regulatory framework of the issue in Bulgaria. Although there is no formal commitment, the government is expected to introduce a specific regulatory framework for the telecom sector, related to the protection of the personal data of telecommunications networks subscribers. This, according to the governmental commitment, will also guarantee the right of privacy. Particularly this applies to the work with personal data in relation to the provision of services over public telecommunications networks, especially in the case of digital networks. This special regulation will bring about a formal harmonization of the Bulgaria law with Directives 95/46/EC and 2002/58/EC. Thus the following principles will serve as guidelines:

- the data should be collected for specified purposes and used as intended
- they should be adequate and not excessive with respect to the purposes for which they are collected
- be accurate and up to date
- be in a form allowing the identification of persons for not longer than necessary.

The specific regulatory framework will supposedly cover:[47]

- obligations for undertaking relevant technical measures for ensuring security of the networks and services on the part of the telecommunications operators and for informing the users if security is at risk;
- guaranteeing the confidentiality of the messages and prohibition of unauthorized interception or other forms of unsanctioned surveillance by third parties;
- confinement of the scope of processing and time of storing traffic data and billing data, prohibition against using the traffic data for purposes other than billing and entitling the subscribers to receive general or itemized bills;
- giving the right to the user to present or restrict the identification of the calling line or connected line, for which he does not have to pay additional price, as well as access to such blocked information in extreme circumstances and for tracing malicious calls;
- guaranteeing the right of the mobile subscribers that the data regarding their location will be processed only with their consent, and possibility to refuse the processing of such data about a connection or message transmission by a simple means;
- giving the subscribers rights and means to reject and return calls forwarded to their line;
- giving the users the right to refuse to be included in publicly accessible printed or electronic directories or to omit part of their address, free of charge;
- giving the users the right to reject unsolicited communications for direct marketing purposes.

[47] According to the Sector Policy.

2. Electronic signature and electronic documents

The general framework on the issue is set in the Electronic Document and Electronic Signature Act of 2001. The Act allegedly adopts the main principles of Directive 1999/93/EC on a Community framework for electronic signatures.

The Act defines *electronic statement*, *electronic document*, and *electronic signature*. It stipulates the conditions that make an electronic statement, and thus any electronic contract, legally effective. The act also determines the time and place of sending and receiving electronic statements. Generally, the act has two major implications: (1) it is of crucial importance for the court practice, which must be already covering disputes over electronic contracts, and (2) it introduces the electronic form of communication into the administrative practice.

The act specifies three types of electronic signature:

- simple,
- advanced, and
- universal.

The major difference between the three types of signature is about the legal validity of the signed statement. The *simple* electronic signature is legally effective when the parties have preliminary agreed that they would recognize each other's electronic statements. The *advanced* electronic signatures require certification by a private *certification-service-provider*; thus it does not require the preliminary agreement between the parties. The universal electronic signature requires certification by a *licensed* certification-service-provider. Only the universal electronic signatures have legal effect in the public sphere.

As mentioned, the act envisages registration regime for the providers that may certify for universal electronic signatures. The registration (licensing) is administered by the Communications Regulation Commission.

It seems that additional legislative changes and governmental regulations are expected in the field of the act implementation, particularly with respect to the operation of the state bodies. Some evaluations stress that the effective implementation of the act "depends to a great extent on the *timely adoption of the respective secondary legislation*,"[48] which is supposed to be in the hands of the Communications Regulation Commission and the Council of Ministers.

3. Provision of public information

The governmental Information Society Strategy[49] has a special focus on the access to information issue. Though vaguely stated, the main principles are explicated in this official document:

- the access to information legislation must envisage mechanisms that would guarantee the "constitutional right to information"[50];
- the legislature must be compatible with the restriction set in Art. 41 of the Constitution, which stipulates that "citizens shall be entitled to obtain information from state bodies and

[48] ARC Fund, 2002, *Bulgaria: ICT Infrastructure and E-Readiness Assessment*.
[49] Council of Ministers, 1999, *Strategy for Information Society Development in the Republic of Bulgaria.*
[50] Op. cit.

agencies on any matter of legitimate interest to them which is not a state or official secret and does not affect the rights of others."

The special legislation that sets the particular rules and the administrative implementation framework are:

- Access to Public Information Act of 2000. It defines *public information* and stipulates that citizens have must have free and unlimited access to such information. The act outlines the procedures, which apply to the state bodies when they carry out their obligation of public information provision.
- Personal Data Protection Act of 2001. (See the description above)
- Protection of Classified Information Act of 2002. The act provides for the establishment of a State Commission on Security of Information to carry out the overall organization, coordination and control in this field.

F4 Regulation / Deregulation of Main Services and Infrastructure Sectors.

For the purposes of the current study, "main services and infrastructure sectors" are:

1) the postal services
2) the physical infrastructure of fixed-lines for transfer of voice and data
3) provision of fixed telephone service
4) provision of mobile telephone service

The regulation regarding points 3) and 4) is examined in Section F11 "Regulation / Deregulation of Major Markets Affecting the IST Industries" (see above). The regulation of the physical infrastructure is depicted in the same section as well as in Section F13 "Privatization Policies."

The regulation of the postal service market is subject to similar considerations as the regulation of telecom markets. It generally considered liberalized and competitive, however there is a licensing regime for providers of the service. Meanwhile, the state postal company receives a regular subsidy from the central budget. The postal market though is not a major focus of this study of information society developments.

SWOT Analysis (of Institutional Capacity and Regulatory Background)

Strengths	**Weaknesses**
✓ Abolishment of the monopoly of the state-owned telecom company ✓ Political will to privatize the state telecom ✓ The general legal framework of the telecom market is already in place	✓ Only partial liberalization of the telecom market ✓ Slow procedure of telecom privatization ✓ Regulations that give discretionary power to the administration
Opportunities	**Threats**
✓ Further liberalization of the telecom market, including reduction of formal entry barriers and admin discretion ✓ Fast privatization of the telecom company with no "social" clauses in the privatization contract	✓ The market remains heavily regulated ✓ The privatization of the telecom company fails for the third time in a row] ✓ The privatization contract (if nay) promises some privileged position to the company ✓ The government is slow and clumsy in its e-transformation

G. EDUCATIONAL SECTOR, LABOUR FORCE SUPPLY, TRAINING IN IST RELATED SECTORS

G1 General Remarks on Bulgarian Educational System

The compulsory education in Bulgaria starts at the age of 6-7 and finishes at the age of 16. The educational system comprises of basic education (I-VIII grades), secondary education (grades IX-XII), higher non-university education (which could be obtained in colleges, most of them incorporated within the structure of universities and specialized higher institutions), and higher university education (provided by 42 universities, 7 of them private).

The primary and secondary public education is free of charge, but pupils are required to purchase their textbooks. Regarding tertiary education, a cost recovery mechanism has been introduced since 1991.

Reforms in Secondary and Tertiary Education

Since 1990 the educational sector in Bulgaria went through deep and continuous reforms oriented towards restructuring of the highly centralized educational sector, improving quality and resource allocation in the educational system and introducing the concept of life-long learning.

The legal framework, adopted after 1990, facilitated establishment of private educational institutions, both in secondary and tertiary education. The first private schools have been established in 1992. From 1995 to 2000 the total number of private secondary schools doubled – from 28 to 56. Vocational schools represent the biggest share of secondary schools - 35. Nevertheless the growth in the number of private schools, in the year 2002/2003 the pupils enrolled in them still represents only 2 % of the total number of pupils.

In higher education, 7 out of all 42 universities are private, although their performance in terms of enrolment is rather low - about 13.4 % of all students are enrolled in private universities. Among the factors determining the low level of interest towards enrolment in private schools and universities are:

- the overall low level of income, resulting in difficulties to pay for education (moreover, the system of student loans is still missing)
- public educational institutions still enjoy higher level of confidence due to longer history and unclear accreditation standards

The low level of enrolment in private educational is resulting in limited competition that public schools and universities face from private ones. This means that Bulgarian educational system fails to use such a competition as a stimulus for improvement of efficiency of resources use in public schools and universities.

1. Reforms in secondary education

The reform process, which is taking place in area of secondary education, could be characterized by:

1.1. Decentralization. Serious reform efforts have been concentrated to the replacement of the previous strongly centralized management of the educational system with allocation of functions within different units. Despite the formal redistribution of responsibilities, the school system is still characterized by high degree of administrative centralization and the

individual schools still lack mechanisms for decision-making on a wide range of issues. The curriculum is centrally determined; there is a system of central approval of eligible textbooks, the Ministry sets the requirements for the examinations, the school heads are centrally selected and employed. Another issue is financial centralization. The secondary education is financed through grants both from the state budget and from the municipal budgets. The Ministry of Education and Science (MES) is responsible for financing of special and vocational schools[51], while the municipalities fund all other schools. This central control over allocation of school budget means, that nevertheless the formal autonomy granted to schools, in practice their autonomy is rather limited.

1.2.Development of new syllabus. With adoption of the Law on the Educational Degrees, the General and Educational Minimum and the Syllabus eight educational areas have been established, among them mathematics, informatics and information technologies. The schools define their plans for implementing the curriculum.

One of the basic reforms related to the syllabus is the introduction of informatics and information technologies in the basic level of education, introduction of new curricula on Informatics and Information Technologies for IX-XI grades, and specialized education at XII grade. This is part of the overall reform aimed at introduction of the concept of e-Learning in Bulgarian education. The projections of the MES envisage introduction of obligatory ICT training in primary education by the end of 2005.

Currently, the syllabus is distributed as follows:

Table G1: Distribution of obligatory syllabus in primary and secondary education (% of total time)

%	Bulgarian language and literature	Foreign languages	Mathematics informatics and IT	Humanities	Natural sciences	Arts	Customs and lifestyle	Sports
Basic education (I-IV grades)	33.4	9.5	15.3	4.6	4.6	17.2	4.7	10.7
Lower secondary education (V-VIII grades)	18.8	14.9	14.9	11.2	14.0	13.1	4.7	8.4
Secondary education (IX-XII grades)	13.0	17.4	16.7	21.8	18.6	3.7	0.0	8.8

Reference: National Institute for Education, MES

The introduction of the new curricula attempts to replace the previous academic knowledge with more practical knowledge, skills and competencies. In 1999, the secondary educational cycle was extended from three to four years with introduction of XII grade. Additionally, an alternative educational form, such as correspondent learning and distance learning has been introduced.

[51] Portion of the funds granted to the vocational schools are covered by the Professional Training and Unemployment Fund. These finds are supposed to cover the programs, organized by the National Employment Service.

1.3. Reform in vocational education and training (VET) system. In the area of vocational training, the major reform step is related to the adoption of the Vocational Education and Training Act (VETA). The Act provides for development of a more flexible system for continuing education (e.g. introduction of open and distance learning), as well as for balance between the education and labour market demands. On a practical level, however, the co-operation between Vet institutions and employers still remains limited to informal exchange of information for market needs. According to the adopted List of Professions for VET (in force since 2001/2002), there are 178 professions included in 38 vocational fields.

2. Reforms in tertiary education

Since 1990, the higher education in Bulgaria went through two fundamental types of transformations: first, granting considerable autonomy to the higher education institutions (HEI), and second, "massovization"of the higher education, associated with rapid enrolment expansion.

Prior to 1990, the higher education was state controlled and highly centralized. There were 30 HEI, of them only three were broad based universities (Sofia University, Plovdiv University and Veliko Turnovo University). All the rest were specialized institutes (e.g. pedagogical, technological, medical, agricultural, economic, etc). The enrolment was centrally determined, with centralized admission procedure and uniform entrance examinations.

After 1990, the main reforms are associated with:

2.1. *Introduction of a new governance system of HEIs* , resulting in considerable autonomy of HEIs. They received the right to develop courses according to their own academic standards, to elect managerial bodies undependable from the state, to collect fees, and to open new branches. Establishment of private HEI was permitted.

2.2. *Introduction of cost recovery trough tuition fees*. In 1991 the HEI obtained the right to collect tuition fees on discriminatory basis. All students with entrance examination results under certain thresholds had the right to pay certain fee and to enroll in the HEI. In 1999, this mechanism was replaced by uniform tuition fee for all students, covering up to 30 % of real per-student costs. The government covers the rest. Currently, the level of tuition fee is in the range of EUR 80 and EUR 180 depending on the specialization and the HEI.

2.3. *Introduction of multi-degree system*. Prior to 1995 the higher education structure comprised of a single degree after 5 years course program. The current three-degree system (Bachelor's, Master's and Doctor's degree) was introduced in 1995.

2.4. *Development of a new system for quality assurance*. The National Agency for Assessment and Accreditation has been established in 1997 as a tool for providing an external assessment of the quality of both public and private HEI.

2.5. *Introduction of new curricula and study programs in HEI*.

2.6. *Provision of life-long learning*. After 1990, the HEI are allowed to organize distance-learning courses.

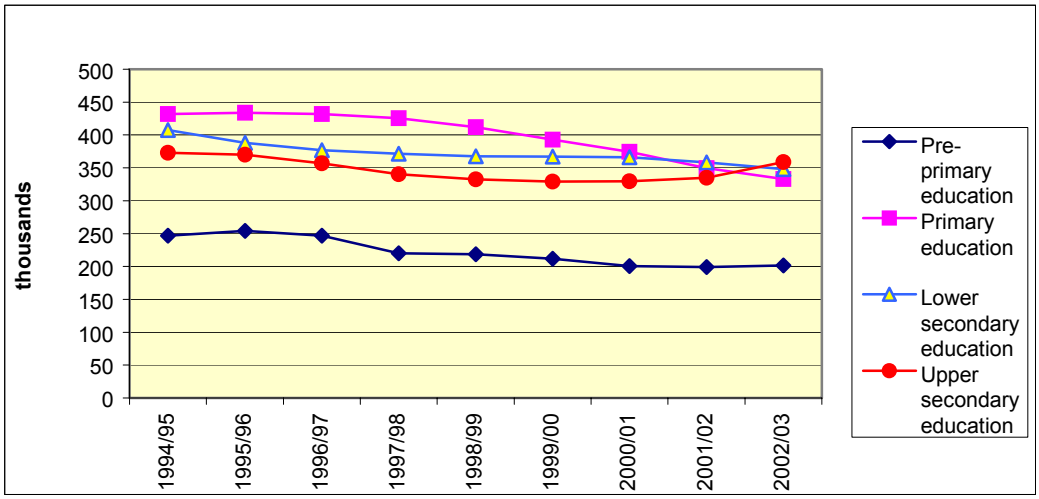
At the end of 2000 the Bulgarian Government launched so called Education Modernization Project, with the financial assistance of the World Bank (EUR 15.30 mln). The project is providing for improvement of quality of teaching and learning in general education, improvement of overall resource management in education, improvement of the efficiency and effectiveness in allocating resources in higher education institutions, reforming the stipend system and establishment of a student loan system, establishment of a Competitive

Teaching and Management System for Higher Education in order to improve the quality of teaching and learning.

Evolution and Trends in Secondary and Tertiary Education

The most serious challenge faced by the Bulgaria's educational system is related to the constant drop in enrolment in primary and secondary education.

Figure G1: Number of pupils in primary and secondary education



Reference: National Statistical Institute

The factors contributing to the declining number of pupils are:

- changes in the demographic structure of the population (declining birth rates);
- significant level of drop-outs. According to the official statistics, about 45,000 children (or 6-7 % of the total) leave schools every year. Additionally, there is a hidden dropout, meaning that about 30 % of all pupils register more than 100 unexcused absences per year (OECD 2002)[52]. Only 67 % of pupils continue their education after eight grade. According to different studies[53] with the existing level of dropouts in 15 years Bulgaria will face significant decline in the number of specialists with secondary and higher education diplomas.

Table G2: Participation Rates by Level of Education in 2000

School Level	Number of students	% of age group	Teacher/student ratio	Total number of schools
Pre-school	211,943	66.4	1:11	3,536
Primary	759,931	95	1:12	1,997
Secondary (general & VET)	340,271	67	1:11	1,154
Total	1,312,145			6,687

Reference: CEPS, Ljubljana, 2001

Declining number of pupils and slow restructuring of the employment in the educational sector contribute to low teacher/students ratio- 1:11 on average. According to the National

[52] See: OECD Thematic Review of National Policies for Education - Bulgaria, 2002.

[53] See: Ministry of Economy of Economy, German Agency for Technical Co-operation (GTZ) and Center for Economic Development, Analysis of the Bulgarian Technology Development, Working Paper, Sofia, 2001

Institute for Education[54], only 6 % of all teachers have computer qualification and use ICT. About 10 % of teachers speak foreign languages. This general lack of ICT qualification together with the lack of resources for additional qualification and pre-qualification is an obstacle for innovations in the educational process and for introduction of ICT in schools, thus influencing negatively on the overall quality of education in Bulgaria.

The improvement of the ICT equipment is another serious challenge to the schools, having the fact that 60-70 % of the school expenditures cover staff salaries and 12 % cover utilities costs, and only 3 % of total expenditures are spent for new investment[55]. In such constellations, development of public-private partnerships is of crucial significance for bringing information and communication technologies in Bulgarian schools. The schools have become more active in finding financing from different sources in order to equip computer labs. Such sources are different donor programs (PHARE), donations from foundations (such as Open Society Foundation), companies and parents, etc. One initiative promoting introduction of ICT in Bulgarian schools is Schools On-line Initiative. Under this initiative, 18 Internet Learning Centers have been set up in 17 towns (Sofia, Blagoevgrad, Burgas, Gabrovo, Haskovo, Kardjali, Sliven, Stara Zagora, Veliko Turnovo, Yambol, Pleven, Plovdiv, Razgrad, Russe, Shumen, Varna and Vratza).

Bulgaria has relatively well established system of secondary vocational and technical schools with the number of pupils accounting for more than 55 % of all pupils in secondary education. The largest share of students in these schools (about 40 %) is enrolled in computer or technical specialties.

Table G3: Share of Students in Upper Secondary Education (%)

Educational Level	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000
Total	100	100	100	100	100	100	100	100	100	100	100	100
General Secondary	39.5	38.7	38.9	40.5	41.6	42.3	42.7	42.6	41.9	43.8	44.4	44.4
Vocational/ Technical	60.5	61.3	61.1	59.5	58.4	57.7	57.3	57.4	58.1	56.2	55.6	55.6

Reference: World Bank (2000) and own calculations

It is expected that the demand for vocational and professional education and training will rise, reflecting the increased demand of the labour market for people with practical skills and knowledge.

Despite the constant reforms undertaken, the structure of tertiary education has not changed significantly during the 1990s. After initial transformation, associated mainly with establishment of private HEIs, upgrading of the status of some of the specialized higher institutes into universities, and transformation of some colleges in university attachments[56], the number of institutions remained relatively stable.

[54] See: Education for All. National Assessment - 2000, MES and the National Institute for Education.

[55] See: Adkins, D.L ."School Finance in Bulgaria in an Era of Educational Reform", World Bank, 1999.

[56] In 1995 the former semi-higher institutes were given dual status: to be independent from the universities or to be included in their structures.

Table G4: Number of Educational Institutions in Bulgaria

Institution	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	01	02
Universities	38	40	40	40	40	41	42	42	42	41	41	42	42
Colleges at the universities	-	-	-	-	-	-	43	41	42	43	43	40	40
Independent colleges	46	46	47	47	48	47	3	3	4	4	4	8	9
Total	84	86	87	87	88	88	88	86	88	88	88	90.	91

Reference: National Statistical Institute

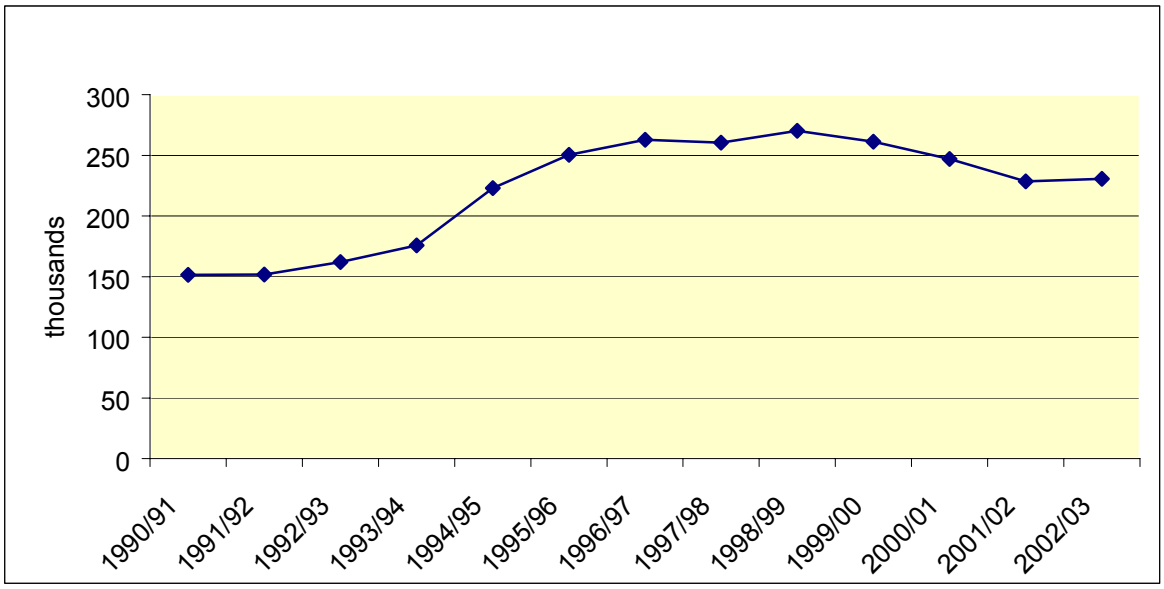
About 50 % of all universities are based in Sofia. Another major university centers are Plovdiv and Varna.

Table G5: Regional Distribution of Higher Educational Institutions

Region	University
Sofia	Sofia University "St. Kliment Ohridski"
	Technical University
	University for National and World Economy
	University for Architecture, Construction and Geodesy
	New Bulgarian University
	Medical University
	University for Chemical Technology and Metallurgy
	University of Mining and Geology "St. Ivan Rilski"
	University of Forestry
	National Academy of Theatre& Film Arts "Krustyo Sarafov"
	National Academy of Arts
	State Academy of Music "Prof. Pancho Vladigerov"
	National Academy of Sports
	Higher School of Transport "Todor Kableshkov"
	Civil Engineering Higher School
	Military Academy "G.S. Rakovski"
	Police Academy
	Higher School of Insurance and Finance
Plovdiv	Plovdiv University "P. Hilendarski"
	Agrarian University
	University of Food Technologies
	Academy of Musical and Dance Arts
	Medical University
	Technical University, Sofia- Plovdiv Branch
Varna	Technical University
	Economic University
	Varna Free University
	Medical University "Prof. Paraskev Stojanov"
	Naval Academy "N. Vaptsarov"
Bourgas	Bourgas Free University
	University "Prof. Assen Zlatarov"
Stara Zagora	Trakia University
Russe	Russe University "Angel Kunchev"
Pleven	Higher Institute of Medicine
Veliko Turnovo	Veliko Turnovo Unoversity "St.St. Cyril and Metodii"
	National Military University "Vassil Levski"
Gabrovo	Technical University
Blagoevgrad	American University in Bulgaria
	South-West University "Neofit Rilski"
Shumen	Shumen University "Konstantin Preslavski"
Svistov	Tsenov Academy of Economics
Botevgrad	International Higher School of Business

Since 1990, a constant enrolment expansion in higher education has been registered. By 1998/1999, the enrolment increased by almost 78 % compared with its level in 1990.

Figure G2: Number of enrolled students in higher education



Reference: NSI

This rapid enrolment growth is partially attributed to the increasing number of fee-paying students. As it has been already mentioned, in the period 1991-1998 all students with entrance examination results under certain thresholds had the right to pay certain fee and to enroll in the HEI. The upward trend in enrolment shows some reversal developments after the introduction of uniform tuition fee in 1999.

According to a World Bank study (2000), the tertiary enrolment rates in Bulgaria in 1990s were the highest in CEE and Baltic Countries.

Table G6: Tertiary Enrolment Rates (gross rates, % of 18-22 age group)

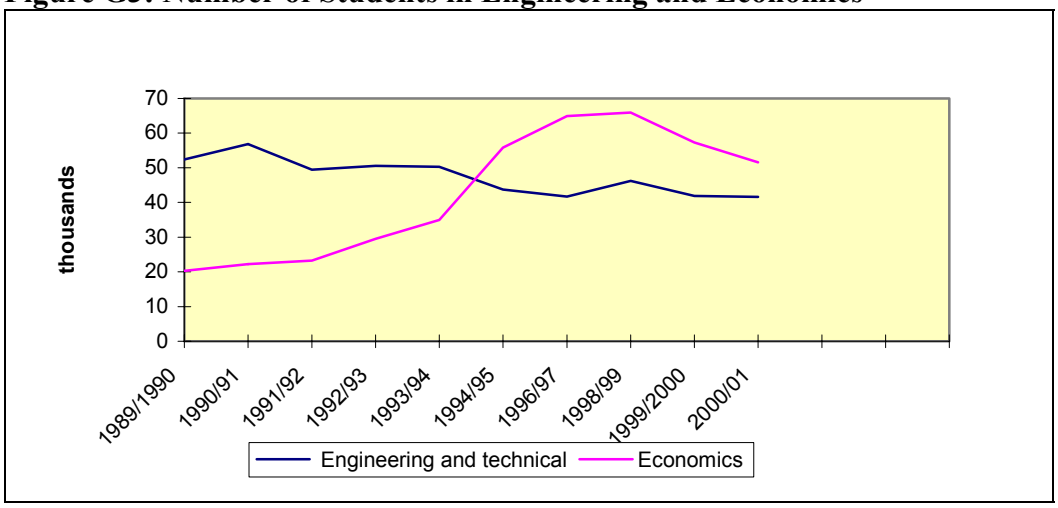
Country	1984	1990	1991	1992	1993	1995	1995	1996	1997
Bulgaria	16.4	18.8	18.7	19.8	20.9	23.0	26.0	27.3	27.1
Czech Republic	12.7	13.6	13.1	13.3	13.6	14.2	15.0	16.6	17.3
Poland	11.6	12.4	13	14.3		17.0	18.1	19.7	20.6
Hungary	13.9	14.2	14.8	15.7	16.8	18.5	20.7	22.9	23.8
Slovakia	13.2	13.8	13.3	14.2	14.4	15.0	15.6	16.8	17.6
Romania	8.8	10.1	11.0	12.2	13.1	13.4	13.3	18.6	18.7
Slovenia	18.2	19.3	21.8	21.6	22.9	23.4	24.7	25.7	n.a.
Estonia	n.a.	14.2	14.2	13.9	14.3	15.6	16.9	18.6	21.3
Latvia	15.2	15.5	15.6	15.9	15.8	16.4	18.5	22.8	24.6
Lithuania	17.7	17.2	15.6	13.7	13.3	13.1	13.9	15.4	18.2

Reference: World Bank (2000)

The higher expansion in the number of students in 1990s has been registered in social sciences, and particularly in economics, management and law. At the same time, the number of students enrolled in engineering and natural sciences decreased significantly. This is a result of the transformation of the needs and demand of the labour market. Prior to 1990, under the framework of the Council for Mutual Economic Cooperation (COMECON),

Bulgaria specialized in heavy industries and electronics. This determined the high enrolment rates in engineering and technical sciences prior to 1990. After 1990, with the restructuring of economy, privatization and liquidation of loss-making state-owned enterprises, the market demand for engineers started to decline in contrast with the demand for qualified specialists in other areas.

Figure G3: Number of Students in Engineering and Economics



Reference: National Statistical Institute

Nevertheless the initial decline in the enrolment in natural and technical sciences, the share of students studying engineering, mathematics, informatics, technology, physics and natural sciences is still significant (35.1%). On average 4,000 students graduate every year in technical sciences and about 1,000 - in the area of mathematics and natural sciences.

For more information on share of newly enrolled students by educational field please see the Annex – Table G1.

In the area of life-long learning (LLL), some progress has been achieved in the last several years. According to Eurostat, 1.5 % of the population aged 25-64 participated on some form of life learning in 2001. For 2002 this share is 1.3 %.

Table G7: Number of students in life-long training by area of training (2000-H1 2001)

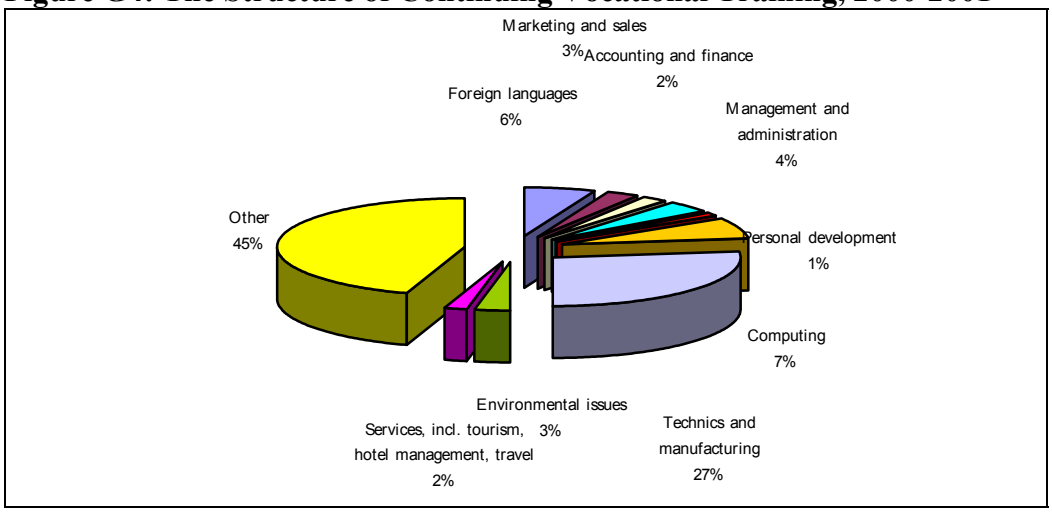
	Thousands
Total	303,409
Foreign languages	11,377
Marketing and sales	7,545
Accounting and finance	18,178
Management (incl. human resource management) and administration	15,299
Office management	1,576
Personal development	12,262
Computing	25,351
Technics and manufacturing	118,325
Environmental issues	35,892
Services, incl. tourism, hotel management, travel	8,741
Other	48,863

Reference: NSI

One possibility for training and retraining of adults is through VET system. Another possibilities are enrolments in the training programs organized by NGO sector or by the HEIs. However, most of the HEIs do not carry out active policies for attracting students in LLL.

According to the Continuing Vocational Training Survey (CVTS2), carried out in 2000,the structure of the continuing vocational training in Bulgaria is the following[57]:

Figure G4: The Structure of Continuing Vocational Training, 2000-2001



Reference: National Statistical Institute

With respect to distance learning, Bulgaria is one of the 13 countries participating in the PHARE Distance Education Program. Since 1995, a National Center for Distance Education, 4 regional and 16 supplementary Centers for Distance Education have been established. Four Master's Programs and more than 50 post-graduate distance courses have been introduced. According to MES, more than 3000 students have been trained in the distance learning courses.

Domestic and International Mobility of Scientific and Technical Personnel

Over the last 13 years Bulgaria is constantly facing the problem of significant "brain drain", seriously threatening its productive capacity in long-run. This process involves both internal migration from universities and scientific institutes to private sector, and external emigration to universities and private companies abroad. As it is shown in the Figure bellow, the higher mobility has been registered within assistant professors and researchers. For the period 1996-2001 the number of assistant professors decreased by 26.9 %.

Figure G1 in the Annex will provide with more information on mobility of the academic staff in higher education institutions (1996-2001).

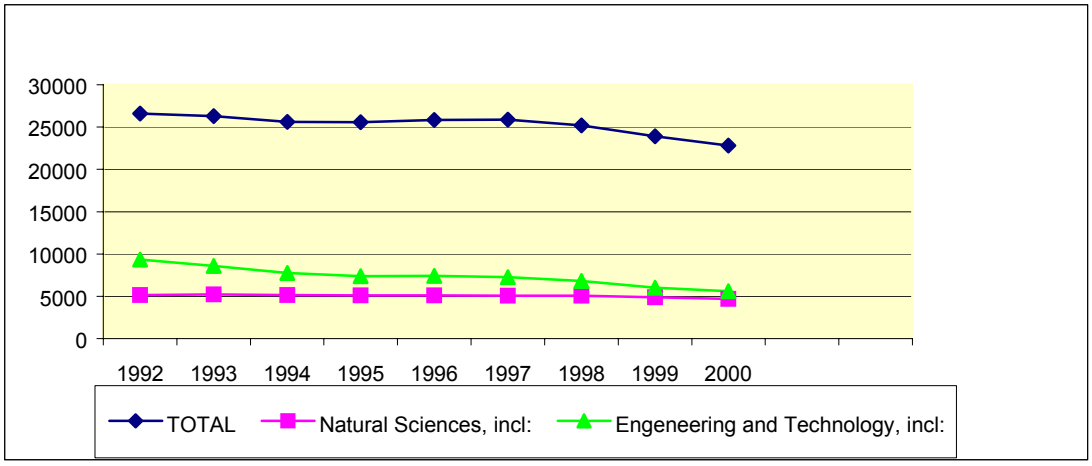
The mobility of scientific personnel in Bulgaria over the last ten years is determined by both demand and supply factors. On one hand, the process of restructuring and closure of the scientific and research institutes is leading to considerable changes in the need for scientific workers and technical personnel. Additionally, the labour market demand for scientific and technical personnel is influenced (rather negatively) by the low level of investment in R&D and technical modernization.

[57] According to the time spent in training

On the labour supply side, growing number scientists and technical personnel are adopting a personal strategy oriented towards searching and finding opportunities to live and work abroad. The driving motivations behind such a decision are the opportunities for achievement of better quality of life abroad, including better remuneration and carrier development, better educational and intellectual opportunities, better education for their children, etc. The internal mobility is pre-determined by the opportunities for higher remuneration and carrier development in the private sector (especially those offered by the foreign companies and banks), compared to the prospects offered by the universities and the research institutes.

The above-mentioned factors contributed to the steady decline of number of scientific personnel in Bulgaria. As it is shown in the Figure below, the drop in the total number of scientific workers is triggered mainly by the drop in the number of scientists, engaged in the technical science.

Figure G5: Scientists by field of science



Reference: National Science Institute

The problem is quite serious in the scientific and educational sector, having the fact that on our estimation about 70 % of young lecturers in ICT related subjects left the universities.

The engineering R&D is another sector hit severely by the internal and external brain-drain problem. For the period 1994-2000, the number of scientists in engineering and technology decreased by 28 %.

The main reasons behind the trends described above are the low level of salaries in the universities and scientific institutes, the outdated system for acquiring scientific degrees and the old and insufficient technical equipment.

According to different estimations, between 22,000 and 60,000 Bulgarians leave the country every year. The National Statistics Institute reports that between 1992 and March-2001 the number of the emigrants is about 196,000, or 2.5 % of the population[58]. The main destinations for this external migration are Germany (23 % of emigrants), USA (19 %), Greece (8%), Spain (8%), Great Britain (6 %), Italy (6%), Canada (5 %), France (4%), etc.[59]

[58] See: Kalchev, Yordan "External Migration of the Population in Bulgaria", Sofia, 2001
[59] Ibid.

The data, provided by the Ministry of Economy, show, that over the last decade over 50,000 electronic engineers, software developers and IT specialists have left Bulgaria.

This process is facilitated by the fact, that in the IT sector both capital and labour are very sensitive to the business environment and they can be easily moved to other location. Bulgarian IT companies recently suffer significant "brain drain" - many high-qualified programmers tend to leave the country attracted by better work conditions and high salaries. Majority of them find an opportunity to leave the country through the initiatives of Germany and USA towards increasing the number of "green cards" granted to software specialists. Only during the first six months of 2000 about 2,200 Bulgarians, most of them high qualified IT experts, emigrated with working visas to the USA, 3,639 to Germany and 606 to United Kingdom[60]. According to the data, provided by the Bulgarian Association of Information Technologies (BAIT), about 15,000 IT professionals have left the country in the last 10-12 years. Only 3 % of them are coming back to Bulgaria.

Tertiary Sector and Research Performance - in IST Related Subjects

One feature of the Bulgarian research and development practices is the separation of the education and research. This is partly due to the legacies of the past, when universities were permitted to perform research with a strictly limited scope. The right to perform applied research was granted to the Bulgarian Academy of Science and specialized branch institutes.

Nevertheless some reform measures aiming at promoting university research, BAS retains it monopoly. The major IST research centers are incorporated under the umbrella of the Bulgarian Academy of Science. These centers include: Institute of Mathematics and Informatics, Institute for Information Technology, Institute for Computer and Communication Systems, Central Laboratory for Parallel Processing, Institute for Control and System Research and National Laboratory for Computer Virology. Additionally, there are seven other institutes in the field of electronics: the Institute of Electronics (or the college) in Botevgrad, Center of Plasma Technology and Research, Business Innovation Center – IZOT, Institute of Electronics of the Bulgarian Academy of Science (BAS), The Institute for Instrumentation and Computer Technique Inc. in Sofia (BAS affiliated), The Central Mechatronics Lab of BAS, and the Central Institute of Computing Technique and Technology.

Apart from them, there are several research centers within the universities. However, the educational process rarely incorporates any research, meaning limited involvement and possibilities for students to acquire more practically oriented skills. Among the factors contributing to these constellations are:

- Lack of clearly defined research/innovation policy;
- Deteriorating facilities and/or inadequate equipment in the universities due to lack of adequate financial resources and following limited investment opportunities;
- Aging staff in the universities, lacking motivation to change established teaching practices and to introduce more flexible educational techniques, including research.

A positive development is the emerging practice of cooperation and accomplishment of joint research projects by BAS and educational institutions.

By 2000, the total number of the scientific personnel is about 22,815. Almost 25 % of them are involved in engineering and technology.

[60] Reference: “Info Week” 9-15 February 2001

Table G8: Scientists by field of science

	1994	1995	1996	1997	1998	1999	2000
TOTAL	25616	25577	25853	25871	2592	23906	22815
Natural Sciences, incl:	5151	5121	5101	5054	5069	4868	4705
- Mathematics					1140	1075	1065
Engineering and Technology, incl:	7743	7361	7421	7255	6813	6001	5604
- Mechanical engineering and mechanics					1018	928	856
- Air and space technics					176	152	129
- Electrotechnics					467	405	318
- Energetics					115	114	101
- Communication technics					437	390	378
- Electronics					495	495	397
- Authomation and data processing					997	819	820

Reference: National Statistical Institute

The main strength of the Bulgarian R&D sector could be seen in the existing traditions. These traditions are especially strong in IST-related R&D, having the over 35 years of specialization in high technologies.

With the restructuring of the economy, privatization and closure of the state-owned enterprises, most of the existing research institutes lost significant share of their contracts, previously financed by the industry. There is constant decline in public procurement for R&D activities.

Currently, most of the research centers (mainly those affiliated with the BAS and universities) rely mainly on government financing. While in 1989 the gross domestic expenditure on R&D was 2.7 % of GDP, in 1994 this share drops to 0.3 %. In 2000, the nominal volume of R&D expenditures was about EUR 70 mln, which accounted for 0.52 % of GDP.

Currently, the only government institution financing research on a national level is the National Science Council (former National Science Fund) with the Ministry of Education and Science. The financing of research has been transformed from institutional funding to direct project-based financing on competitive basis. Since its establishment in 1990 the National Science Council has approved and provided financing for 4,706 projects out of 10,107 applications, totaling about EUR 1,702,167.

The financing of the research projects by the National Scientific Fund in 2001 was distributed as follows:

Table G 9:Research Projects Financed by the National Scientific Fund in 2001

	Number of Applications	Approved projects	Average amount demanded per project	Average amount granted per project (EUR)
TOTAL, of them	210	71	2,987	660
Mathematics and mechanics	12	6	2,542	409
Informatics	7	3	2,679	852
Chemistry	35	12	2,255	575
Physics	14	6	2,583	937
Technical sciences	27	6	6,372	630

Reference: MES

The government Innovation Strategy[61] provides for establishment of two foundations (the Bulgarian Science Foundation and Bulgarian Technology Foundation) to facilitate the government financing of R&D. The Bulgarian Science Foundation will distribute grants for pure scientific research, while Bulgarian Technology Foundation will provide financing for projects in technological development.

There is a lack of available detailed information on the overall R&D applications and projects. The existing data show a negative trend in level of R&D activity since 1989 (see the table below). The most dramatic decline (more than 10 times) has been registered in applied scientific projects, and in the number of Scientific, Research and Development (SRD) projects (about 4 times drop).

Table G10: Level of R&D activity (number of projects)

	1989	**1995**	**1998**	**1999**	**2000**
SRD projects	12 115	5 207	4 709	4 190	3 125
Applied scientific projects	11 533	2 944	2 628	2 155	1 607
Experimental development of new and improved products	4 431	702	784	766	554
Development/implementation of new technologies	2 531	648	655	n.a.	n.a.
Completed fundamental research projects	574	1 417	1 297	1 269	964

Reference: "European Trend Chart on Innovation", 2001

According to the NSI, for the period 1995-2001 the average number of the completed research projects was 4,290 per year. In 2001 their number was 3,171, out of them 925 were fundamental research, 1,675 were applied research, and 571 experimental work.

In 2001 the number of completed research project with international funding was 504. 60.7 % are bilateral, and 32.1 % were financed by international organizations.

According to the Annual Report of the Bulgarian Academy of Science (BAS), in 2002 the research institutes of the BAS performed 211 researches under contracts with industry (mainly SMEs), ministries and government agencies.

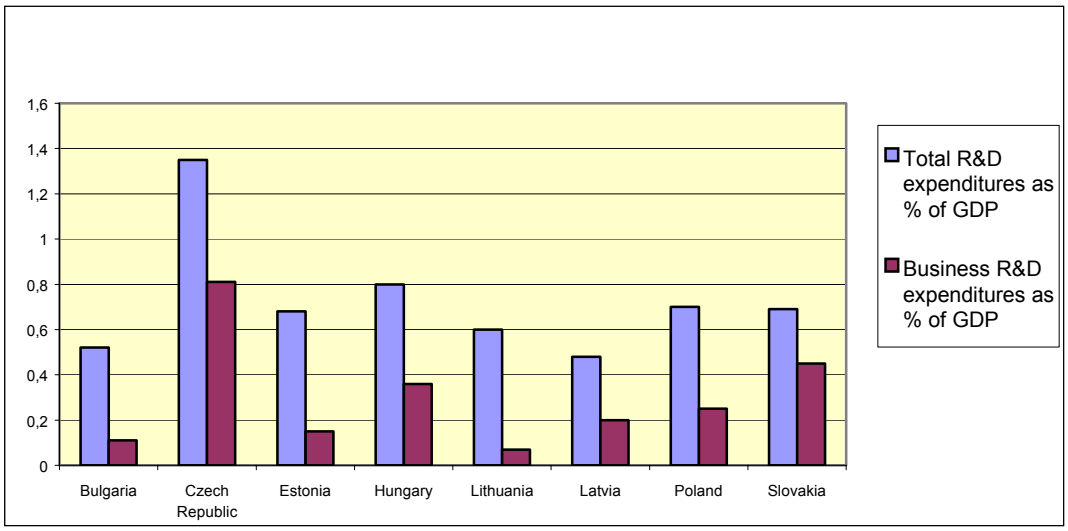
Bulgaria is participating at Fifth Framework Program with more than 250 projects, most of them in collaboration with partners from Greece, Germany, UK and Spain.

[61] See: "Science, Technology and Innovation in Bulgaria: Strategy and Implementation", Position Paper, Ministry of Economy, Sofia 2003.

Issues of Technical Transfer and Innovation

The private sector in Bulgaria still does not recognize the advantages of investing in research and development, or prefer to provide financing under short-term contracts. Partly this is due to the fact, that there are no special financial stimuli for the companies, investing in innovation activities. Moreover, most of expenses for R&D, covered by the companies, are not reported as such in their accounting, making estimation of R&D investments by the business very difficult. According to the official statistics, the private share of R&D expenses has remained unchanged and has even decreased somewhat since 1991. On average, Bulgarian business only spend about 0.11 % of GDP on innovation, representing one of the lowest levels among EU-accession countries.

Figure G6: Level of R&D expenditures in selected countries



Reference: Eurostat

According to a survey of the Ministry of Economy (2000), focusing on science and technology and innovation potential in industry, 25 % of Bulgarian companies consider that Scientific Research and Development (SRD) sector does not create new products and technologies. At the same time, about 35 % of the companies, included in the survey, have external R&D contracts. The predominant part of these companies is from high-tech sector. An interesting fact is, that 23 % of these companies claim that they are contracting universities for R&D projects, and only 7.3 % use the services of the Bulgarian Academy of Science. This probably means, that while the government (through its financing) grants serious preferences to the R&D activities of the BAS, the business preferences are in favor of the R&D activities of the universities. Additionally, most of the old institutes, incorporated in BAS, are failing to compete successfully with the foreign R&D and consulting companies, operating in Bulgaria.

According to another survey, conducted among 230 companies by Center for Economic Development in 2001, only 5 % of the companies consider the cooperation with universities for R&D and development of new products as intense and continuous.

According to the Ministry of Economy[62] most of the SMEs in Bulgaria have a comparatively poor knowledge base and do not perform R&D activities. However, it is considered that some

[62] Ibid.

of these SMEs have the potential to develop an innovation strategy, which could drive them out of low-cost-competition. In this respect it could be expected, that the technology transfer mechanisms will enhance innovativeness in these companies. As appropriate policy in this respect is envisaged those aiming at establishment of innovation transfer institutes and product innovation centers, which are expected to "organize diffusion activities and provide (individual and collective) innovation services to SMEs with innovation potential"[63].

Role of Academia in Innovation

In 2002 the research institutes affiliated to Bulgarian Academy of Science produced 182 R&D products, ready to be implemented in the business practices. Among these are scientific products for protection against computer viruses, technologies for production of cosmetics and chemicals, drugs, apparatus and devises for the chemical industry, application systems for space research, information-management systems for industry, transport, ecology and defense, etc. Among the R&D products in the area of agriculture, the specialized BAS institutes released improved brands of vegetables, tobacco, etc. 95 scientific projects were completed under contracts with enterprises (mainly SMEs), ministries and other government bodies. Apart from this, the institutes within the Bulgarian Academy of Science performed different research tasks under 211 projects contracted with National Electricity Company, Ministry of Ecology and Waters, Nuclear Plant "Kozloduj" different universities, Ministry of Regional Development and Public Works, Ministry of Defense, State Railways, companies, foundations, etc. and completed 125 R&D commissions in Bulgaria and 31 abroad.

Attractiveness of Academia for FDI

According to the National Statistics, the level of foreign direct investment in education is about 0.3 % of the total FDI in non-financial enterprises.

Table G11: FDI in education

Thousands USD	1997	1998	1999	2000
FDI in education	5,086.0	5,349.8	6,127.9	n.a.

Reference: National Statistical Institute

After the initial growth in investment in education, including foreign direct investment associated mainly with establishment of private schools in 1990s, after 2000 the level of these investments in private education started to decline. This is due to: a/ lack of significant demand for private education (because of demographic changes, economic reasons and surprisingly high confidence in the public educational sector) and b/ complicated and costly procedures for licensing and accreditation.

In the area of tertiary education, the main foreign investment is associated with the establishment of the American University in Bulgaria, which collaborates with the Universities of Delaware and Mine in the USA. The initial investment of the University of Main in AUBG was some US $1.2 mln., one-third of this amount was invested in ICT equipment. Another private university - New Bulgarian University was established with the initial financing from Soros Foundation. Additionally, 6 foreign universities opened branches in Bulgaria - University of Portsmouth (UK), St. Andrews University (UK), Holborn College (UK), Moscow State University for Economics and Information and the St. Petersburg State Technological Economic University, International University of Moscow, and City University Seattle (USA).

[63] Ibid.

Generally, there is lack of publicly available official information on the level of FDI in education. The National Institute has done the only official survey, providing such information, for Education[64]. This study, however, reflects a rather strange notion of the FDI: as such are considered donations from private individuals and foundations, different government and international donors through different international programs. According to the survey, for the period 1990-2000, the Bulgarian academia managed to attract FDI totaling to EUR 100 mln. Most of these so called "investment" took a form of scholarships and fellowships (56 %), 25 % were directed to institutional support of the universities, and 19 % provided assistance for elaboration of educational programs, foreign languages training, publishing, etc.

In the period 1991-1997 the main source of direct investment in Bulgarian universities was TEMPUS-PHARE Program, providing about EUR 70 mln. Another significant source of was Open Society Foundation, providing grants for more than EUR 8.7 mln through its programs "Education", "Universities", "Libraries", "Publishing", "Scholarships". The British Know How Fund provided USD 907,500 through its program "Bulgarian Academic Communities". The British Council in Bulgaria provided assistance for the establishment of the National Agency for Evaluation and Accreditation, as well as financial support to Plovdiv University, New Bulgarian University and Sofia University. Through Fulbright and other similar programs for academic exchange the US government provided grants totaling US $7.45.

G2 ICT-Related Education

It is considered, that Bulgaria has a good tradition in the area of IT education. To some extent this is due to the fact that in 1980's in the framework of the COMECON Bulgaria specialized in education of electronic engineers to serve the needs of the COMECON market. In addition, Bulgaria has a good reputation on educational performance in mathematics and fundamental sciences. Bulgarian education system had and still has high results in mathematics and in natural sciences. According to the World Bank and the Economist ranking, Bulgaria is ranked 5th in sciences and 11th in mathematics.

Table G2 in the Annex describes the TIMSS 8th grade student assessment results for science and mathematics.

According to the IT IQ Report of Brainbench Inc. (2002) Bulgaria is ranked eight among the top ten countries with its 8,844 certified IT Professionals. This ranking is based on on-line tests and certification. One possible explanation of the above results could be found in motivation of Bulgarian IT specialists to pass such tests and take such certification as a precondition for obtaining better job-position and higher remuneration packages.

Four universities basically provide education in the field of electronics, computer science and informatics: Technical University-Sofia, Varna Technical University, Gabrovo Tecnical University and University "Angel Kunchev" in Russe.

Additionally, 25 other HEIs offer programs in the area of information technologies and their application. Among them are St. Kliment Ohridski University of Sofia, the P. Hilendarski University of Plovdiv, the University of National and World Economy, the Varna University of Economics; The American University in Blagoevgrad; The New Bulgarian University and

[64] See: Analysis of the Foreign Direct Investment in the Higher Education in Bulgaria, National Institute for Education

several universities succeeding the former higher education institutes specializing in chemistry, technologies, food and beverage industries. According to ICT Agency, around 50 % of all Bulgarian universities have computer specialties.

In 2001, the number of students majoring in Computer sciences is 6,485, representing 3 % of the total number of students. A total number of 5,609 students study mathematics and informatics. About 4,000 students graduate every year in the field of technical sciences and technology and about 1,000 - in mathematics and natural sciences.

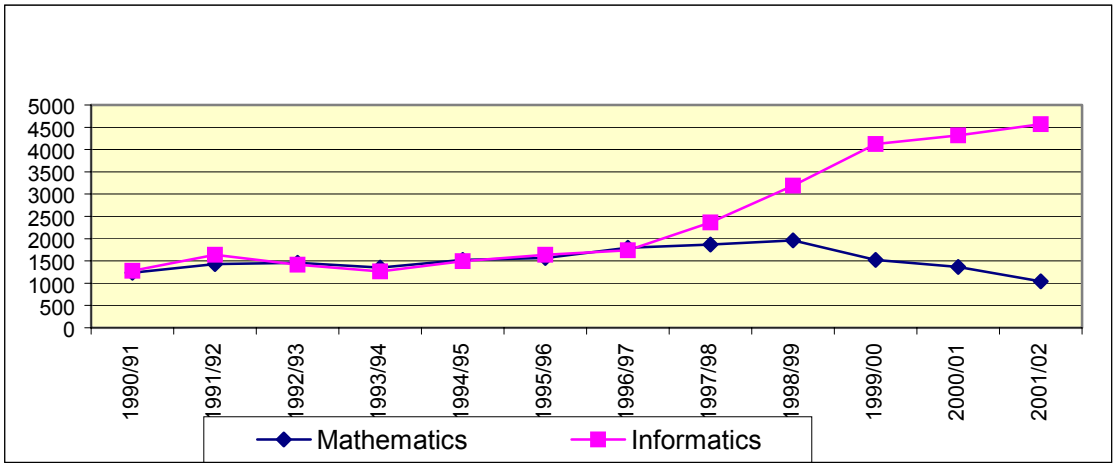
Table G12: Number of Students in IST Related Subjects

	1990/91	1991/92	1992/93	1993/94	1994/95	1995/96	1996/97	1997/98	1998/99	1999/00	2000/01	2001/02
Mathematics	1236	1433	1460	1351	1520	1567	1793	1867	1962	1526	1363	1039
Informatics	1281	1638	1412	1267	1493	1636	1738	2364	3188	4120	4317	4570
Statistics	n.a.	305	422	492	605	737	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
Mechanics	44	75	64	34	37	32	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
Electronics	16518	14540	14489	13029	11822	11133	17583	18416	n.a.	16662	n.a.	n.a.
Chemical technologies	6147	5664	4975	4735	4320	4909	4383	3961	n.a.	2877	n.a.	n.a.
Transport	2947	2973	3103	3274	3294	3201	3263	n.a.	1202	3643	1738	1762
Communications	2412	2015	2422	2471	2327	2783	3191	n.a.	n.a.	n.a.	n.a.	n.a.
Electrical Engineering	5010	4480	5735	5391	5060	4615	n.a.	n.a.	n.a.	6072	n.a.	n.a.

Reference: Ministry of Education and Science

As it is shown in the Figure below, while in early 90-s the number of students majoring in mathematics and informatics were almost equal, since 1997 there was a clear trend toward increasing the number of students in informatics and in 2002 their number is about 4 times bigger that those enrolled in mathematics.

Figure G7: Number of students in mathematics and informatics



Nevertheless the registered drop in level of enrolment in technical sciences, there is significant interest to ICT education. Only in Technical University- Sofia, the average number of applications for IT is above 3,800, and for communication technologies - about 1,200.

Table G13: Number of applications in Technical University- Sofia

	2000	2001	2002
1. Computer Systems and Technologies	2 902	3 852	2 786
2. Communication Technologies	1 098	1 163	1 190
3. Electronics	132	191	184
4. Automatics	158	166	187
5. Electromechanical Engineering	51	64	60
6. Industrial Management	381	368	408
7. Aviation Engineering and Technologies	248	171	156
8. Electrical Engineering and Electrical Equipment	95	140	119
9. Transport Engineering and Technologies	119	134	105
10. Machine Technology	33	27	28

Reference: Technical University-Sofia

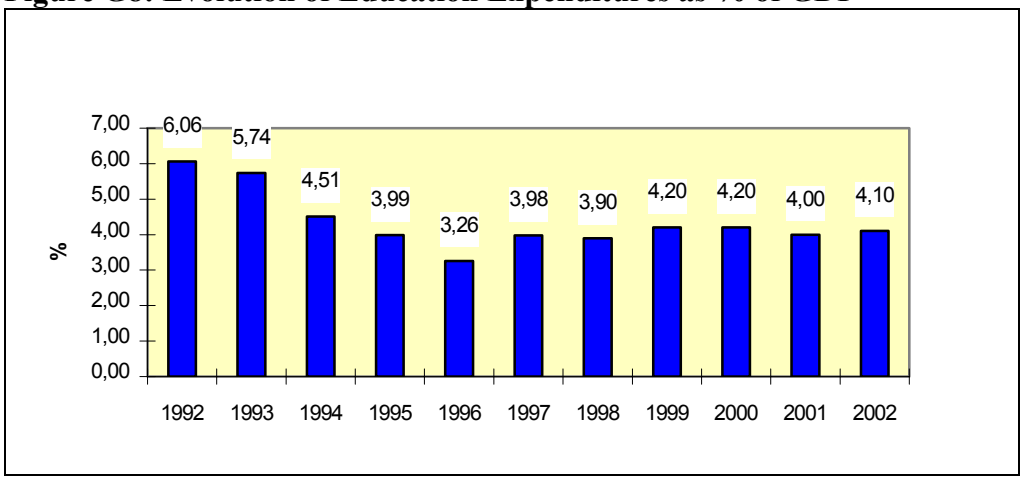
Apart for the universities and colleges, there are different initiatives aiming at further development of ICT skills and knowledge. Most of these initiatives are driven by the shortage of ICT-skilled workers and the general notion that most of the ICT-educational programs do not meet the requirements of the labour market. Thus, some of the biggest Bulgarian and international IT companies have initiated their own activities, or developed educational programs together with the main universities. These initiatives are focused on broad area of subjects, related with the implementation of information technology. As it was already mentioned, there are 38 CISCO Academies and 5 Microsoft Academies, most of them affiliated with some of the main Bulgarian universities. The Cisco Academy Program offers special training in designing, building and maintaining of computer networks. The Cisco Academies offer two levels of certification - Cisco Certified Networking Associate (CCNA) and Cisco Certified Networking Professional (CCNP). The Microsoft IT Academy Program offers certification of proficiency and expertise in working with Microsoft Application packages. Another public-private initiative in the area of ICT Training and Education are the Public Computer and Communication Center, funded by USAID and implemented by the Academy for Educational Development through LearnLink, "Chitalishta" Project, financed by the UNDP, USAID and the Dutch Government, envisaging implementation of ICT education by Cisco Systems in 25 *chitalista*[65] and 3 regional centers. Additionally, MES signed an Agreement for Strategic Partnership with Oracle, providing for development of a program for IT education and training. IBM-Bulgaria, MES and Open Society Foundation also launched a joint initiative for ICT implementation in different subjects.

G3 ICT-related Education: Institutional Resources

One of the most important transformations in the area of education in the last decade is the reform in financing of education. However, these reforms do not contribute to any sizable improvement in the allocation of resources in educational sector. At the same time, the public expenditures on education contracted significantly since 1990.

[65] Chitalista is a unique structure of the Bulgarian communities, which have been developed about 150 years ago and have played a major role in education and preservation of the national cultural heritage. Currently these centres provide mainly educational and arts courses, and library services to the local communities.

Figure G8: Evolution of Education Expenditures as % of GDP



Reference: Ministry of Finance, World Bank

In 2000 the real expenditures on education reached 40 % of the level in 1999, representing one of the highest drops among the CEE countries.

Table G13: Real Expenditures on Education as % 1990 Level

	1995	**2000**
Bulgaria	52.6	40.3
Czech Republic	118.3	96.0
Estonia	91.2	108.5
Hungary	93.5	98.6
Latvia	86.5	116.1
Lithuania	69.1	70.1
Poland	154.6	211.0
Romania	154.8	128.9
Slovak Republic	90.1	81.3
Slovenia	117.8	139.5

Reference: World Bank

This sharp drop in financing contributed to the decline of investment activities of the schools, including uneven introduction of ICT in Bulgarian secondary and tertiary education. However, there national statistics do not provide clear data on resources of educational establishments spent on ICT equipment. At the same time the ICT budgets of the educational institutions are not publicly available and the government subsidy do not provide details regarding the money envisaged for ICT-related spending (see attachment g42).

The overall level of ICT penetration in secondary schools is low compared with the EU average. About 68 % of the schools have no single computer. Only 10 % of the schools have modern computer equipment. As it is shown in the table 3 bellow, the regional distribution of ICT laboratories and equipment between schools is highly uneven. In different regions the students per high-class computer ratio varies between 19.2:1 and 220.8:1. Moreover, the figures show that these penetration rates are not dependent on the economic development of the respective region. For example, the lowest students per high-class computer ratio of 19.2:1 and the highest one – of 220.8:1 are registered in two of the poorest regions in the country – Montana and Smoljan. The highest share of computer laboratories (15.2 %) is registered in Sofia, which could be explained by the fact that the concentration of schools in the capital is highest. Almost the same is the situation in the other big cities – Varna and Plovdiv, where are concentrated respectively 7.9 % and 6 % of all computer laboratories. However, when we

take into account the number of PCs in schools, Sofia has comparatively low share of PCs - only 4 % of the total, compared with the other big cities Varna (7.8 %) and Plovdiv (5.3%). At the same time there is a high share of PCs available at schools in some small towns, as Pazardjik (7.4 %), Vratza (5.3 %) and Dobritch (4.8), although majority of these PCs are low-middle class. As a whole, 66.2 % of all PCs in the schools are higher class.

Table G14: ICT Infrastructure in Bulgarian Schools by Region

Region	Computer laboratories	% of the total	PCs	% of the total	Low-middle class PCs	Higher class PCs	Students per high-class PC ratio	Schools with Internet access
Blagoevgrad	76	5.8	339	2.8	68	271	74,7	24
Bourgas	51	3.9	483	3.6	65	418	58,7	19
Gabrovo	30	2.3	313	2.6	22	291	22	9
Dobrich	21	1.6	589	4.8	437	152	37,1	1
Kardjali	40	3.0	279	2.3	25	254	33,5	4
Kyustendil	42	3.2	382	3.1	152	230	43,3	4
Lovech	30	2.3	301	2.5	112	189	41,3	9
Montana	40	3.0	268	2.2	122	146	19,2	4
Pazardjik	45	3.4	903	7.4	558	345	50,6	18
Pernik	26	1.9	281	2.3	22	259	48,8	4
Pleven	49	3.7	379	3.1	135	241	47,5	5
Plovdiv	79	6.0	651	5.3		651	36,8	15
Razgrad			240	1.9	126	114	69,9	6
Russe	43	3.3	424	3.5	41	383	41,3	19
Silistra	22	1.7	229	1.9		229	33,3	7
Sofia city	200	15.2	490	4.0		490	40,6	53
Sofia region	42	3.2	589	4.8	284	305	78,9	10
Sliven	36	2.7	263	2.1		263	40,6	9
Smolyan	36	2.7	231	1.9		231	220,8	8
Stara Zagora	49	3.7	467	3.8	52	415	39	16
Targoviste	32	2.4	465	3.8	312	153	73,8	6
Haskovo	47	3.6	536	4.4	288	248	62,7	8
Shoumen	26	1.9	198	1.6	67	131	28,9	9
Varna	104	7.9	946	7.8	396	550	32,3	28
Veliko Turnovo	57	4.3	616	5.0	69	547	40,8	21
Vidin	22	1.7	437	3.6	289	148	34,4	3
Vratza	37	2.8	642	5.3	480	162	54,1	9
Yambol	30	2.3	261	2.1		261	53,2	8
TOTAL	**1,312**		**12,202**		**4,122**	**8,077**	**66,4**	**336**

Reference: MES, ARC Fund, own calculations

According to the data, provided by the Ministry of Education and Science, by April 2003 the total number of computers in secondary schools are 20,521, of them 3,560 (or 17.3 %) having Internet access. The overall pupils per computer ratio is 30.5:1.

The ambition of the Ministry is this ratio to achieve level of 10:1. According to the MES program, the total number of PCs in the school network is expected to reach 35, 000 by 2005. Generally, there is no reliable official information on ICT penetration in Bulgarian higher education. According to ARC Fund (2002) estimations, the total number of computers in all HEIs is some 20 000. According to the data, provided by the MES, the total number of

computers in HEIs is 15 753, only 7.5 % of them are in colleges. According to different estimates, about 27 % of the Bulgarian scientists and academic staff have access to computer.

Table G15: Penetration of computers in the higher education in Bulgaria

HEI	Number of Students	Number of Computers
Sofia University	30 289	3 500
AUBG	700	550
Technical University-Sofia	13 560	1 800
University of Russe "Angel Kanchev"	6 476	720
University of Forestry	2 960	300
University of Burgas	2 827	230
University of Chemical Technology and Metallurgy	3 491	412
University of Economics – Varna	8 733	470

Reference: Vitosha Research

Generally, the outdated and insufficient equipment in the educational establishments is a main obstacle for implementation of modern education, based on use of information and communication technologies.

Currently the MES launched a strategy for introduction of ICT in Bulgarian education, providing for:

- further development of study content, teaching methods and materials with reference to the state educational requirements in ICT;
- provision of schools with hardware, software and Internet access;
- development of partnerships for financing and project development. Currently, there is a joint initiative of MES, IMB-Europe and Open Society Foundation for ICT implementation in different subjects;
- initial and in-service training of teachers in ICT-related matters;
- development of special educational software to be used in teaching process;
- development of programs for individual training of pupils;
- development of a system for monitoring of the incorporation of ICT into education.

Employment of recently trained

The employment structure of recently trained in the fields of technical and natural sciences went through serious restructuring since 1990. The main reason is in the restructuring of the economy, closure or reduction of activities of some of the state-owned enterprises, previously employing a significant part of graduated professionals, closure of most of the industrial science and research organizations. Currently, the main part of recently trained ICT specialists and graduates in natural and technical sciences find jobs in private companies, most of them-SMEs. According to the national statistics, about 53 % of all ICT specialists are employed in SMEs. Big companies recruit about 14 % of the total labour force in the sector.

According to different estimates, in 2002, the real number of IT specialists (in the area of software development, Internet applications and design, system administration, hardware) was 18,000-20,000, which represents 0.7 % of total employment in the country. If we take into account the telecom engineers, ICT teachers and IT specialists in public administration, this number reaches 45,000- 50,000 people.

According to GTZ study[66], the share of Bulgarian software industry in the total employment is still EU average, but is rising steadily. For example, in 1998 it represented 0.23 % of the total employment, while in 1999 its share reached 0.40 %.

According to Eurostat data, the high tech and medium- high tech manufacturing industry in Bulgaria employs 5.3 % of the total labour force (compared to EU average of 7.4%), and 22.2 % of the employment is concentrated in knowledge-intensive services (compared with 33.3 % EU average).

Table G16: Distribution of employment by selected sectors in %, 2002

	Total employment (thousands)	**High tech and medium-high tech manufacturing**	**Other manufacturing***	**Other (neither manufacturing, nor services)****	**Other services*****	**Knowledge intensive services**
EU	162,974	7.4	11.8	12.9	34.7	33.3
Bulgaria	2,800	5.3	18.5	19.5	34.5	22.2
Czech Republic	4,763	8.9	19.1	17.0	31.2	23.9
Estonia	581	3.4	18.6	15.4	31.8	30.9
Cyprus	315	1.1	11.1	16.2	45.4	26.2
Latvia	988	1.9	14.5	24.5	34.4	24.7
Lithuania	1,421	2.6	15.2	28.2	29.3	24.7
Hungary	3,846	8.5	16.4	15.3	33.3	26.4
Slovenia	922	9.2	21.9	17.0	29.1	22.8
Slovakia	2,111	8.2	18.8	17.1	31.2	24.0
Romania	9,768	5.5	16.0	45.8	19.9	12.8

Reference: Eurostat

Notes:

*refers to total manufacturing excluding high tech and medium-high tech manufacturing sectors;

** refers to total economy excluding manufacturing and service sectors;

*** refers to total services excluding knowledge-intensive services

Mobility of recently trained

The high mobility of workforce in Bulgarian ICT sector (both in terms of company-to company and geographical mobility) is determined by their fairly good educational background and skills. ICT jobs in Bulgaria are considered quite attractive, having the higher salaries in the sector. According to an on-line survey of Computerworld/Bulgaria, by the end of 2002 the average monthly salary in IT sector was about EUR 400, which is 4,3 times higher than the average in the country. 26 % of all IT specialists receive more than EUR 500 per month, and 35 % receive less than EUR 200. The IT specialist working for foreign companies receive on average EUR 570, while those working for government institutions are paid much less - EUR 172 on average. According to the position, the highest salaries receive the IT directors and team managers.

[66] www.gtz.de/eu-clusters/english/bulgaria.htm

Table G17: Average Salaries in IT Sector According to the Type of Activity

Position	Average salary BGN	Average salary EUR
System integrator	1,200	613
Software developer	1,187	606
Banking	970	495
Web systems developer	747	381
Communications	706	360
IT consultant	671	343
Information services	620	317
Sales representative	570	291
Hardware distributor	519	265
IT specialist in industry	509	260
Internet provider	405	207
System administrator	321	164

Reference: ComputerWorld/Bulgaria

According to Vitosha Research, 186,000 people have high education somehow related to ICT and about 565,000 people have some formal computer training.

There is no clear match between the quality of education and the needs of the labour market in Bulgaria. According to ARC Fund study “IT education is not a decisive factor for recruitment and more than 80 % of the cases it is not a prerequisite for employment”. The reason for such a situation is the fact that most of the employers consider the skills acquired at the school and at the university as not much adequate to the practical needs and rely on on-the-job training.

SWOT Analysis of Education

The existing **traditions of education in technical sciences** are considered as a competitive advantage for Bulgarian IT development. The availability of qualified and experienced IT specialists is considered as an important strength.

However, despite the **strong interest in ICT-related education**, the **implementation of information and communication technologies** in the Bulgarian education is still one of the lowest in Europe. This is a result of the chronic **lack of finance for modern IT equipment** and low salaries that cannot motivate high-qualified experts to educate the new generation of IT students. In addition, the education is **not enough practically oriented**. This insufficient emphasis on ICT education and training threatens the ability of labour force to meet the future market demands for skilled employees. This, together with the serious **brain drain** of IT-workers, scientists and engineers reduces the ICT-opportunities of Bulgaria. Considering that the quality of education influence Bulgaria's competitiveness in a long-term plan, education could turn into the main threat to the country's competitiveness

Strengths	Weaknesses
✓ Strong traditions in technical sciences ✓ Good education in mathematics and natural sciences ✓ Traditions in R&D sector ✓ Well established networks of specialized VET schools and technical universities	✓ Still high level of administrative centralization in education ✓ Poor teachers' qualification in ICT-related subjects ✓ Low level of ICT penetration in secondary and tertiary education ✓ Worsened standards in secondary education ✓ Lack of practical orientation of educational process ✓ Separation of education and research ✓ Lack of interest in SMEs in supporting long-term research ✓ Lack of specific vision and policy for setting science, research and development priorities.
Opportunities	**Threats**
✓ Strong interest in ICT-related education ✓ Introduction of ICT training in primary and secondary education ✓ Adoption and implementation of the strategy for introduction of ICT in education ✓ Introduction of distance learning practices ✓ Development of public-private partnerships to facilitate provision of ICT equipment and facilities in schools ✓ Integration of education and research	✓ Brain drain ✓ Limited competition between public and private schools and universities ✓ High level of drop-outs in primary and secondary general education ✓ Aging of academic staff

H. NATIONAL AND REGIONAL DEMOGRAPHIC DATA AND PROSPECTIVE

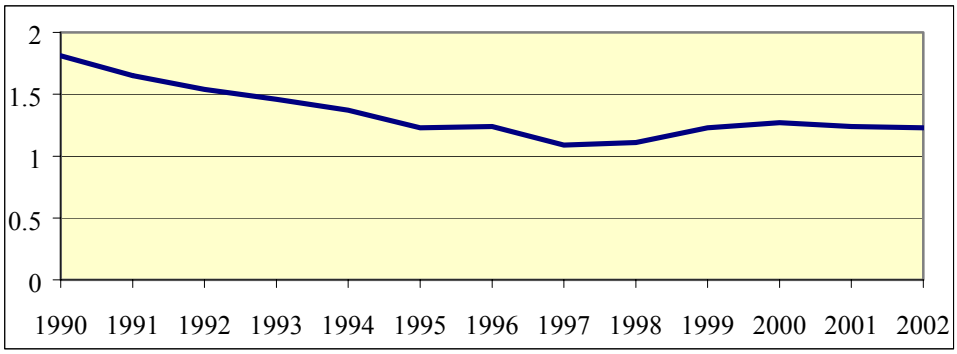
H1 Main Economic and Social Effects of Population Dynamics

The population of Bulgaria in the year 2002 is 7,845,841, which is 89.47% of the 1989 level. Thus it decreased by 10.53% for the period, which equals a yearly rate of population growth of minus 0.85% on average. The reasons for this negative population growth are the negative rate of natural increase and the emigration. 43% of the population decrease is attributable to the difference between the birth and the death rates and 57% to the emigration.

The emigration is mainly a consequence of the large difference between the Bulgarian and industrial countries' standards of living - that includes not only the income levels, but also the administrative, social, criminal and legal conditions in the country. The public administration is not user friendly and it takes a lot of time and money to comply with all the requirements (for example, as we noted earlier, the registration of a small company is more expensive, consist of more procedures and is more time-consuming). The legal system is slow and is perceived as not just enough.

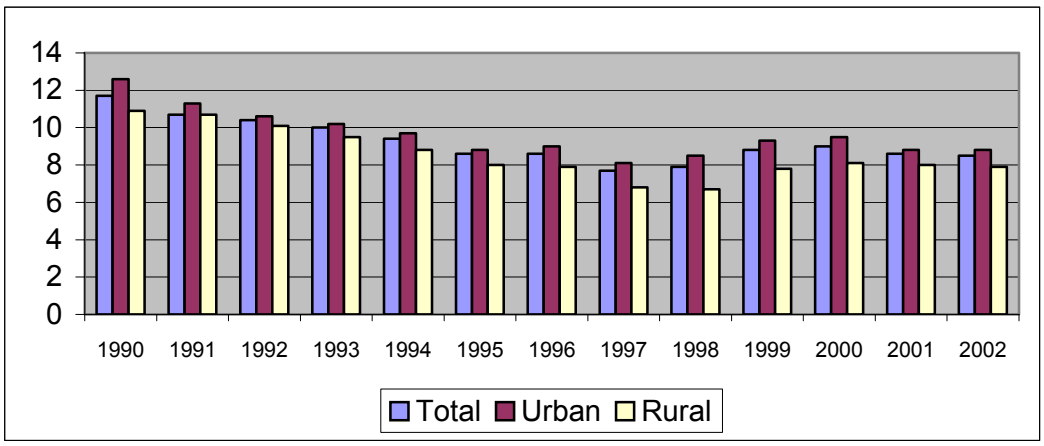
The negative rate of natural increase is a result of the smaller birth rates and the higher death rates. The higher death rates are caused by the relatively higher share of the elderly population. The smaller birth rates are caused by the decision of the families not to have many children unless they can provide for a good standard of living for these children.

Figure H1: Total fertility rate



Reference: National Statistical Institute

Figure H2: Birth rate



Reference: National Statistical Institute

The share of the people over 65 years increased by 26% (from 13.39% of the population in 1990 to 16.92% of the population in 2002) and the share of the people under 20 years decreased by almost 21% (form 27.4% of the population in 1990 to 21.75% of the population in 2002).

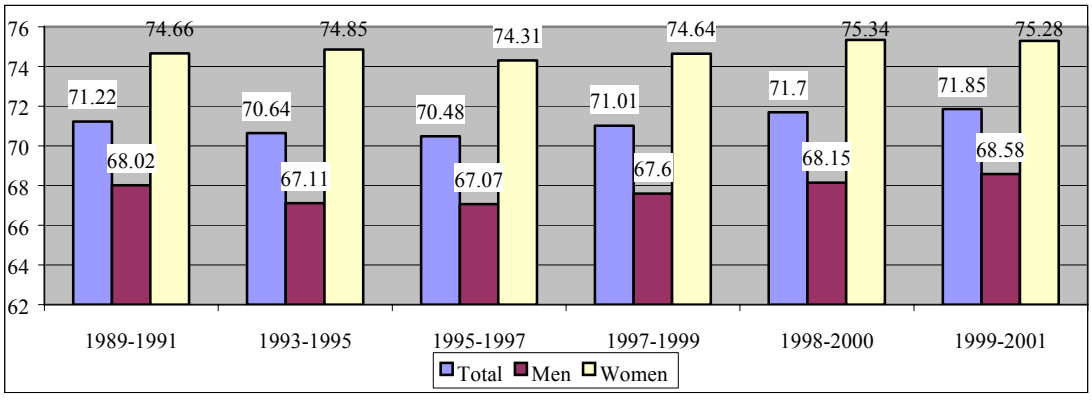
Because of these demographic developments it is now obvious that the current pension system, based on the pay-as-you-go model, is unsustainable in medium and long term in the sense that the burden on the working people is and will be excessive and despite this the pensions are and will be quite modest. That situation creates fiscal and economic risks and therefore there may be some attempts for more radical reforms of the system in the direction of funded pension system.

The increasing share of the elderly population creates higher demand for health services and because the healthcare system is a centrally financed state-owned compulsory monopoly that is another fiscal risk. However, there are lots of efficiency gains if the system is reformed so that risk can (and probably will) be mitigated through further reforms.

The decrease of the population increases the gross domestic product (GDP) per capita other things being equal. Of course, the condition ceteris paribus never applies to the reality so in the Bulgarian case the decrease of the population leads to a smaller drop in GDP per capita than the drop in GDP in the years before 1998. Likewise, the economic growth as measured by growth of GDP per capita is higher than the growth measured by the growth of the total GDP. As a result of this the yearly average GDP growth per capita is minus 0.55% compared with the minus 1.39% growth in the total GDP. Therefore the measured GDP per capita in 2002 is 93.1% of its 1989 level although the measured GDP is 83.3% of its 1989 level. Of course, if we take into account the unobserved (gray) economy, which is fairly large at the moment (about 36% according to Friedrich Schneider's research) and was much smaller in 1989, we would conclude that the current GDP per capita is bigger than it was before the collapse of the socialist regime.

The increase of Bulgarian emigrants after 1989 is sometimes considered as a problem for the country. However, the transfers, made by these emigrants to their families, amount to a relatively large sum (about 500 million EUR, which is about 3% of GDP) so it turns out that their role is quite positive – they support some of the needy and in this way perform some functions that can be described as social.

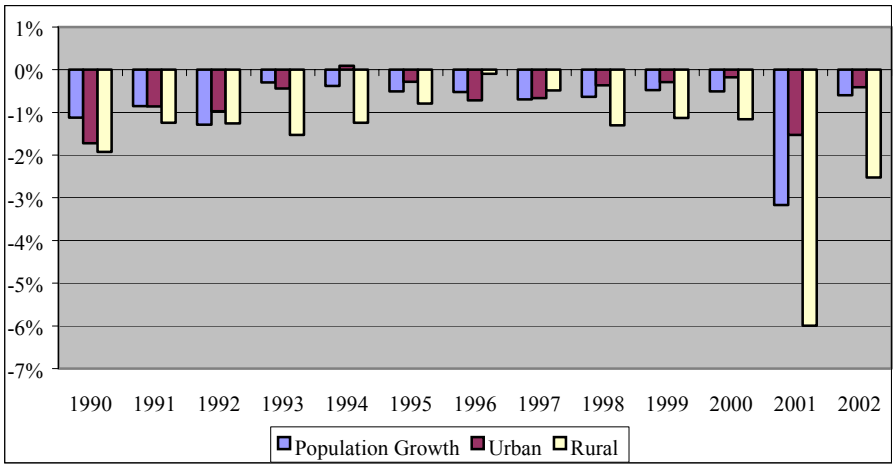
Figure H3: Life Expectancy at Birth



Reference: National Statistical Institute

The life expectancy at birth decreased slightly in the initial years of transition from 71.22 in 1989-1991 to 70.48 in 1995-1997, mainly as a result of the decrease in the life expectancy at birth of men form 68.02 to 67.07. However, after that period the life expectancy at birth increased and as a result in the period 1999-2001 it exceeded the 1989-1991 level.

Figure H4: Population Growth



Reference: National Statistical Institute
Note: * In 2001 there was a population census, which made it clear that a lot of people had emigrated. That is the reason for the higher population drop in 2001.

The share of the urban population increased from 67% in 1990 to nearly 70% in 2002. This tendency will continue due to the fact that the mortality rate in the rural areas is almost twice the rate in the urban areas (because of the older population in the rural areas), the infant mortality rate is higher and the birth rate is lower. Also, there continues the migration from the rural to the urban areas. This migration is determined by:

- Relatively higher possibilities for finding a job in the urban areas;
- Better living conditions in the big cities, more services, theatres, cinemas, cafes, and clubs, Internet etc.
- Less people needed in the agriculture and correspondingly lower incomes in the agriculture.

The population density can be seen in the Annex – Figure H1.

H2 Human development index

The human development index for the year 2000 is 0.779, which is the same as the 1995 value and slightly lower than the 1990 value. Obviously, according to the United Nations Development Program in the decade following the fall of the communist regime the level of the human development was fairly stable. In fact, according to UNDP the human development index for the year 1997, after the great economic crisis of 1997 – 1997, is a little higher than the pre-crisis 1995. And the index for the year 2000 is lower than 1997. So, the index does not measure the effects of the economic change, reforms, the reverse of the reform direction in the middle of the 1990s, the new beginning in 1997, the resulting 5 successive years of economic growth. Of course, the reason for that is construction of the index – it consists of a number of non-economic indicators, which are quite stable (for example, education and literacy). So what we can see from the index is that the overall absolute level of human development is the same in the late 1980s and early 1990s. However, the relative level

of human development decreased, i.e. the rank of Bulgaria among the countries, included in the index, felt from 33 in 1990 to 62 in 2002. The reason is that the other countries' absolute indices increased while the Bulgaria's index remained at the same level.

Table H1: Human development index

Year	1990	1995	2000
Human development index	0.786	0.778	0.779

Reference: Human Development Report 2002

Table H2: Human development index

HDI rank	62
Life expectancy at birth, 2000	70.8
Adult literacy rate (% age 15 and above), 2000	98.4
Combined primary, secondary and tertiary gross enrollment ratio (%), 1999	72
GDP per capita (PPP US$), 2000	5,710
Life expectancy index	0.76
Education index	0.90
GDP index	0.68
Human development index (HDI) value, 2000	0.779
GDP per capita (PPP US$) rank minus HDI rank	18

Reference: Human Development Report 2002

SWOT Analysis

Strengths 1. The increasing transfers, made by emigrants to their families, help alleviate the poverty 2. Rising life expectancy at birth	**Weaknesses** 1. Relatively high infant mortality rate 2. Unfriendly business climate, high taxes, existence of conscription army, rigid labour market, slow economic reforms
Opportunities 1. Reforms in the pension, education and healthcare systems that should become more effective and efficient 2. Labour market reform	**Threats** 1. The population ageing is a serious risk for the unreformed pay-as-you-go pension system and centralized health system and thus for the government budget 2. A growing share of the electorate is depending on the government (through pensions, unemployment benefits, subsidies and other assistance programs) thus developing a dependence mentality and increasing the redistribution seeking

I. CULTURAL AND SOCIOLOGICAL DATA

I1 Changes in employment structures

Bulgarian transition had a tremendous impact on labour market. In fact, the huge structural reforms that were carried out made a vast amount of industrial workers obsolete. During the period 1990-1998 more than 1.2 mln industrial workers had to leave and find another job. Conversely, the relative share of agricultural employment rose from 19% to 26%. But the number should not be misleading; the methodology of labour market surveys often include rural population not officially registered as unemployed as "agricultural labour". The actual shift is towards employment in the service sector. In fact, more than 65% of all (public and private sector) who work under labour contract are at present employed in services. Even discounting for government employees, the private sector services account for 45% of official employment. Provided that widespread hidden employment (without labour contract), it is fair to claim that the share of services employment is higher than 50% in private sector alone.

Table I1: Employment by major sectors

Employment	Shares (%)	Shares (%)	Shares (%)	
Year	**1989**	**1993**	**1998**	**2002**
Agriculture	18.6%	21.9%	26.7%	25.6%
Industry	46.5%	37.5%	30.0%	27.6%
Services	34.9%	40.6%	43.3%	46.8%
Total	100.0%	100.0%	100.0%	100.0%

Reference*:* NSI

I2 New forms of employment and their link to IST

The transition to a market economy, together with the development of new technologies gave start to a range of entirely new forms of employment. Several business sectors, which use extensively ICT, had grown fast during the last decade:

1. Communications. The national telecom (BTC) invested heavily in new infrastructure, thus requiring up-to-date knowledge and providing high-profile jobs for qualified personnel. With the emergence of the mobile communications the opportunities for engineers and ICT specialist expanded even further.
2. Energy generation and transmission. Concerned with nuclear power safety at the beginning of the 1990-ies, the national electric company continuously renovated its management and control systems. This in turn opened new IST opportunities.
3. TV and radio. The liberalization of the frequency range for private media use allowed hundreds of new radio and TV stations to commence business, with the respective growth of communication-specific employment.
4. Internet. Especially during the last 2-3 years, the Internet became a media for numerous information and analytical services provided on a commercial basis.
5. Banking and finance. After the bank crisis of 1995-1996 and the subsequent rehabilitation and privatization, banks and other financial intermediaries started to invest heavily in new technologies. In fact, at the end of 2002 all major banks provide electronic banking and Internet-based banking, and the stock exchange recently introduced the new system for online trading. All of these required qualified personnel and thus more ICT job opportunities were created.

Apart from the penetration of ICT in different areas of economic activity, the ICT production itself grew significantly and according to different assessment provides between ten and fifteen thousand jobs. These would include software development and project management in ICT.

I3 Mobility

The census of 2001 marked increasing trend for internal migration. A total of 400,000 people moved within the country during the eight-year period of study.

About 50% point as major reason "family matters" and 24% - "job opportunities". However, a combined share of 43% mention better employment opportunities as important factor for the migration. Of those looking for a better job, 74% moved to the cities.

Table I2: Structure of the internal migration (in %)

Direction	**1993-2001**
Total	100
Town-town*	46,2
Town-village	27,9
Village-town	15,6
Village-village	10,3
Intensity of migration	4,8

Reference: NSI, Census 2001
Note: * The definitions of "town" and "village" are according to the Law on Administrative Division of the Republic of Bulgaria; "town" is a settlement with more than 3,500 inhabitants and well-developed utility infrastructure

The numbers above provide information only on those, who officially changed their address and personal documents. Apart from them, different estimates show about 200,000 seasonal migrants in tourism, agriculture and construction – close to 10% of registered employment. The growth of migration, and seasonal one in particular, was sizeable during the last 3-4 years. However, the rigidity of labour market regulations combined with problems on the real estate market, including inflexibility of rent market and underdeveloped mortgage market still constrain to a visible extent the process of migration.

During the 1993-2001 a net of 177,000 people left Bulgaria. Major reason was search for better employment. The numbers are not fully representative, since a significant number of Bulgarians travel officially for educational and other purposes and are not counted as 'emigrants' until several years after departure elapse.

Table I3: Structure of the international migration (in %)

Direction	1993-2001
Total	100
Germany	23
USA	19
Greece	8
Spain	8
UK	6
Italy	6
Canada	5
Other	25

Reference: NSI, Census 2001

The transition period does not seem to have increased income inequality. The ratio of top-to-bottom declined of income earners have changed from 2.5 in 1989 to 3.6 in 1999. The average for the CEE countries is about 3.9.

A possible explanation of this seemingly low ration of inequality is the widespread shadow employment and cash-payments that are not included in official statistics. It may well be that the actual inequality is higher, if unreported incomes in the shadow economy are taken into account. Labour market data for example show an average monthly salary for a software developer of $120, while actual size in private sector is about $500, or 4 times higher.

The income gap is especially visible in comparing qualified with non-qualified labour, and also domestic to foreign companies employees. It is a common knowledge among HR companies and foreign investors that local labour is not “highly qualified” in general, rather, there is a relatively small number of highly educated and productive specialists (especially in software programming); but those are not cheap to hire. Thus, it is not uncommon to see fast career tracks with young professionals under their 30-ies to hold top management positions in big companies. The environment of labour market opportunities suggests relatively high chances for social mobility, with previously acquired status and origin playing insignificant role in personal achievement.

I4 Changes in consumption patterns

The are several important trends in the consumption patterns (see the table bellow):

1. After the deep economic crisis of 1996-1997 the share of basic goods - food - in the consumption declines. This reflects the growth of disposable income since 1998 and the related changes in consumption priorities.
2. The reform of utility sector after 1997 meant abolishment of subsidies to household electricity, heating and water supply, which increased the expenditure on these items by 50% over the last 5 years.
3. Leisure and communications show a steady increase, especially after 1999.

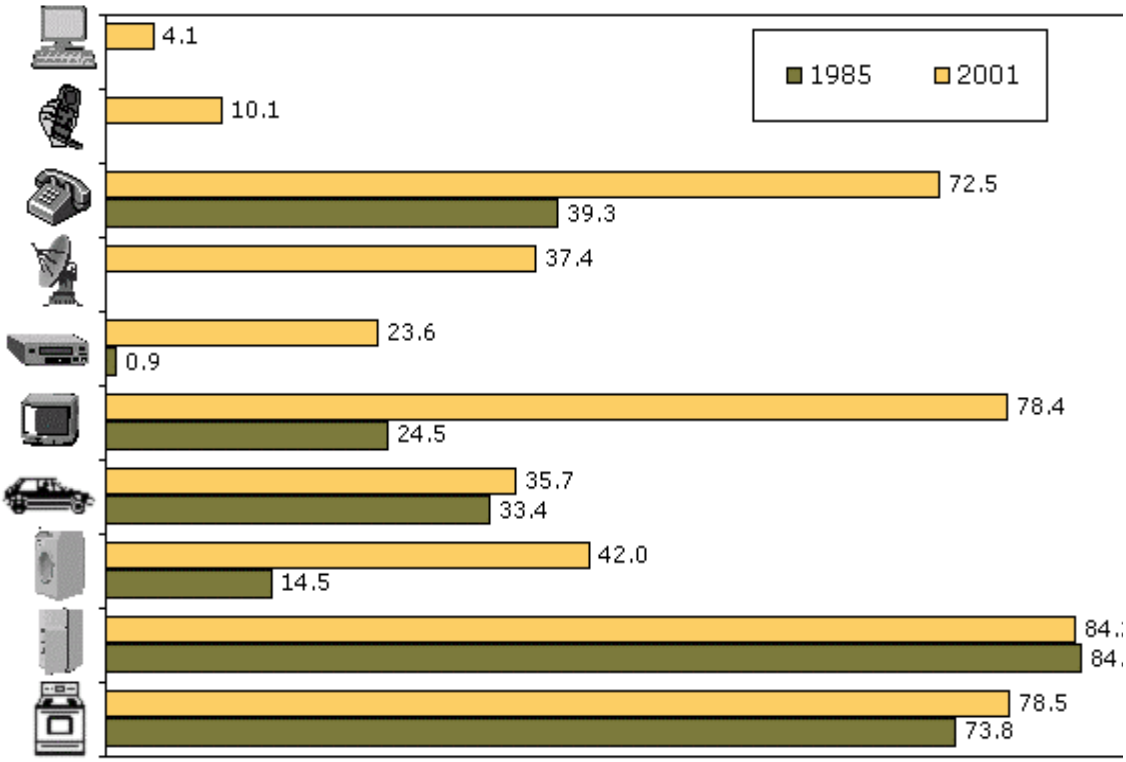
Table I4: Structure of household expenses

Expenses	1995	1996	1997	1998	1999	2000	2001	2002
Monetary expense	**100,0**	**100,0**	**100,0**	**100,0**	**100,0**	**100,0**	**100,0**	**100,0**
Consumption, including:	**81,5**	**83,4**	**82,8**	**82,1**	**83,7**	**83,2**	**84,7**	**85,2**
Food	39,7	43,0	45,6	41,0	37,8	38,4	39,8	37,6
Alcohol and tobacco	3,9	3,7	3,0	3,2	4,0	3,7	3,6	3,8
Garment	8,4	6,9	6,7	6,7	5,9	4,5	3,9	4,0
Rent, utilities	7,8	10,1	10,6	11,6	13,3	13,6	13,3	14,5
House maintenance	4,9	3,9	3,2	3,6	3,7	3,2	3,1	3,3
Health	2,1	2,1	2,4	2,7	3,2	4,0	4,3	4,5
Transport	7,1	6,8	5,3	5,9	6,4	5,8	5,8	5,7
Communications	0,9	1,0	1,3	1,5	2,3	2,8	3,7	4,7
Leisure and entertainment	3,4	2,7	2,1	2,9	3,7	3,6	3,5	3,6
Others	3,3	3,2	2,6	3,0	3,4	3,6	3,7	3,5
Taxes	6,5	5,8	6,2	6,0	4,8	4,1	3,4	3,3
Household production	4,4	4,1	4,6	4,4	3,5	3,3	3,4	3,3
Other expenses	7,6	6,7	6,4	7,5	8,0	9,4	8,5	8,2

Reference: NSI, Household Surveys 1995-2002

The census of 2001 provided some aggregate data on availability of basic equipment and technology in Bulgarian homes:

Figure I1: Share of households that own



It is visible that the last sixteen years changed the everyday life of the common citizen significantly. Satellite TV, personal computers and mobile phones were virtually non-existent

in 1985. Now, they shape the way of life for many. And the data from 2001 are already out-of-date – in the beginning of 2003, about 30% of population uses mobile phone.

Another illustration of the fast growth of the entertainment industry is the number of new movie theaters. In the last 4 fours more than 30 new movie screens were opened (with only 4 of the old state-owned cinemas being closed) in Sofia alone.

The delayed consumption of basic house appliances in the socialist period predetermined the vast spending and growth of this sector in the 90-ies. In late 90-es the typical entertainment includes some kind of audio-visual technology (HI-FI stereo, FM Radio, satellite or cable TV, VCR or DVD players). It is only now that more interactive forms of entertainment and information exchange gain importance. The number of Internet users is about 250,000 and is growing. The visitors of web-portals and news-services on the net are also increasing.

I5 Evolution of access to basic infrastructure and services (drainage, etc.)

According to all international institutions (UN, World Bank, WHO) Bulgaria has achieved significant level of access to basic infrastructure. Access to safe drinking water, safe sanitation and electricity connection is close to 100%. Privatization and concessions of utilities have begun; however, the legal framework in the respective areas is so designed that a minimum level of service will be provided to all citizens at affordable price. In general, access to basic infrastructure will not pose any threats to economic growth and IS development.

SWOT Analysis of Culture, Social Interactions

Strengths	Weaknesses
✓ High level of access to basic infrastructure ✓ High level of literacy ✓ Fast changes of employment structure towards more IST related jobs	✓ Lack of tradition of ICT use in everyday life and especially formal relations (e.g. contracts or administrative documents) ✓ Low level of PC penetration ✓ Low level of ICT penetration in secondary and tertiary education
Opportunities	**Threats**
✓ Huge growth potential for IST introduction in most areas of social life ✓ Finding niches on international IST provision markets ✓ Growing mobility of IST related labour force	✓ Brain drain ✓ IST development locked in government funded projects only ✓ Ageing population

COUNTRY DIAGNOSIS

Economic Development

- ✓ Bulgaria economy is constantly growing at sustained and comparatively better rates vis-a-vie EU and many accession countries. The growth is led by the private sector, which share in GVA is steadily increasing since beginning of the transition, reaching 72.7% in 2002. It demonstrates better flexible and competitiveness than the public sector and this is reflected in the development scenarios, outlined below.
- ✓ The introduction of the currency board in 1997 established a simple and automatic monetary system that lead to stable exchange rate of the Bulgarian leva to the EUR. The monetary base is backed with foreign currency reserves, which are increasing. The resulting low inflation rate is favorable for the longer-term economic planning made by the private economic agents. The 1997 arrangement diminishes the government room to maneuver; fiscal reforms are almost the only policy instrument at hand.
- ✓ The low budget deficits, financed by privatization revenues, made it possible for the government to avoid the issuance of additional public debt and to increase the amount of the fiscal reserves. Because of the economic growth the government and government guaranteed debt decreased to less than 50% of GDP in the end of 2003. The country and the government have gained credibility, higher credit rating, and attracted in 2003 own transition record in FDI (USD 1,3 billion). This provides for an optimism in IS development, which is reflected in the scenarios.
- ✓ Free trade agreements with EU, neighboring countries, CEFTA, and other countries have worked well; the duties are lower and the foreign trade is freer. The foreign trade sector of the economy (the sum of the exports and imports of goods and services) is 112.8% of GDP in 2002 and 118.4% of GDP in the first quarter of 2003. This high openness of the economy is beneficial to the economic development, allowing further specialization and use of comparative advantages.
- ✓ The gross fixed capital formation in Bulgaria is increasing, reaching 18.1% of GDP in 2002, and 19.4% in 2003. This development is in line with the so-called Lisbon targets. It is modernization-biased, fosters productivity growth and lowers resource intensity in the industrial production.
- ✓ After the privatization of the government-owned banks the banking sector is completely (99.5%) private. The private ownership of banks and the smaller government interference in the sector were necessary conditions for efficient allocation of resources. There is an increased the competition in the sector, better diversity of services and products offered, and increased access to capital. Credit to private sectors grew by almost 50% in 2003. The banks lead the ICT investment, improving there management systems and offering credit cards, on-line-banking, etc.
- ✓ The relatively lower wages in Bulgaria are a result of the low capital to labour ratio. The return on capital in Bulgarian economy should be higher than the other economies. However, the other things are never equal so this principle holds only partially.
- ✓ The administrative burden (of regulations, permits, licensing, etc.) on the economy remains significant. The total cost of regulatory burden is around 12% of GDP per annum. The opportunity arising in this respect is that deregulation and upgrading administrative services opens itself a considerable room for development and innovation.

- ✓ Furthermore, the highly regulated (and because of that – rigid) labour market prevents job creation by competitive and efficient companies and activities. Often Bulgaria government reads Lisbon targets as a reason to increase rigidity. The taxation of labour remains high at the level of about 41% (estimated on the basis of the average salary) thus creating a huge tax wedge (the labour costs of the employer minus the take-home pay of the employee). This tax wedge creates stimuli for tax avoidance, reduces the incentives for work and lowers the disposable income of the families.
- ✓ The taxation of the middle class is also very high. The direct and indirect taxes, social security contributions, excises, duties and fees that a Bulgarian working on a contract or as sole proprietor must pay are about 60% of its income (the calculation is made on the basis of a monthly income of 1000 leva). The high taxation hampers the entrepreneurship and thus the economic growth. The opportunity is that, given the above-mentioned limited availability of economic policy instruments, reforms lowering tax burden could produce prompt and non-trivial positive effects.
- ✓ The slow process of the judicial settlement of disputes increases the transaction costs of doing business and makes the business environment more uncertain. It remains to require more from the court system in terms of property rights protection. Court work and registries (of companies, land, etc.) is still paper based; their reform is expected to boost IT consumption in the years to come.
- ✓ The subsidies are 2.4% of GDP in 2001 and 2002; they distort efficient allocation of resources being channeled to money-loosing sectors and companies. The redistribution through the budget remains high. The expenses of the Consolidated government budget are more than 40 per cent of GDP on average for the last five years. The distribution of the money is also quite inefficient when made centrally so it also distorts the efficient allocation of the resource in the economy. Again, the opportunity here is that the reform is relatively easy.
- ✓ Because of the above-mentioned factors after 1997 the economy grows moderately and in 2002 the GDP per capita reached 93 per cent of its 1989 level. If we include also some measure of the so-called "shadow" or "gray" economy (estimated to more than 30 per cent of GDP), the GDP per capita is well above the 1989 level. However, there are many possibilities for improvement in the economic performance if some of the negative factors are reduced or entirely removed.

National and Regional IS Policies

- ✓ Bulgaria still is experiencing IT nostalgia for COMECON years when it enjoyed virtual IT monopoly on those markets, based on government protection and financing. The popular view of IS and e-government in Bulgaria is as rather as a technology change than as a new way of organization of public service. Therefore, most efforts up until now are put into equipment, software, networks etc. The same holds true for all ideas for IS development. Information society is seen as a society of more computers, Internet and databases but not as a society where knowledge is dispersed and utilized quickly to create value and well-being. In a way, the vision of IS sees technology ("hard" and "soft") as a goal not as a means. Apart from the legislation on e-documents and e-signatures, there are no initiatives to reform the way the administration is structured and operating.
- ✓ There is a lack of local strategic thinking. Most policy documents and subsequent projects were shaped to meet international donor requirements rather than local needs.

In other words, Bulgarian policy makers are not seeking financing for projects and ideas that are designed to work effectively in Bulgarian environment, but on the contrary – form policies that are eligible for funding. This poses a huge political threat to all initiatives for IS development: the government can hardly explain why and how their ideas will impact Bulgarian society, and instead has to quote international programs that will supposedly be implemented. For this very reason, IS related policies rarely receive strong general support (politically) and are not effective in implementation (because they are not shaped and demanded by Bulgarian conditions).

- ✓ A new understanding of the role of regulations is emerging. The long period of failed policies and projects seems to yield a better understanding for the need of legal framework that allows the existence and functioning of certain activities, necessary for the development of the information society. Two pieces of legislation are of particular importance: the Law on Electronic Document and Electronic Signature (2001) which for the first time in Bulgarian legal tradition acknowledges the legal power of electronic documents and signatures, thus enabling e-commerce and Internet exchange of information, and the Law on Personal Data Protection (2001) which clearly defines the scope of personal data that the law should protect, thus enabling the exchange of non-protected data while securing the secret of individual data collected by both government and private parties. Apart from this, private sector is becoming a driving force behind changes of legislation enhancing the use of IST. Major player for the moment are commercial banks that started extensive use of IT, including e-banking services. All activities in this area require adequate government action; thus placing pressure on politicians to deal with IS related policies with high priority.

Industrial Development and Competitiveness

- ✓ After 1997 all industrial sectors has recorded increase in the productivity of labour. This development is favorable for the economic growth and the competitiveness of the national economy.
- ✓ The communication sector grows fast in the years after the fall of the communist regime thus offering more services to more people and companies. As far as the communication sector is a necessary infrastructure for the business opportunities its progress is favorable for the industrial development.
- ✓ The agriculture sector develops slowly because of protectionism, subsidies and the ban on sales of land to foreigners. That locks labour resources in unproductive activities and increases the prices of the agriproducts, needed by the other sectors.
- ✓ The existence of state-owned monopolies with non-market behavior (pricing etc.) distorts the economic environment creating incentives for mal-investments. An example for this is the Bulgarian Telecommunication Company that cross subsidizes the local phone calls with revenues from the long-distance calls.
- ✓ Bulgaria has a long history of specialization in high technologies and ICT industry under the Council for Mutual Economic Assistance. This experience pre-determined the overall development of the ICT sector in the country. The increased productivity of labour in all industrial sectors has positive influence over current development and competitiveness of ICT sector. However, to some extent, this development is restricted by the existence of state-owned monopolies.
- ✓ After 1990, the Bulgarian IT companies have reoriented their activities from ex-COMECON markets towards EU – North America and towards imports and services to domestic consumers, started to seek higher utilization of domestic resources and

opportunities and focused more on quality of the products and on collaboration with well-known international companies.

- ✓ The ICT sector is one of the fastest growing sectors (and especially the communication sector), with estimated annual growth of 35 %. The increasing number of the Bulgarian IT companies and presence of big well-established foreign companies reflect the opportunities offered by the Bulgarian IT market and eventually will lead to more competitive environment and higher growth of the ICT sector. However, there is one missing internal institution: there are hardly any operational man-in-the-middle in the software industry of Bulgaria; i.e. there are limited number of intermediary firms that try to match supply and demand or resolve the growth issues of the industry. To the extend intermediaries exists, their strategy is rather to seek rent from a government or international (other government) subsidy than directly serves the industry.
- ✓ Nevertheless the high number (over 1000) of the companies, operating at the Bulgarian ICT market, it still remains highly concentrated (two companies hold more than 60 % of the ICT market), mainly due to the limited competition in telecommunications. Further liberalization of the telecommunication market brings serious potential for increased competition between ICT companies.
- ✓ The small size of the domestic IT market and the high price elasticity seriously limit the growth potential of the sector. This constellation results in significant diversification of the activities of the IT companies. At the same time, most of the successful Bulgarian ICT companies proved to be flexible in terms of applied marketing strategies and focused their efforts towards expanding on fast growing EU and North American markets.
- ✓ In the last decade the overall level of innovation activities in Bulgaria have been rather low, due to a set of different challenges. Among these were: lack of financial resources for implementation of innovation projects, low level of private sector interest and involvement in supporting R&D and science, low level of long-term investment in enterprise sector and related to this low level of innovation demand, decreasing level of external innovation demand, lack of specific government innovation policy, etc. The innovation potential of Bulgaria is seen in pharmacology, chemistry and electronics.

Presence of Most Relevant Economic Activities for IST Applications

- ✓ A number of indicators show that after 1998 the ICT related activities are growing in Bulgaria. Achieving macroeconomic stability is the first pre-condition for all kind of businesses to develop. The major role is of the government attaining and sustaining stable and predictable environment. Despite the progress, the process of Bulgaria's catching-up to the EU standards will require further reforms and significant investment in ICT sector.
- ✓ Despite the registered growth, the e-commerce is still in status nascendi, probably reflecting the limited understanding of ICT benefits in everyday life. The current positive trends of development in this area are preconditions for further development.
- ✓ Investments in R&D are steadily increasing after 1998, although their level as a share of GDP is still on a very low level. Due to financial shortage and lack of innovative strategies, private expenditures on R&D are still at a low level.
- ✓ Not all products currently produced are competitive in the global market. This is because under the socialist market environment, Bulgaria's products were artificially

protected and only subject to international competition under carefully controlled conditions.

- ✓ Nowadays, public debate is frequently opposing stability to growth with the understanding that larger government interference would result in higher growth. Following this reasoning the government determined five priority sectors (in its Management Strategy) that will be treated preferentially as one of them is ICT. This 'preferential status' basically means that the government can grant different treatment on various occasions with discretionary decision-making.
- ✓ Besides this, most of the large ICT projects are ordered by the government (under EU or local programs). As the government is one the main contracting parties the pressure for additional preferences is increasing. These claims are mainly based on the government promise to support the ICT sector.
- ✓ The environment to do business is not predictable because there is no awareness of the upcoming actions and regulations stemming from the 'preferential' status (as ideas and programs are frequently changing).
- ✓ Economic openness in terms of trade and capital flows provides for increasing number of firms to operate ex-territorially. Free movement of persons and goods means high penetration and intensification of competition. On the other hand trade liberalization agreements with the EU, CEFTA, most of the SEE countries (on the basis of bilateral agreements) and others are lowering the costs to access ICTs. Liberalized trade means more intense competition, new markets and possibilities and potentially higher demand for ICTs by businesses aiming to improve their competitive position and to cope with the increasing competitive pressure by decreasing transaction costs (for instance the e-commerce case).
- ✓ Therefore it is expected investment in ICTs to grow together with the boost in trade. This deductive causality seems to be of importance for Bulgaria since both CEFTA and EU agreements are covering the huge portion of trade as of 2002.
- ✓ ICT investments in Bulgaria have already gained momentum. Perspectives to sustain current trends seem optimistic especially if the government re-orients its policy from more interventionist policy towards creating stable and predictable environment. Such a policy would also create conditions for e-commerce and trade over Internet to develop further. Despite the intense initial growth they are still in status 'nascendi'.

IST Penetration Rates

- ✓ The ICT penetration rates in Bulgaria remain rather low, with a stable trend for growth. However, there is significant geographical disparity regarding the access to ICT.
- ✓ The two sectors of the economy, which have the greatest IT penetration, are financial services sector (banking and insurance) and telecommunications. There are good prospects for further development of e-commerce and e-business.
- ✓ Nevertheless the fact, that only 7,5 % of Bulgarians have computers at home, the rapid expansion of Telecenters, Internet cafes and computer games clubs provides huge opportunities for access to PCs and Internet for those who lack personal access at home.
- ✓ Despite the large proportion of out-of-date technology, the existing communication infrastructure is providing for broad access to Internet, by pre-paid access (e-cards) and VoIP. Generally, in terms of Internet access and usage Bulgaria is still far behind EU.

- ✓ Lack of formal regulation of Internet (no requirement for licensing and registration) and increasing number of users is resulting into rapid expansion Internet services providers (currently more than 200) and ultimately, to high reduction of prices.
- ✓ The increased number of online users has triggered competition among various information portals, resulting in higher quality of their content and more regular updating. This is however not the case with the websites of most of Bulgarian companies, which are rarely updated and contain mainly static, basic information.

Institutional Capacities and Regulatory Background

- ✓ Abolishment of the monopoly of the state-owned telecom company as of 1st of January 2002 was the start of the liberalization of the telecom market. Although the market is still heavily regulation, an essential improvement was the demonopolisation. The further reduction of barriers to entry in the market must go hand in hand with reduction of the administrative discretion (granted to the executive by the current legislation). The liberalized marker is conductive for higher competitive pressure on companies that provide telephone and Internet services to improve efficiency by adopting new technologies. Although competitive pressure is hard to measure (and so is the exact impact of increased competition), we are inclined to believe that the higher competitive pressure would bring improved chance for innovation and information society development.
- ✓ The privatization of Bulgarian Telecommunications Company – although not as essential for the information society as the liberalization of the market – remains of certain importance. Though in a demonopolized market, BTC retains the property right over the infrastructure of fixed lines. It is most likely that the most efficient use of the infrastructure would be reached under private ownership. Thus we believe that the privatization of the telecom company would contribute to the further development of the communication services, Internet coverage, and thus information society boom. What may hamper this process is a privatization with "social" clause that restrict the freedom of the new owner to restructure the company, as well as privatization commitment of the government to guarantee certain privileged market position of *BTC*.
- ✓ The tradition of government action makes us skeptical about the fast and efficient transformation of the administration into an e-government. The basic legal framework for administrative change already exists. However we expect that the government will be in a catching up position with the private sector. It is most likely that the change in the administrative practices will be private sector driven rather than the other way around. Therefore we do not consider the e-government formal initiatives a major drive of information society development. Still the actual e-practice of the administration may be a good indication for the information-society inclination of the private sector.

Educational Sector, Labour Force Supply, Training in IST Related Subjects

- ✓ Bulgaria has a strong tradition in ICT education. T he potential for providing good education in ICT and fundamental sciences, comparable with the international standards, is still high. This potential, combined with the existing high interest in ICT-related education, with the development of new ICT curricula at schools and development of a public-private partnerships to facilitate provision of ICT equipment and to improve existing facilities in schools and universities, provide good opportunities for further technological progress.

- ✓ However, Bulgaria fails to capitalize this educational background, which in turn results in worsening educational standards and knowledge diffusion. Several factors are contributing for these developments, among them lack of flexibility of the teaching practices, slow introduction of contemporary educational methods, inadequate material basis of the schools and universities and low ICT penetration in education, poor teachers' IT qualification and skills, lack of adequate financing of education, and lack of interest in employers to invest in training and increasing qualification of the employees, etc. Additionally, the limited competition between public and private educational institutions do not provide stimulus for improvement of resource allocation and quality of educational process. Thus, some of the main challenges faced by Bulgaria in the attempts to improve its competitive position are further decentralization of the educational system, introduction of working quality assurance mechanisms, modernization of ICT equipment in schools and universities, and further development of cooperation between the educational institutions and business.
- ✓ Prior to 1990, Bulgaria was the only country under the framework of the COMECON specializing in development of high-tech industry. Over 35 years of specialization in high technologies presuppose a solid foundation for further development of innovations and technologies. Bulgaria inherited a large network of research institutes and universities. However, due to restructuring of the economy and related changes in R&D demand structure and declining investment (both public and private) in R&D, as well as due to institutional factors like separation of education and research and lack of adequate equipment, and failure of many of the research centers to adapt to the new market environment (and especially to the transition from institutional to competitive project-based financing) is resulting in weak demand for R&D and could be considered as a serious limitation to the Bulgaria's potential for catching-up based on new technologies.
- ✓ Bulgaria lacks specific vision and policy for setting science, research and development priorities. Additionally, most of the Bulgarian companies base their competitiveness strategies not on innovation and high technologies, but rather on good educated and cheap labour. These factors are contributing negatively to the effectiveness of the scientific research work and R&D intensity.
- ✓ The motivation for students, young professors and scientists to stay in universities and research institutes is constantly decreasing. This is due to the low level of salaries in the universities and scientific institutes, the outdated system for acquiring scientific degrees and the old and insufficient technical equipment. The result is both internal migration from universities and scientific institutes to private sector, and external emigration to universities and private companies abroad. On one hand, migration from universities to private sector influence positively the practical dissemination of ICT knowledge and skills to businesses, but on other hand it leads to shortage and overall aging of academic staff, threatening the overall quality of education.
- ✓ It is considered, that one of the main competitive advantages of Bulgaria is its highly qualified labour force, especially in fundamental sciences and ICT . However, the combination of internal and external "brain drain", declining enrollment in post-graduate studies, worsening educational standards, lack of practically oriented education and separation of education and research, together with the general lack of vision and policy for fostering innovation, could be considered as the most serious threat to the country's technological development. One possible solution for the "brain drain"

problem could be creation of a highly paid ICT jobs, compared with the international standards.

- ✓ Further development of Bulgaria's innovative potential and application of science in technology are important preconditions for strengthening the competitiveness of Bulgarian industry. Further efforts towards fostering innovative potential of Bulgaria should include adoption of a strategic vision and specific policy aiming at promoting higher educational and R&D standards and practices, encouraging co-operation between research centers, universities and business, providing friendly environment for creation and operation of technology- based companies.

Demo Figures

- ✓ The decrease in population, experienced by Bulgaria is attributable to the negative natural growth of the population (low birth and high mortality rates) and to the emigration.
- ✓ The high migration outflow is caused by the economic situation, which is not so favorable both for the employers and the employees (unfriendly business climate, high taxes, existence of conscription army, rigid labour market, slow economic reforms). The increasing transfers, made by emigrants to their families, help alleviate the poverty, since these remittances are important currency inflow into Bulgarian economy and support the incomes of many people.
- ✓ The infant mortality rate is relatively high in comparison with other countries (it is more than 15 per thousand on average for the period 1990 – 2002, which is about three times more than the EU average). On the other side, the life expectancy at birth started to increase.
- ✓ The population of Bulgaria is aging, which is a serious challenge to the unreformed pay-as-you-go pension system and to the health system.

Cultural and Sociological Issues

- ✓ Bulgarian transition had a tremendous impact on labour market. As a result of the structural reforms a vast amount of industrial workers have been made obsolete. A shift towards employment in the service sector has been registered.
- ✓ The development of new technologies gave start to a range of entirely new forms of employment. The ICT production itself grew significantly and according to different assessment provides between ten and fifteen thousand jobs. These would include software development and project management in ICT.
- ✓ However, the lack of traditions is influencing negatively ICT use in everyday life, especially in formal relations.
- ✓ Bulgaria has achieved significant level of access to basic infrastructure. Access to safe drinking water, safe sanitation and electricity connection is close to 100% and do not pose any threats to economic growth and IS development.

SCENARIOS FOR FUTURE DEVELOPMENT

ICT and Bulgaria's economic and social welfare

Lisbon indicators[67]

The Lisbon criteria help outlining the initial conditions the future developments and policies could embark upon.

In the table below, in the left and center column we give the current status of each individual criterion according to NSI data (if not otherwise indicated) and in the right column we comment on probable developments; this comment is based on own calculations and assessment.

Criterion	Comment and additional information	Probable development
GDP per capita (PPS) - 5900 EUR.	This level is low elative to the EU – 25% of the GDP per head in 2002	The growth of GDP is likely to be sustained at pace twice faster than EU average
Productivity per person - 6111 EUR	It is roughly 1/3 of EU average (31%) in 2002; it is up from 24% indicated by Eurostat in 1998[68] due to cuts of excess employment; in 2002, the non-farm productivity had risen by 50% compared to 1997; At the same time unit labour costs remain unchanged – 24-24% of EU average..	In 2002 and 2003, i.e. after almost completed privatization and related structural adjustment the growth of non-farm productivity is 5% per annum and is likely to stay this way (in 1998-2001, at the peak of privatization liquidation of loss makers, the growth was 10%).[69]
Employment rate (objective: 70%) - 40.3%	In 2003, the number of unemployed had fallen from 17.46% to 13.52%; due to different factors; some of them are related to new reporting rules but half, we believe, of the reduction is due to job creation in the private sector	According to the demographic dynamics (measured via the census of 2001) aging population will not allow to achieve the objective even in long term; from 2003 to 2011 the population is forecasted by NSI to decline from 7.9 to 7.4 million
Employment rate of older (55-64) - 30.5; workers (objective: 50%)	The older worker is 1.13% of all employed and their employment shows seasonal dynamics of 8-10% up and down in the last three years, e.g. in June 2002 it is 32.4% and in June 2003 – 34.7%. Pensioners are 35.3 % of the population above 15 years old; while employed (of the same age) in the private sector are 32.4 and 10.2% in the public sector.	The older workforce has little chance of employment, partly due to demographic factors; some positive developments are possible but the objective does not seem achievable in medium term.
Business investment (measure of changes in the physical capital stock) - 19.7%	This rate is about the average for the last six years – 18-20 fixed capital formation per annum, as indicated in the BNB statistics.	Estimates differ: the World Bank sees the fixed capital formation in 2004 and 2005 at 20.2 and 20.9% respectively[70]; we believe this indicator can be sustained at this rate in medium term and at 15-17% in long-term.

[67] As of December 31, 2002, based on an Internal note of DG EcoFin (17.07.2003), following the decision of the Lisbon Strategy Group of 10.07.2003

[68] This is the latest Eurostat data on productivity for Bulgaria.

[69] Source: NSI, own calculations.

[70] World Bank. Doing Business in Bulgaria: Progress, Prospects and Potential for Growth (unpublished concept paper, March 2004).

Criterion	Comment and additional information	Probable development
Public expenditures on Education - 4.2%	There are unaccounted public private partnerships. It is likely improved reporting would indicate a higher level.	In sort term a level of 5% of this expenditures is likely; 6% - in medium and/or long-tern
R&D expenditure (objective: 3% of GDP) – 0.52% of GDP	Tax (amortization) and reporting rules have been amended in 2002 as well there are plans to improve university for-profit regulations	In medium to long run 1.5% of R&D to GDP is ambitious but realistic objective in short-medium term; however, it depends on the progress with said regulations that would allow for business-academia cooperation.
Business Demography (rate of created/destroyed companies per year)	The business creation rate is as follows: in 1997 - 6.0%; '98 - 7.9%; '99 -2.6%; 2000 -5.2%; 2001 - 0.15%. Data for 2002 and 2003 is not available. However, private creation sustained in 1999 – 2001; the slower overall pace is due to liquidation of loss-making state owned enterprise. Administrative barrier are sustain but there debates and even plans to remove/reduce them.	We assume that 3.5%-4% rate is realistic over medium and long-term.
Long-term unemployment - 11%	It is a result of both Demo Figures and restructuring but there is little information to speculate on the weight of individual factors.	Reduction to single digit level is possible due to short-term labour migration and improving vocational activities, public and private.
Regional cohesion (measure of coefficient of variation of employment rates across regions within one country) - 9.2%.	In-country migration and emigration is yet not complete; 1992-2001 migration town – to - town (46.3%) and village – to – town (15.6%); According to statistics 177 000 people emigrated the country for the period, estimated 200 000 by 2002. The process is natural and difficult to revert.	The coefficient will not be improved.

The Lisbon target seems achievable by incremental, private sectors led development, which could be supported by well-focused regulatory work of the government (e.g. in university for-profit rules). However, indicators linked to demographics and employment do not suggest that any planned improvement in employment of senior citizens, in reversing trends in migration, and in dramatically changing the employment ratios.

There are positive developments related to IST/ICT performance:

- The prospect to improve public and to account for private expenditures in education (40% increase, sustained in long term) would be an important IST/ICT growth factor;
- R&D likelihood of growing three-time is another factor;
- Productivity growth rates are relatively well-set and combined roughly stable unit labour costs, in order to be retained, would require technology change and ICT investment; this development will be supported by stable rates of fixed capital formation.

Having stated the above, we would like to note the detailed research and statistics is not yet available to allow more articulated argument.

Two distinct patterns

Last fourteen year the economic growth has been uneven, but there are two distinct pattern of economic performance. They are summarized in the following table.

Indicators (annual average)	1990-1997	1998-2002
Inflation (%)	210.1	5.7
Inflation Tax Rate (%)	54.9	5.3
GDP Growth (%)	-4.6	4.1
Investment Growth (%)	-8.8	20.1
Budget Deficit (% of GDP)	-6.3	-0.1
Government debt/GDP	168%	75%
	1990-1996	**1997-2002**
Foreign Investments (mln. $)	63.2	692.4
Foreign Investments (% of GDP)	0.8	5.6

Reference: NSI, BNB, MF, BFIA, own calculations

Challenges and assumptions

Estimates for some indicators for 2003 are outstanding, e.g. 0% budget deficit and USD 1 150 FDI. The last seven years are longest positive business cycle of the Bulgaria economy since 1949, irrespectively the methodological difficulties of such comparisons.[71] One of the challenges ahead is sustaining this upstream development. ICT policies may contribute to this provided there are no sharp amendments to policies to date. Any major change of policies to alter the 1997-2004 economic system can cause a significant risk.

We assume[72] that that the key macroeconomic policy dimensions for the next seven-eight years are the following:

- Currency Board and fixed exchange rate until 2009-2011 (EUR after that);
- Low CPI inflation – 3-5% per year;
- Balanced and/or Small Budget Deficits (not exceeding 1.5-2% of GDP);
- Decreasing Government debt as a share of GDP at about 40% in 2005 and after;
- Increased credit to the private sector, reaching 30% of GDP in 2006 and sustaining that level for the period after.
- Sustained levels of external demand, mostly due to restructuring of the EU economies, agriculture and social welfare.
- Sustained levels of FDI at 7.5-8% of GDP.

[71] For the period before 1989 see: Grzegorz W. Kolodko, Globalisation and Catching-Up. From Recession to Growth in Transition Economies, In: Domenico Mario Nuti and Milica Uvalic (editors), Post-Communist Transition to a Market Economy. Lessons and Challenges, Ravenna, Longo Editore Ravenna, 2003, p. 26, 25-29.

[72] In making these assumptions we consulted leading experts in macroeconomics, outside IME, members of Bulgaria Macroeconomic Association, among them: Nikolay Nenovski and Tzvetan Manchev, deputy governors of BNB, Kalin Hristov, Dead Research Department, BNB, Stefan Petranov, Director ZL Investment Fund, and others. These assumptions have been largely accepted by official institutions, and authors of these lines, Dimitar Chobanov and Krassen Stanchev, used them in forecast on macroeconomic prospects needed for planning Bulgaria membership in NATO.

- There are will be gains from trade after EU accession in terms of GDP growth are further average annual 0.13 % in the optimistic case (presumably in 2007) and 0.08 % in the pessimistic case (presumably in 2011).[73]

At the same time there are projects and policies in *status nascendi* that could contribute to certain positive or negative developments; among them the two important are:

- Construction of a second nuclear power station the financial frame for which is not yet elaborated, although the decision to proceed with construction is advertised as already taken; it will contribute to costs equal to 2.1% of GDP per annum for the next 7 years, costs that would be most likely to be covered and/or guaranteed by the government; respectively, this project would restrict other priority expenditures, among them ICT and education;
- Reform of government information services, increasing efficiency, public private dialogue, use of government registers (of companies and legal persons, land and real estate, pledges, etc.), improving access to acts and procurements of the government and launching the prerequisites for reduction of administration and government administrative expenditure.[74]

The baseline scenario below presupposes that the second nuclear power station will not be build and that government information services will be gradually implemented. The alternative assumes that the latter factor leads to a comprehensive reform in services and education, in a combination with successful take of a number of private sector initiatives.

In either case, there are realities that cannot be avoided; among them the most important is the demographics of the country, the initial constellations of the reform and the resulting development-lag vis-a-vie both old and new EU member countries.

Sc.1 Baseline scenario

1. The annual economic growth continues to be moderate but stable and twice faster than today's EU-15 average, at about 4% per annum. This means that the GDP per capita of Bulgaria will reach the EU average level of GDP per capita in 45 to 65 years.

2. Comparative advantages of the country in a long run will be rather based on lower prices and lower unit labour costs. The history of the latter is rather telling. Since 1997, irrespectively the rise of productivity and real wages (of about 6% per annum) unit labour cost, as mentioned above, remain virtually unchanged. Market proximity and improved border crossing infrastructure and procedures will continue to attract FDI.

3. The government generally understands the importance of ICT for the economic development of Bulgaria. The basic policy documents and strategies concerning ICT development and e-government are adopted, although remain to be implemented. The government led demand for ICT development would be one of the factors for boosting ICT-based investment. i.e. estimate this demand at 0.25% of GDP.

[73] See: Vladislav Slanchev, Bulgaria's Membership in EU: Does the Actual Year of Accession Really Matter to Economic Performance?, IME, 2003, p. 6 (http://www.ime-bg.org/en/index.html)

[74] For similar size of population, Bulgaria maintains ten times more administration than Sweden.

4. However, the major factor for ICT development will remain FDI. During the 90's and in 2000-2001, the non-farm productivity in enterprises linked to FDI[75] has been 30 to 40% higher than average "indigenous" (non-BIBA member) enterprise.

5. Increased public expenditure in education from the current 4% of GDP to 5% in medium tern will be mostly related to active work of three factors:

- The computerization and wiring of the schools and university classes, currently low by any standard;
- Public private partnerships in education;
- Needs to improve conventional infrastructure (buildings etc) of schools.

We estimate the first two factors will contribute to expenditures increase at 0.3-o.4% of GDP per annum. The rest would come from investment in conventional infrastructure.

6. As mentioned, IS regulatory framework is being amended. The key regulatory factor to contribute to gradual growth of R&D shares in GDP is the improvement of reporting requirements for for-profit activities of universities. Its background idea is to allow for better competition between public and private educational institutions and for accelerated pace of implementing knowledge and innovation.

7. Regional disparity will remain a key reality in medium and long term. Demographics of the country will not allow for prompt change in the qualification of the labour force. Meanwhile, the house ICT consumption pattern is likely to sustain its current direction that involves mobile phones, computers and Internet access purchasing of leisure related hi-tech. This phenomenon has a general impact on education, not so much on domestic industries.

Sc2. Alternative scenario(s)

1. The economic reforms are carried out at a high pace. The macroeconomic stability is preserved; the judicial system is reformed; the privatization, deregulation and liberalization are completed in the next years; the tax burden is decreased considerably; the regulatory and licensing framework is eased and made friendlier; the subsidies and protectionist measures are abolished; the pension and healthcare systems are reformed and the other budget expenditures are optimized; the business environment is improved. Bulgaria is a member of EU and utilizes the participation in a large and competitive market.

2. As a result the average yearly growth of the economy in the next two to three decades will be about 7 per cent. In this way (assuming the EU-average growth per capita is between 1.5 and 2.5% per year on average) the GDP per capita of Bulgaria will reach the EU average level of GDP per capita in 20 to 25 years. As a result of the higher output the incomes of the people will reach the EU-average incomes in 20-25 years creating opportunities for them to join the information era and supporting the IST development.

3. The enforcement of favorable legal environment (e.g. Law on Electronic Document and Electronic Signature, Personal Data Protection Act), supporting effective competition and user protection, and the proper implementation of e-government strategy, leading to improvement of public registries and reporting, and to lower transaction cost, ultimately result in expansion of electronic exchange of information, e-commerce and e-business. The fast

[75] In Bulgaria they are easy identifiable since they are members of the Bulgarian International Business Association (BIBA).

development of business-to-business e-commerce lowers cost and increases efficiency of the companies.

4. Reform of government policies related to specific and IT intensive areas.

- As a result of the full liberalization of the telecom sector and privatization of the BTC, including reduction of formal entry barriers and administrative discretion, the competition in communication market increases and the telecommunications infrastructure goes trough modernization and expansion. This development, combined with the increased level of investment in ICT, provides for access to more advance technologies and for availability of wider variety of and cheaper information and communication services.
- Full realization of e-government and improvement of government services, which were mentioned in the introduction to this discussion on scenarios.

5. Further reform measures in the area of education, including introduction of ICT training in primary and secondary education and adoption and implementation of the Strategy for introduction of ICT in education provide the basis for more practically oriented training process and for higher quality of education. Re-organization of the system for resource allocation in higher education and development of public-private partnerships lead to improvement in efficiency and effectiveness in allocating resources to educational establishments. The final outcome is facilitation of provision of ICT equipment and facilities in schools. Strengthening the research in education, including through separation of financing for education from financing of research and through adoption of new practice of cooperation and accomplishment of joint research projects by BAS and educational institutions.

6. Reversal of the trends in migration of scientific and technical personnel by means of achieving better stimuli to work and live in the country, including through better remuneration and prospects for carrier development.

7. The above-mentioned development would allow for the realization of number of private sector initiative and would trigger a number of ICT related developments.
The ideas in pipeline that remain merely drafts are the following:

- Logistics services related to improved international infrastructure and regulations on transit routs;
- International outsourcing of IT related services;
- Sophisticated services related to liberalized energy and communications markets, including emission credit trading;
- Expansion of FDI investment in hi-tech, particularly of the existing FESTO (pneumatic machines) and EPIQ Electronic Assembly (electronics) investments and attraction of new FDI in high value-added-industries.

The economic development, summarized above in the Lisbon criteria for Bulgaria could be estimated as follows:

- Considerable growth in ICT penetration in most areas of social life, sustained growth of ICT penetration rates of 15% per annum;
- R&D expenditures of about 3% of GDP;
- Education expenditure (not only by the government) at 6% of GDP;

FDI at the higher end of the above assumptions (8% of GDP and more) but, notably, with changed structured towards higher value-added.

REFERENCES

National Statistical Institute, Statistical Yearbook, different years

Bulgarian National Bank, *www.bnb.bg*

Ministry of Finance, *www.minfin.bg*

European Central Bank, Monthly Bulletin, different issues

Eurostat Yearbook, 2002

Board of Governors of the Federal Reserve System, Statistics: Releases and Historical Data, www.federalreserve.gov

Vienna Institute for International Economic Studies, www.wiiw.at

United Nations Development Program, Human Development Report, different years

National Strategy for Development of High Technologies in Bulgaria, CoM, 1999

Strategy for the Development of the Information Society in Bulgaria, CoM, 1999

National Program for the Development of the Information Society in the Republic of Bulgaria – 1999; updated in 2001

E-government Strategy, Bulgaria

National Plan for Economic Development 2000-2006

Development Strategy for High-Tech Activities and High-Tech Parks, 2000

Telecommunications Act

Ordinance on the specific telecommunications activities subject to individual licensing, general licensing and free regime (#5, MTC)

General licenses for telecommunications activities, resulting from the amendment of the Telecommunications Act (State Gazette, issue 112/2001)

United Nations Economic Commission for Europe: Towards a Knowledge Based Economy: Bulgaria, Country Readiness Assessment Report, 2002

ARC Fund, Bulgaria: ICT Infrastructure and E-readiness Assessment, 2002.

European Commission, European Trend Chart on Innovation, Country Report: Bulgaria, 2001

Dimiter Doychinov, Applying the E-government Framework in Bulgaria

Grace, J., Kenny, C., Qiang, C., Liu, J., and Reynolds, T., Information and Communication Technologies and Broad-Based Development: A Partial Review of the Evidence, 2001

ICT Development Agency, Ministry of Transport and Communications, Information and Communications Technologies: Overview, 2002

Ministry of Economy, CED, GTZ, Analysis of Bulgaria's Technological Development, 2001

Sadowsky, G., Report of a Mission to Bulgaria, 2001

Stanchev, K. and I. Georgiev, Information Technology, 2001

Tchouparov, T., Industrial Productivity in Bulgaria: new challenges for the e-economy

UNDP, Information and Communications Technology for Development, 2001

Antonov, Ventzislav, Roumen Avramov (Eds.) The year of the Iron Sheep: Bulgarian Economic Reform in 1991, Sofia, Agency for Economic Coordination and Development, 1992.

Waclaw Wilczynski, Five Years of the Polish Transformation: 1989-1994, In: Five Years After June: the Polish Transformation, 1989-1994, Ed. by Jan Winiecki, London, The Center for Research into Communist Economies, 1996.

CBN, IT Public Procurement in Bulgaria

Richard Deiss, "Information Society Statistics", Statistics in Focus: Industry, Trace and Services, Theme 4-37/2001

OECD Thematic Review of National Policies for Education - Bulgaria, 2002

MES and the National Institute for Education, Education for All. National Assessment, 2000

Frances Tsakonas, "Private Sector Development in Education in South East Europe, Country Report: Bulgaria", March 2002.

Adkins, D.L."School Finance in Bulgaria in an Era of Educational Reform", World Bank, 1999

Ministry of Education and Science, Strategy for introduction of ICT in Bulgarian education, draft

Totomanova, A., "The Role of Bulgarian Universities in the Transformation of Society", Center for Educational Strategies, Sofia

National Institute for Education, Analysis of the Foreign Direct Investment in the Higher Education in Bulgaria, Sofia

Zeljko Bogetic, Sajal Chattophadyay, Efficiency in Bulgaria's Schools, A Nonparametric Study, World Bank, WPS 1422, 1995

Kalchev, Yordan "External Migration of the Population in Bulgaria", Sofia, 2001

LIST OF ABBREVIATIONS

ATM – Automated Teller Machine
AUBG - American University in Bulgaria
B2B - Business-to-business
B2C - Business-to-consumer
BAIT - Bulgarian Association of Information Technologies
BAS - Bulgarian Academy of Science
BGN – Bulgarian lev
BIBA - Bulgarian Industrial Business Association
BISERA - Banking Integrated System for Electronic Transfers
BNB - Bulgarian National Bank
BORIKA – Bank organization for settlement through cards
BRI - Basic-Rate Interface
BSE - Bulgarian Stock Exchange
BTC – Bulgarian Telecommunication Company
CBA - Currency Board Arrangement
CED – Center for Economic Development
CEE – Central and Eastern Europe
CEFTA – Central European Free Trade Agreement
CEPS - Center for Educational Policy Studies
COBOS - Client Order Book Online System
COMECON - Council for Mutual Economic Cooperation
CVTS - Continuing Vocational Training Survey
DVD - Digital video disc
EBRD – European Bank for Reconstruction and Development
ECU - European currency unit
EMU – European Monetary Union
ERP - Enterprise resource planning
EU – European Union
FDI – Foreign direct investments
GDP – Gross domestic product
GSM - Global System for Mobile Communications
GVA – Gross value added
HDI - Human development index
HEI - Higher education institutions
HTP - High Technology Parks
IDA - Industrial Design Applications
IME - Institute for Market Economics
IMF – International Monetary Fund
ICT – Information and communication technologies
IFC – International Financial Corporation
IS – Information society
ISDN - Integrated services digital network
ISP - Internet Service Provider
IST – Information society technologies
IT – Information technology
LLL - Life-long learning
LLU - Local loop unbundling

MES - Ministry of Education and Science
NATO – North Atlantic Treaty Organization
NDSV – National Movement Simeon II
NGO – Nongovernmental organization
NSI - National Statistical Institute
OECD – Organization for Economic Development and Cooperation
ONP - Open network provision
PC – Personal computer
POS – Point of sale
PPP – Purchasing power parity
PRI - Primary-Rate Interface
PSTN - Public switched telephone network
R&D – Research and development
RINGS - Real Time Gross Settlement System
SME – Small and medium enterprise
SMP - Significant market power
SOE – State-owned enterprise
TARGET - Trans-European Automated Real-time Gross settlement Express Transfer system
TLD - Top-level domain
UDF – Union of Democratic Forces
UK – United Kingdom
UMTS - Universal Mobile Telecommunications Systems
UN - United Nations
UNDP – United Nations Development Program
USAID – United States Agency for International Development
USSR – Union of Soviet Socialist Republics
VAT – Value added tax
VCR – Videocassette recorder
VET - Vocational Education and Training
VETA - Vocational Education and Training Act
VoIP – Voice over Internet Protocol
WHO – World Health Organization
WWW – Worldwide web

ANNEX – TABLE OF CONTENTS

A. NATIONAL AND REGIONAL ECONOMY

A1. Background Data

Figure A1: Bulgaria and Southeastern Europe

Table A1: Bulgaria - General Data

Location	Southeastern Europe, bordering the Black Sea
Population, 2002	7.85 million
Area	111 000 sq km (including 360 sq km water)
GDP per capita, PPP, 2001	5 706 Euro
GDP growth, 2002	4.8%
Exchange rate	EUR 1.00 = 1.9558 BGN (Bulgarian Levs)
Inflation, 2002	3.8%
Private sector	72.7%
Sectors – share of GVA, 2002	
Agriculture	12.5%
Industry and Construction	27.8%
Services	59.7%
Penetration of IT	
Telephones per 100 people, 2003	36.45
- Of which digitalized	20%
PCs per 100 people, 2002	5.2
Internet Users per 100 people, 2003	14
Mobile Phones per 100 people, 2003	38.46
Foreign Trade, 2002	
Exports, % of GDP	53.1
Imports, % of GDP	59.7
Free Trade	Member of WTO, CEFTA; free trade agreements with the European Union, EFTA, Albania, Croatia, Estonia, Israel, Latvia, Lithuania, Macedonia, Turkey.

Reference: National Statistical Institute, Institute for Market Economics, Eurostat, International Telecommunications Union, Bulgarian Telecommunication Company, MobilTel, Globul, Center for Economic Development, and Ministry of Economy.

Table A2: Real GDP Growth

Year	1990	1991	1992	1993	1994	1995	1996	1997	1998	1 999	2000	2001	2002*
Real GDP Growth (%)	-9,1	-8,4	-7,3	-1,5	1,8	2,9	-9,4	-5,6	4	2,3	5,4	4,1	4,8

Table A3: Nominal GDP Level

Year	1990**	1991	1992	1993	1994	1995	1996	1997	1998	1 999	2000	2001	2002*
GDP, EUR, mln	13156,522	6462,43	6694,4	9263,4	8154,67	10019,7	7795,83	9140,21	11361,898	12163,859	13678,506	15190,08	16526,85
Yearly average exchange rate BGL per ECU (EUR)	3,45	23,73	30,62	32,31	65,79	88,49	382,12	1876,73	1969,90	1,95583	1,95583	1,95583	1,95583

Notes: * preliminary;
** Until February 1991 there was no FX market. The figure for 1990 is calculated on the basis of the official exchange rate BGL per USD
Source: NSI, WIIW (for years 1991 and 1992), BNB, ECB, FED

Table A4: PPP GDP

Year	1994	1995	1996	1997	1998	1 999	2000	2001*
PPP GDP, EUR (mln)	46100	48200	44700	42700	45000	47200	51400	45027
* IME calculation (data by NSI)								
Source: Eurostat, Yearbook 2002								

A2 Regional Division of the Republic of Bulgaria

During the communist regime Bulgaria was divided into 28 administrative regions. Later, instead of these 28 regions there were introduced 9 regions. In 1999 the old division with 28 regions was restored (see figure A2). The 28 regions form the so-called NUTS 3 regional division.

Figure A2: Administrative Division (NUTS 3), 2003

The lowest level division in Bulgaria is composed of the municipalities. The number of the municipalities in Bulgaria is 262 (see figure A3).

Figure A3: Regional Division, 2003 – municipalities and NUTS 2 regions

Because of the EU accession process Bulgaria had to adopt also the NUTS[1] division in order to have comparable statistical information with the other EU countries and to be able to receive financing from the structural funds of the European Union. Six NUTS 2 regions, called planning regions in Bulgaria (see figure A3 and figure A4), were formed to meet this requirement.

[1] NUTS stand for Nomenclature of Territorial Units for Statistics.

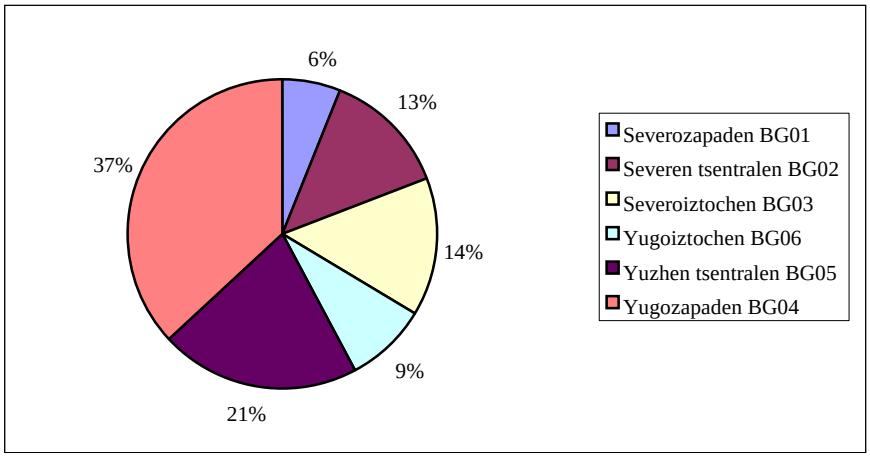
Table A5: NUTS regions

Code	Name	Level
BG01	**Severozapaden**	**NUTS 2**
BG011	Vidin	NUTS 3
BG012	Montana	NUTS 3
BG013	Vratsa	NUTS 3
BG02	**Severen tsentralen**	**NUTS 2**
BG021	Pleven	NUTS 3
BG022	Lovech	NUTS 3
BG023	Veliko Tarnovo	NUTS 3
BG024	Gabrovo	NUTS 3
BG025	Ruse	NUTS 3
BG03	**Severoiztochen**	**NUTS 2**
BG031	Varna	NUTS 3
BG032	Dobrich	NUTS 3
BG033	Shumen	NUTS 3
BG034	Targovishte	NUTS 3
BG035	Razgrad	NUTS 3
BG036	Silistra	NUTS 3
BG04	**Yugozapaden**	**NUTS 2**
BG041	Sofia stolitsa	NUTS 3
BG042	Sofia	NUTS 3
BG043	Blagoevgrad	NUTS 3
BG044	Pernik	NUTS 3
BG045	Kyustendil	NUTS 3
BG05	**Yuzhen tsentralen**	**NUTS 2**
BG051	Plovdiv	NUTS 3
BG052	Stara Zagora	NUTS 3
BG053	Haskovo	NUTS 3
BG054	Pazardzhik	NUTS 3
BG055	Smolyan	NUTS 3
BG056	Kardzhali	NUTS 3
BG06	**Yugoiztochen**	**NUTS 2**
BG061	Burgas	NUTS 3
BG062	Sliven	NUTS 3
BG063	Yambol	NUTS 3

Reference: Eurostat

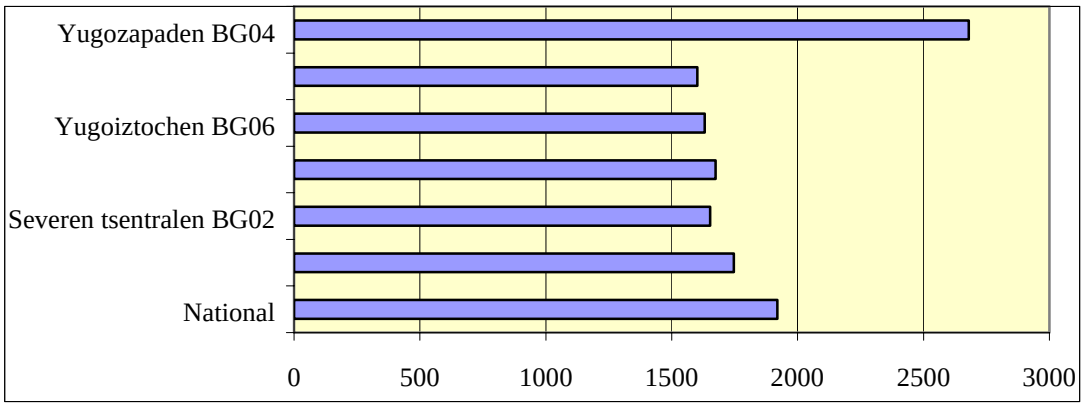
Figure A4: NUTS 2 regions

Figure A4a: GDP by Regions



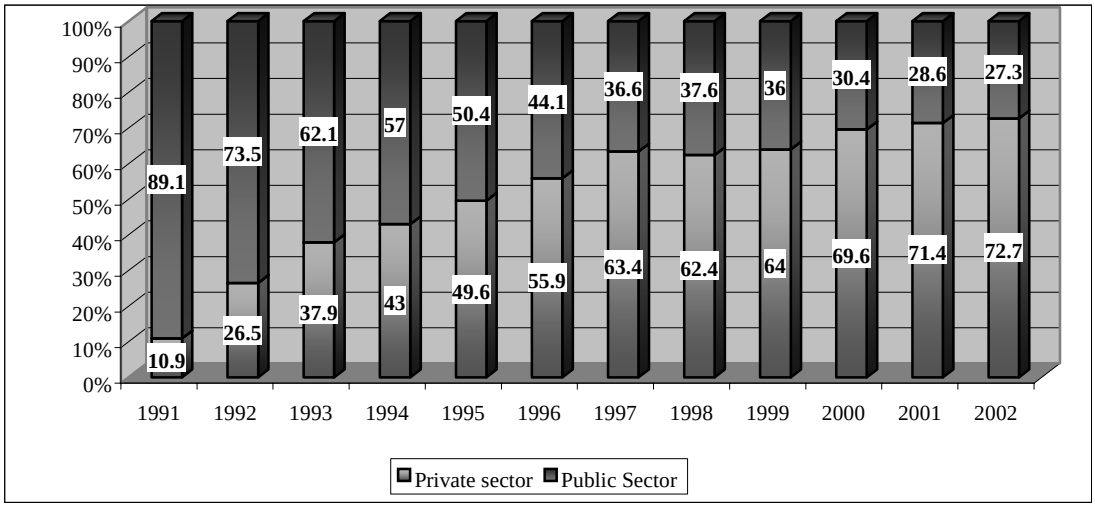
Reference: National Statistical Institute

Figure A4b: GDP per Capita by regions in Euro, 2001



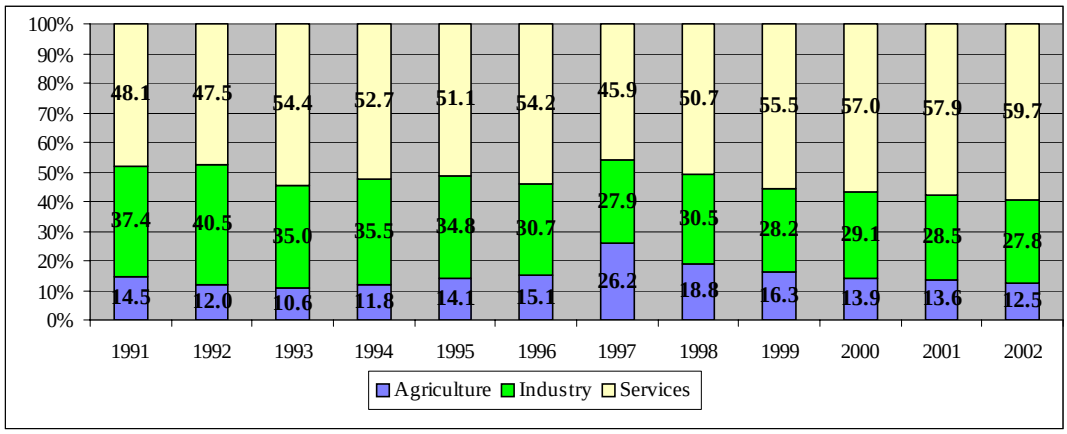
Reference: National Statistical Institute

Figure A5: Share of Private Sector in the Gross Value Added



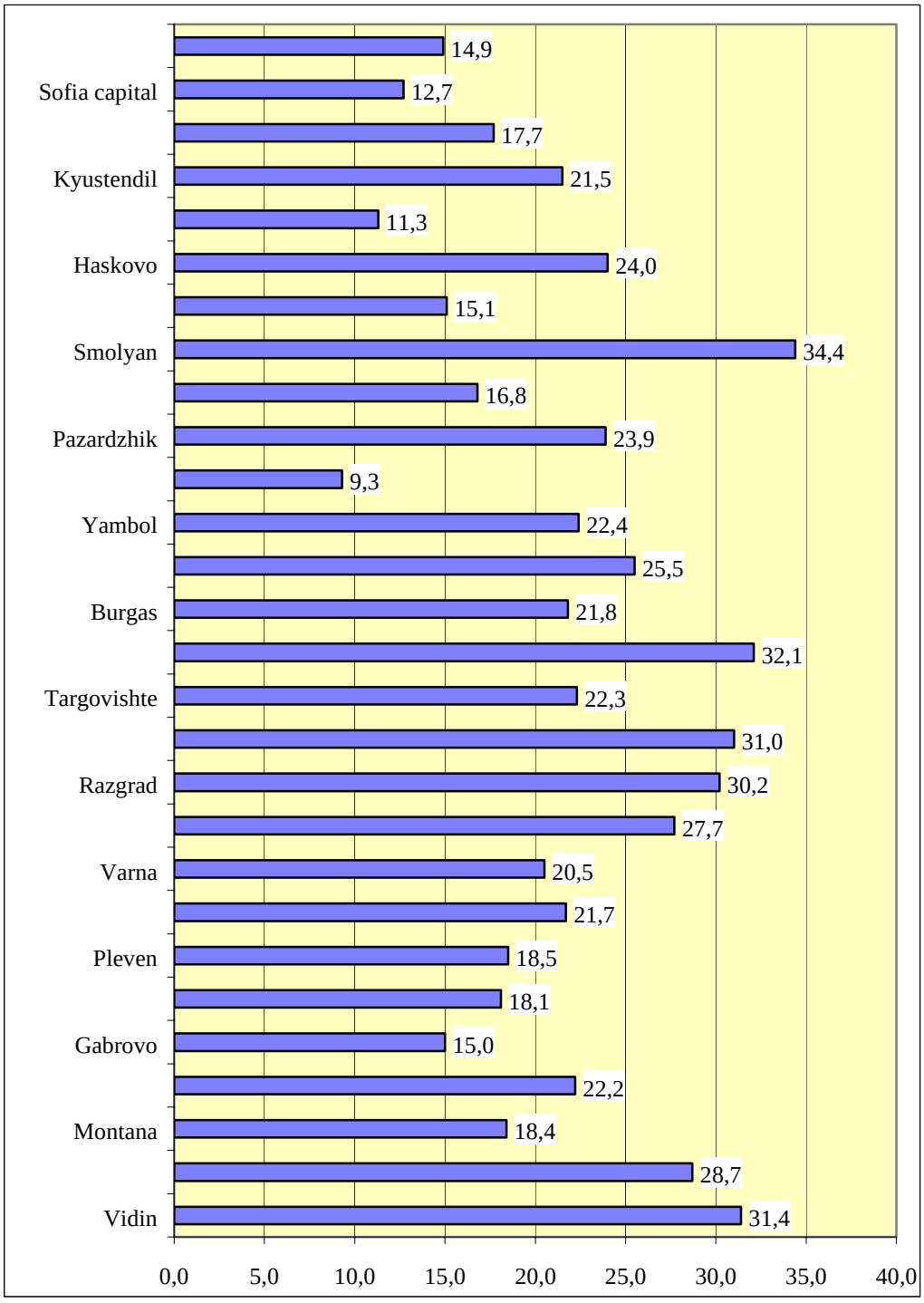
Reference: National Statistical Institute

Figure A6: Economic Sectors Share in Gross Value Added



Reference: National Statistical Institute

Figure A7: Unemployment by Regions



Reference: National Statistical Institute

Table A6: Changes in Major Sectors of Production (share in Gross Domestic Product, %)

Economic Sector	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002*
Agriculture	15,4	11,6	9,9	11,5	12,7	14,2	23,4	16,8	14,5	12,3	12,1	11,0
Industry	39,8	39,0	32,7	29,9	31,0	29,0	25,0	27,3	25,1	25,8	25,2	24,5
Services	51,2	45,8	50,8	51,8	51,1	51,2	41,0	45,3	49,5	50,5	51,2	52,7
* preliminary data												
Reference: National Statistical Institute (NSI)												

Table A7: Changes in Major Sectors of Production (share in Gross Value Added, %)

Economic Sector	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002*
Agriculture	14,5	12,0	10,6	11,8	14,1	15,1	26,2	18,8	16,3	13,9	13,6	12,5
Industry	37,4	40,5	35,0	35,5	34,8	30,7	27,9	30,5	28,2	29,1	28,5	27,8
Services	48,1	47,5	54,4	52,7	51,1	54,2	45,9	50,7	55,5	57,0	57,9	59,7
* preliminary data												
Reference: National Statistical Institute (NSI)												

Table A8: Demand Side of Growth (Changes in %)

Year	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002*
Individual Consumption	-2,4	-2,9	-4,4	-1,90	-3,90	-16,00	2,60	9,30	4,90	4,50	3,90
Gross Fixed Capital Formation	-7,3	-17,5	1,1	16,10	-21,20	-23,90	35,20	20,80	15,40	19,90	9,30
Collective Consumption	-9,3	-9,3	-5,6	-2,10	-35,00	-1,20	23,40	4,10	13,30	4,70	6,20
Enet (Export minus Import)	-	-	-	-	-	29,85	-201,52	-102,81	-34,38	n.a.y.	n.a.y.
IME calculations, data by NSI; *preliminary data; n.a.y. - not available yet											

Table A9: Rate of Unemployment (%)

Year	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002
Unemployment	10,9	12,5	15,84	14,04	11,37	11,05	14,04	12,2	13,79	18,10	17,52	17,42
Reference: Employment Agency												

Table A10: Rate of Unemployment by Regions (%)

District	1999	2000	2001
Vidin	25,8	25,1	31,4
Vratza	22,2	22,8	28,7
Montana	26,9	27,7	18,4
Veliko Tarnovo	20,2	22,2	22,2
Gabrovo	14,0	13,2	15,0
Lovech	15,8	16,4	18,1
Pleven	19,0	16,5	18,5
Ruse	19,5	24,0	21,7
Varna	15,5	18,5	20,5
Dobrich	21,6	27,8	27,7
Razgrad	23,9	22,0	30,2
Silistra	18,6	15,8	31,0
Targovishte	26,0	34,2	22,3
Shumen	27,8	26,7	32,1
Burgas	18,6	22,4	21,8
Sliven	24,1	24,4	25,5
Yambol	23,0	24,0	22,4
Kurdzhali	11,2	12,6	9,3
Pazardzhik	21,9	14,0	23,9
Plovdiv	9,6	6,1	16,8
Smolyan	14,2	31,9	34,4
Stara Zagora	9,8	9,6	15,1
Haskovo	19,8	23,0	24,0
Blagoevgrad	14,7	12,9	11,3
Kyustendil	18,0	17,9	21,5
Pernik	12,5	14,9	17,7
Sofia capital	8,2	8,1	12,7
Sofia	8,2	6,1	14,9

Note: Because of a new regional division data is available since 1999 only
Reference: National Statistical Institute (NSI)

Table A11: Share of Different Age Groups Among the Unemployed (percent)

Age Group	1995	1996	1997	1998	1999	2000	2001	2002
up to 24	24,50%	24,62%	21,81%	18,63%	17,42%	16,50%	15,01%	16,01%
25-29	14,93%	15,25%	14,98%	14,53%	13,94%	13,13%	12,79%	13,33%
30-44	38,16%	37,89%	38,32%	39,37%	39,50%	38,30%	37,92%	36,89%
45-49	11,17%	10,93%	11,87%	12,73%	13,03%	13,18%	13,31%	12,51%
50 and over	11,23%	11,32%	13,01%	14,74%	16,11%	18,89%	20,97%	21,26%
Reference: Employment Agency								

Table A12: Participation Ratio (percent)

Year	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002
Participation Ratio	59,00	55,48	55,40	52,40	51,50	51,80	51,60	50,40	42,20	47,50	48,10	48,40
Reference: National Statistical Institute (NSI)												

Table A13: Changes in Labour Productivity in Manufactory (percent)

Year	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002*
Change in productivity	-4,60	-2,49	8,83	-0,04	10,64	-3,47	-15,02	-1,94	12,92	1,52	16,83	8,13	4,00
* IME estimate													
IME Calculations, data source: National Statistical Institute (NSI)													

Table A14: Financial account

Year	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002
Financial account (EUR, mln)	-345,88	472,54	649,17	0,84	275,23	-550,63	459,35	445,50	1478,60	1963,10	1659,50	1766,20
Reference: BNB												

C. INDUSTRIAL DEVELOPMENT AND COMPETITIVENESS

Table C1: Economic Sector Shares in Gross Value Added

Economic Sector	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002
Agriculture	14.5	12.0	10.6	11.8	14.1	15.1	26.2	18.8	16.3	13.9	13.6	12.5
Industry	37.4	40.5	35.0	35.5	34.8	30.7	27.9	30.5	28.2	29.1	28.5	27.8
Services	48.1	47.5	54.4	52.7	51.1	54.2	45.9	50.7	55.5	57.0	57.9	59.7

Reference: NSI

Table C2: Economic Sector Shares in Gross Domestic Product

Economic Sector	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002*
Agriculture	15.4	11.6	9.9	11.5	12.7	14.2	23.4	16.8	14.5	12.3	12.1	11.0
Industry	39.8	39.0	32.7	29.9	31.0	29.0	25.0	27.3	25.1	25.8	25.2	24.5
Services	51.2	45.8	50.8	51.8	51.1	51.2	41.0	45.3	49.5	50.5	51.2	53.6
Adjustments	-6.4	3.5	6.6	6.7	5.2	5.6	10.6	10.6	10.9	11.4	11.5	10.9

Reference: NSI

Table C3: Industrial production – division by sectors

Industrial Production - Division by Sectors						
Year	1996	1997	1998	1999	2000	2001
Total	**100%**	**100%**	**100%**	**100%**	**100%**	**100%**
Mining and quarrying	**5,25%**	**5,47%**	**5,27%**	**5,54%**	**5,10%**	**4,68%**
*coal, petroleum and gas	2,35%	2,31%	2,75%	2,87%	2,16%	2,03%
*ores	2,28%	2,50%	1,80%	1,87%	2,17%	…
*other	0,62%	0,66%	0,73%	0,80%	0,77%	…
Manufacturing	**84,62%**	**83,01%**	**79,72%**	**79,24%**	**79,96%**	**79,86%**
*Food products, beverages and tobacco	18,40%	17,41%	20,26%	19,30%	17,43%	17,65%
*Textiles and textile products	3,09%	3,19%	2,79%	2,39%	2,23%	…
*Wearing apparel	2,00%	2,15%	2,77%	3,10%	3,23%	…
*Leather and leather products	1,33%	1,28%	1,11%	0,97%	0,90%	0,86%
*Wood and wood products	0,96%	1,02%	1,14%	1,56%	1,34%	1,42%
*Pulp, paper and paper products; publishing and printing	3,19%	2,95%	3,22%	3,38%	3,21%	3,15%
*Coke, refined petroleum products and nuclear fuel	15,03%	12,76%	8,66%	…	…	…
*Chemicals, chemical products and man-made fibres	10,23%	10,04%	8,20%	7,42%	7,83%	8,23%
*Rubber and plastic products	2,35%	2,23%	2,08%	1,88%	1,82%	1,68%
*Other non-metallic mineral products	3,58%	3,73%	3,89%	4,08%	3,44%	3,58%
*Basic metals except casting	9,55%	11,13%	9,02%	7,98%	9,87%	10,55%
*Metal products, machinery and equipment, casting	8,21%	8,97%	9,65%	9,31%	7,93%	5,51%
*Electrical and optical equipment	3,35%	3,22%	3,47%	3,46%	3,46%	3,44%
*Transport equipment	2,18%	1,92%	2,31%	1,60%	1,32%	1,00%
*Manufacturing n.e.c.	1,16%	1,01%	1,16%	…	…	…
Electricity, gas and water supply	**10,13%**	**11,52%**	**15,00%**	**15,22%**	**14,94%**	**15,45%**

Reference: NSI; Data is available since 1996 only because there was a change in the classification of economic activities

Table C3 - continuation

Year	Year	Year	Year	Year	Year	Year
Total	100%	100%	100%	100%	100%	100%
Mining and quarrying	5,25%	5,47%	5,27%	5,54%	5,10%	4,68%
Manufacturing	84,62%	83,01%	79,72%	79,24%	79,96%	79,86%
Electricity, gas and water supply	10,13%	11,52%	15,00%	15,22%	14,94%	15,45%
Reference: NSI; Data is available since 1996 only because there was a change in the classification of economic activities						

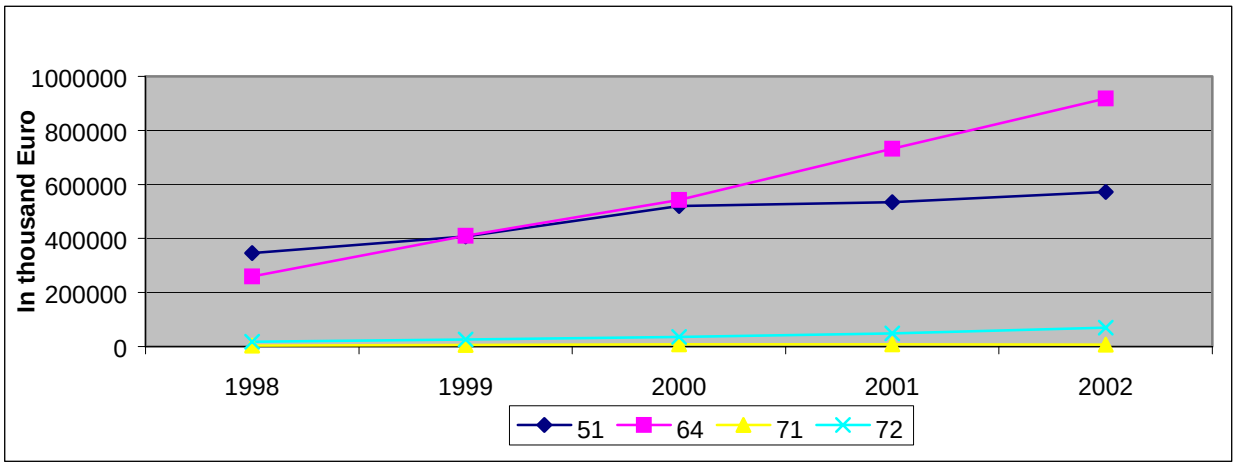
Table C4: Industrial Production - Current Price by Sectors (mln Euro)

Year	1996	1997	1998	1999	2000	2001
Total	**7989,77**	**8534,16**	**8582,01**	**8079,95**	**10073,98**	**10540,44**
Mining and quarrying	**419,70**	**466,97**	**452,62**	**447,38**	**513,85**	**493,40**
*coal, petroleum and gas	187,96	196,91	235,84	231,62	217,30	213,72
*ores	181,93	213,55	154,47	151,34	218,83	…
*other	49,81	56,51	62,31	64,42	77,72	…
Manufacturing	**6761,04**	**7083,88**	**6841,80**	**6402,40**	**8055,40**	**8418,04**
*Food products, beverages and tobacco	1470,27	1486,13	1738,67	1559,44	1755,78	1860,62
*Textiles and textile products	246,65	272,32	239,75	193,27	224,46	…
*Wearing apparel	159,74	183,10	237,84	250,53	325,69	…
*Leather and leather products	106,64	109,01	95,37	78,74	91,01	91,01
*Wood and wood products	76,91	87,01	97,67	125,78	135,49	149,81
*Pulp, paper and paper products; publishing and printing	255,24	252,08	275,98	273,03	323,14	332,34
*Coke, refined petroleum products and nuclear fuel	1200,92	1088,91	743,14	…	…	…
*Chemicals, chemical products and man-made fibres	816,97	856,52	703,50	599,75	788,92	867,68
*Rubber and plastic products	187,95	190,17	178,65	151,85	183,55	176,91
*Other non-metallic mineral products	285,79	318,18	333,44	329,27	346,14	377,85
*Basic metals except casting	762,93	949,77	774,36	644,74	994,46	1111,57
*Metal products, machinery and equipment, casting	656,14	765,62	827,86	752,62	799,15	580,33
*Electrical and optical equipment	267,38	274,94	297,63	279,68	348,19	363,02
*Transport equipment	174,51	164,15	198,17	129,36	132,94	105,33
*Manufacturing n.e.c.	92,98	85,96	99,78	…	…	…
Electricity, gas and water supply	**809,04**	**983,32**	**1287,59**	**1230,17**	**1504,73**	**1629,00**
Reference: NSI; Data is available since 1996 only because there was a change in the classification of economic activities						

TableC5: Output per employee (mln Euro)

Year	1997	1998	1999	2000	2001
Total	**0,009793**	**0,010260179**	**0,010644266**	**0,01406812**	**0,015365**
Mining and quarrying	**0,007713**	**0,008162243**	**0,009200247**	**0,012630232**	**0,01389**
*coal, petroleum and gas	0,0056896	0,007129556	0,007457986	0,009030422	0,0104037
*ores	0,0121604	0,010654703	0,0148404	0,023008403	…
*other	0,006751	0,007911427	0,008737661	0,010930572	…
Manufacturing	**0,009415**	**0,009460665**	**0,009821179**	**0,013083496**	**0,014223**
*Food products, beverages and tobacco	0,0122163	0,014024918	0,013529643	0,015756058	0,0168306
*Textiles and textile products	0,0058152	0,005775848	0,005511402	0,007027462	…
*Wearing apparel	0,002142	0,002480013	0,002576493	0,002879639	…
*Leather and leather products	0,0036049	0,003830652	0,003588177	0,004349549	0,0050627
*Wood and wood products	0,0046467	0,005718532	0,007866521	0,008042998	0,0089083
*Pulp, paper and paper products; publishing and printing	0,0088563	0,009884007	0,01034204	0,013116966	0,0145218
*Coke, refined petroleum products and nuclear fuel	0,0820828	0,057142268	…	…	…
*Chemicals, chemical products and man-made fibres	0,018112	0,01520925	0,014961467	0,023677883	0,0277354
*Rubber and plastic products	0,0073122	0,007762845	0,007855856	0,010592901	0,0107069
*Other non-metallic mineral products	0,0081435	0,009432114	0,010812819	0,013561003	0,0168525
*Basic metals except casting	0,0243862	0,021163767	0,019392981	0,037481634	0,018418
*Metal products, machinery and equipment, casting	0,0049099	0,005736466	0,005999375	0,007219445	0,0091563
*Electrical and optical equipment	0,0054772	0,006342341	0,007108857	0,009804848	0,0109844
*Transport equipment	0,00674	0,0088488	0,006965154	0,009777573	0,0078381
*Manufacturing n.e.c.	0,0033135	0,004148165	…	…	…
Electricity, gas and water supply	**0,016812**	**0,022275903**	**0,021005178**	**0,02520067**	**0,027783**
Reference: NSI; Data is available since 1996 only because there was a change in the classification of economic activities					

Figure C1: Value Added in Selected Sectors by NACE 2 Digit



Reference: NSI

Table C6: Value Added per Employee

Year	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002
Employees	4096848	3564037	3273661	3221838	3241601	3282183	3285877	3157435	3152554	3087830	2980108	2940292	2704,4
GVA, mln Euro	13156,8	6873,6	6458,4	8649,9	7604,8	9496,7	7355,9	8167,9	10161,2	10842082,9	12115912,43	13397874,56	14568649,12
GVA per employee, mln Euro	0,00321	0,00193	0,00197	0,00268	0,00235	0,0029	0,0023	0,00259	0,00322	3,51	4,0656	4,556647625	5387,017126

Table C7: Expenditure on Acquisition of Tangible Fixed Assets by Branches (mln euro)

Year	1996	1997	1998	1999	2000	2001
Total	**1187,22**	**1239,45**	**1716,94**	**2352,40**	**2765,80**	**3422,74**
Agriculture, forestry and fishing	**31,33**	**34,89**	**54,21**	**54,45**	**56,65**	**74,81**
*agriculture	24,66	30,90	48,77	51,23	53,63	
*forestry and fishing	6,67	3,99	5,44	3,22	3,02	
Mining and quarrying	**40,89**	**38,33**	**55,56**	**58,59**	**59,11**	**52,77**
*coal, petroleum and gas	22,66	17,85	40,97	31,09	19,33	
*ores	16,06	17,68	11,85	21,93	30,78	
*other	2,18	2,80	2,74	5,57	9,00	
Manufacturing	**258,47**	**245,93**	**465,70**	**523,77**	**659,87**	**792,15**
*Food products, beverages and tobacco	99,28	63,13	102,86	131,96	159,73	
*Textiles and textile products	4,85	9,36	8,43	11,76	52,10	
*Wearing apparel	8,52	12,78	21,71	32,36	30,27	
*Leather and leather products	2,13	3,99	6,62	5,68	4,60	
*Wood and wood products	4,19	3,55	6,37	20,09	49,95	
*Pulp, paper and paper products; publishing and printing	6,80	7,79	19,38	55,53	37,99	
*Coke, refined petroleum products and nuclear fuel	8,73	12,06	21,45	11,04	12,83	
*Chemicals, chemical products and man-made fibres	55,37	28,12	59,37	38,45	51,18	
*Rubber and plastic products	3,39	9,12	7,08	9,71	14,57	
*Other non-metallic mineral products	7,99	14,95	56,33	74,60	68,56	
*Basic metals except casting	27,93	38,25	66,62	47,50	71,02	
*Metal products, machinery and equipment, casting	16,59	26,53	45,70	46,17	69,13	
*Electrical and optical equipment	6,26	7,36	14,58	18,82	19,89	
*Transport equipment	3,45	6,05	23,05	10,07	6,85	
*Manufacturing n.e.c.	2,99	2,90	6,15	10,02	11,15	
Electricity, gas and water supply	**159,82**	**86,51**	**131,73**	**213,72**	**293,15**	**269,81**
Construction	**29,16**	**140,15**	**122,44**	**158,81**	**175,43**	**214,36**
Trade and repairing	**88,82**	**77,13**	**204,62**	**282,54**	**397,97**	**450,14**
Hotels and restaurants	**20,62**	**26,28**	**38,27**	**100,98**	**118,87**	**172,28**
Transport and communication	**166,69**	**359,23**	**372,47**	**591,36**	**629,69**	**889,72**
*Transport	101,64	290,11	259,43	438,94	496,52	
*communication	65,06	69,12	113,05	152,42	133,14	
Financial intermediation	**145,52**	**111,68**	**60,21**	**54,61**	**63,41**	**81,53**
Real estate, renting and business activities	**166,17**	**23,41**	**38,86**	**77,77**	**114,33**	**188,05**
*Real estate, renting	155,43	9,67	16,70	32,11	57,42	
*Research and development	1,25	2,50	1,42	2,45	2,56	
*Other business activities	9,49	11,24	20,75	43,20	54,40	
Public administration; compulsory social security	**29,94**	**40,26**	**98,77**	**143,57**	**106,28**	**84,88**
Education	**13,37**	**20,37**	**26,00**	**21,53**	**16,22**	**22,69**
Health and social work	**14,83**	**14,78**	**18,26**	**21,93**	**28,00**	**55,51**
*Health and social work	14,77	14,77	18,17	21,83	27,97	
*Veterinary activities	0,07	0,01	0,09	0,10	0,05	
Other	**21,59**	**20,51**	**29,83**	**48,78**	**46,82**	**74,06**
*Activities of membership organizations	4,74	1,07	2,34	2,56	4,04	
*Sewage and refuse disposal, sanitation and similar activities	8,11	10,96	19,51	26,79	24,03	
*cultural activities	5,30	6,28	5,49	9,46	9,46	
*Recreational and sporting activities	3,43	2,21	2,49	9,97	9,25	
Reference: NSI						

Table C8: Investments: Gross Fixed Capital Formation from the National Accounts Statistics

Year	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001
Gross fixed capital formation, share of GDP, %	21,3	18,2	16,2	13	13,8	15,3	13,5	11	13	15,1	15,7	17,8
c42: Gross fixed capital formation, change year on year, %			-7,3	-17,5	1,1	16,1	-21,2	-20,9	35,2	20,8	15,4	19,9
Gross fixed capital formation, current price, millions of euro	2797,68	1173,10	1085,90	1199,92	1122,25	1528,22	1055,59	1003,29	1479,59	1840,90	2150,50	2689,09

Table C9: Expenditure on Acquisition of Tangible Fixed Assets (mln euro)

Year	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001
Total	2838,4	1179,9	1454,2	1349,4	1306,6	1650,4	1187,2	1239,4	1716,9	2352,4	2765,8	3422,7
Reference: NSI												

Table C10: Market Shares of ICT Industries (thousands EUR)

Year	1999		2000	
ICT activities	Amount	Percent	Amount	Percent
Hardware supply	84 773.6	8.14%	100 205	10.68%
Software development	13 220.82	1.27%	11 998.3	1.28%
Communication services supply	19 829.33	1.90%	19 304.59	2.06%
Distribution	122 649	11.78%	76 812.4	8.19%
Assemblies	29 975.87	2.88%	25 314.33	2.70%
System integrations	35 850.69	3.44%	35 625.84	3.80%
Communication integrations	10 240.53	0.98%	1 664.485	0.18%
ISP	18 124.46	1.74%	14 171.19	1.51%
Telecommunication	695 658.6	66.83%	639 359.2	68.17%
Information services	10 634.06	1.02%	13 440.75	1.43%
TOTAL	1 040957	100.00%	937 895.9	100.00%

Reference: IDG Bulgaria and own calculations

Table C11: CRT monitors (2002)

	17”	15”	19”
Market share	62.1%	31.7%	6.2%
Revenues	62.4%	23%	11.2%
Leading suppliers	Samsung (25.9%) CTX (12.5) LG (10.5%)	LG (41.9) Samsung (11.7%)	Samsung (33.4%) LG (12.5%) CTX (7.3%)

Reference: Computerworld

Table C12: LCD monitors – major dealers, market share of total LCD market (2002)

LCD monitor supplier	Market share
Samsung	20.2%
CTX	8.5%
LG	7.6%

Reference: Computerworld

Table C13: LCD monitors market share by type (2002

LCD monitor type	17”	19”
Major supplier	Samsung (31.7%)	Samsung (66%)
Secondary supplier	Sony (4.5%)	ViewSonic (13.2%)

Reference: Computerworld

D. PRESENCE OF MOST RELEVANT ECONOMIC ACTIVITIES FOR IST APPLICATIONS

D1. Case study on spillover effects

In order to acquire better impression we selected the following examples for an anecdotic overview of the sector including three companies:

- Lukoil Neftohim – petrol refinery in Bourgas, privatized in 1999 and bought by the Russian Lukoil.
- Bulgartabac – State owned monopoly-producing cigarettes and tobacco in procedure for privatization (we are investigating the Balance sheet of the mother company of the holding and not the consolidated balance).
- Elcabel – Producer of a large variety of cables, privatized in 1998.

For these companies we compare the Share of R&D, Software and Patents in the Balance sheet in 1999 and in 2001 (see tables bellow).

We focus our attention on R&D expenditures as a conventional measurement of the technological and innovation policy of the firm. In the case of the privately owned Lukoil Neftohim and Elcable expenditures on R&D are considerably rising as in the latter by factor of eighteen. On the other hand, expenditures on R&D for the state owned Bulgartabac are progressively declining. This is also the case with other state owned enterprises whose privatization was designed to take place in the middle of the 90s but in effect has been postponed and nobody knows when it will occur. The common phenomenon is that the market price of these enterprises is decreasing.

D2. Case study: The Banking sector

Case Study: The Banking sector

We selected some examples for anecdotic overview of the services sector in order to acquire better understanding where ICTs investment have been concentrated for the time being.

The banking sector. United Bulgarian Bank, Hebros Bank and Bulbank made significant investments in ICT.

One indicator of the overall level of ICT investment in the banking system is the increase in promptness and in number of payments through the national payment system BISERA. For instance, between 1999 and 2001 the number of peak daily interbank payments increased by 78% having only two new banks.

ICTs are especially important to speed up settlement; according to the table below the peak daily number of inter-bank payments is increasing during the period 1999-2001.

Table D1. List of the largest ICT projects:

Ministry of Defence
ICT projects of this Ministry have the highest budgets. The largest project is the introduction of the NATO standards in the communications systems of the Bulgarian Army amounting approximately at USD 60 mln.

Ministry of Interior
The already functioning Automated Information System for Bulgarian Identification Documents had a budget of about USD 35 mln.

National Social Security Institute
The World Bank and the Bulgarian government financed the ITC system of the National Social Insurance Institute (as to latest information – USD 33 mln).

Ministry of Finance
Several ICT projects have been launched in the past four to five years. The approximate amount is between 10 and 12 mln USD.

National Health Insurance Fund
The ITC system of this Fund is envisaged to cover the whole population and to contain all relevant data on health insurance and patient files, hospital system, pharmacies etc. The costs of the project are around USD 10 mln.

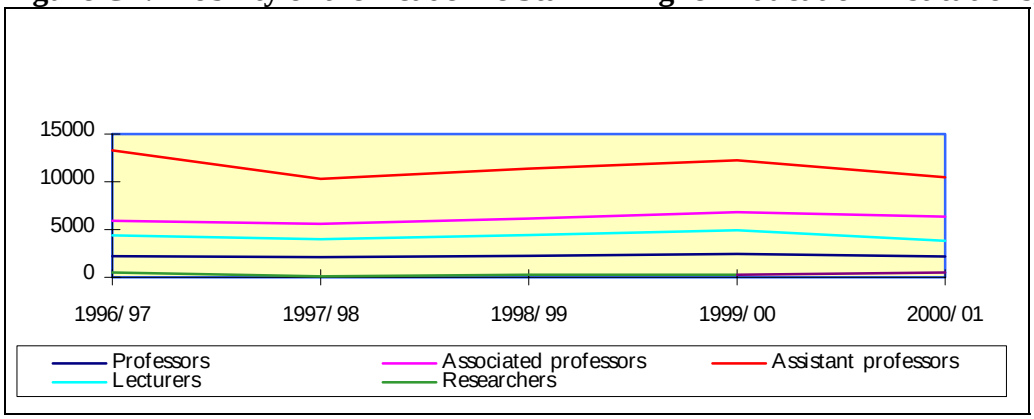
G. EDUCATIONAL SECTOR, LABOUR FORCE SUPPLY, TRAINING IN IST RELATED SECTORS

Table G1: Share of Newly Enrolled Students by Educational Field

Educational field	1998	1999	2000
TOTAL	100	100	100
Engineering	19,4	18,3	18,0
Industry and Technology	1,6	2,3	2,3
Mathematics	0,9	0,6	0,7
Informatics	1,5	1,7	2,4
Physics	2,2	1,8	2,1
Natural Sciences	0,6	0,7	0,8
Humanities	7,9	7,6	8,8
Social and Behavioral Studies	11,1	12,8	12,2
Journalism and Technical Information	0,6	0,7	0,8
Pedagogic Studies	10,7	12,2	11,7
Arts	2,5	2,5	2,7
Management and Administration	20,9	21,0	20,4
Law	4,1	3,8	3,6
Architecture and Building	2,5	2,6	2,6
Agriculture and Forestry	1,8	1,6	1,6
Veterinarian Medicine	0,5	0,6	0,5
Healthcare	1,8	1,1	1,4
Transport	0,5	0,5	0,9
Social Services	1,5	1,5	1,2
Personal Services	2,2	2,1	2,3
Environment Protection	1,2	1,4	1,1
Security and Safety	3,7	1,7	1,6
Other	0,2	0,2	0,3

Reference: Totomanova, 2002

Figure G1: Mobility of the Academic Staff in Higher Education Institutions, 1996-2001



Reference: National Statistical Institute

Table G2: TIMSS 8-th Grade Student Assessment Results for Science and Mathematics[2]

	Math, 1995 mean score	Math, 1999 mean score	Science, 1995 mean score	Science, 1999 mean score
Bulgaria	527	511	545	518
International Average	519	521	518	521

Reference: World Bank, Bulgaria Public Expenditure Issues and Directions for Reform, August 2002

Table G3: Number of students in life-long training by area of training (2000-H1 2001)

Number of students in life-long training by area of training (2000-H1 2001)	Thousands
Total	303,409
Foreign languages	11,377
Marketing and sales	7,545
Accounting and finance	18,178
Management (incl. human resource management) and administration	15,299
Office management	1,576
Personal development	12,262
Computing	25,351
Technics and manufacturing	118,325
Environmental issues	35,892
Services, incl. tourism, hotel management, travel	8,741
Other	48,863

[2] Third International Mathematics and Science Study, http://timss.bc.edu

Table G4: Number of graduated in secondary and tertiary education (thousands)

Number of graduated in secondary and tertiary education (thousands)	**1989**	**1990**	**1991**	**1992**	**1993**	**1994**	**1995**	**1996**	**1997**	**1998**	**1999**	**2000**
Graduates of secondary level of education in general schools	42,289	41,892	43,648	41,801	34,645	37,096	36,695	38,446	39,238	37,468	34,154	32,634
Graduates of vocational schools (total), icl.	0,577	0,62	0,654	1,051	0,724	0,876	1,118	1,032	0,873	0,716	0,538	0,536
- technics						0,147	0,349	0,291	0,307	0,17	0,162	0,209
Graduates of secondary vocational schools, incl.	29,506	26,595	25,726	26,925	28,884	27,942	29,228	28,732	24,972	21,643	18,661	18,198
- icl. Technics						12,91	13,315	13,943	11,048	10,011	9,277	8,685
- manufacturing and processing						6,346	8,024	7,596	6,616	5,562	4,434	4,32
- architecture and building						2,067	2,067	2,218	2,41	1,548	1,356	1,278
- agriculture, forestry and fishery						2,236	1,628	1,099	1,606	1,446	0,853	0,819
- services						2,392	2,562	2,708	2,297	2,275	1,973	1,773
- transport						0,449	0,229	0,254	0,291	0,184	0,163	0,189
- business and administration						1,542	1,403	0,914	0,622	0,549	0,479	0,542
Graduates of secondary technical and art schools, incl.	29,027	28,031	27,231	28,519	27,392	25,954	26,965	25,354	23,292	28,628	28,732	28,439
- computing						0,211	0,14	0,182	0,243	0,229	0,217	0,249
- technics						12,118	11,645	9,45	7,452	10,662	11,024	11,223
- manufacturing and processing						4,835	4,75	3,632	3,558	4,58	3,902	4,161
- transport						0,549	0,381	0,076	0,046	0,07	0,075	0,071
- architecture and building						1,674	1,562	1,178	1,115	1,476	1,59	1,68
- business and administration						3,589	4,463	5,654	5,418	5,728	6,015	5,818
Graduates of post-secondary vocational schools									3,908	3,933	4,433	4,721
- computing									0,01	0,012	0,018	0,021
- technics									0,371	0,367	0,354	0,387
- manufacturing and processing									0,158	0,127	0,208	0,296
- architecture and building									0,043	0,024	0,014	0,035
- business and administration									0,927	1,22	1,502	1,222

Graduates of tertiary education, incl.	19,087	21,817	22,825	23,886	21,15	30,147	32,956	36,463	38,714	41,898	44,851	46,718
- Engineering and technical	5,467	6,346	6,538	7,157	6,353			6,24		5,141	5,376	5,072
- Mathematics								0,459		0,378	0,155	0,159
- Computing											0,406	0,643
- Agricultural								1,54		0,1718	0,587	0,767
- Business and administration								6,925		10,678	10,843	13,542
- Mass comunication and documentation								0,548		0,369	0,404	0,391
- Arts								0,505		0,567	0,761	0,933
- Education		7,212	7,541	8,706	7,082	7,291		7,298		7,37	6,378	4,644
- Humanities								1,526		1,776	2,221	2,646
- Social and behavioural science								1,477		3,198	4,576	6,409
- Law								1,317		2,481	1,867	2,151
- Medical		1,86	2,238	2,129	1,621	1,754		4,868		3,884	4,612	3,199

Reference: NSI

Table G5: Science data

Scientists by field of science	**1994**	**1995**	**1996**	**1997**	**1998**	**1999**	**2000**
TOTAL	25616	25577	25853	25871	2592	23906	22815
Natural Sciences, incl:	5151	5121	5101	5054	5069	4868	4705
- Mathematics					1140	1075	1065
Engeneering and Technology, incl:	7743	7361	7421	7255	6813	6001	5604
- Mechanical engineering and mechanics					1018	928	856
- Air and space technics					176	152	129
- Electrotechnics					467	405	318
- Energetics					115	114	101
- Communication technics					437	390	378
- Electronics					495	495	397
- Authomation and data processing					997	819	820
Medical Sciences	4802	4729	4817	4760	4673	4417	3949
Agricultural Sciences	1649	1626	1653	1767	1576	1422	1356
Social Sciences and Humanities	6271	6740	6861	7035	7061	7198	7201
Personnel engaged in R&D	**1994**	**1995**	**1996**	**1997**	**1998**	**1999**	**2000**
TOTAL					21766	18451	16853
Researchers					14045	12335	10527
Technical staff					5439	4438	4192
Other personnel					2282	1678	2134
Scientists in engineering							
	1996	1997	1998	1999	2000		
Engineering and Technology / Total							
	28%	28%	27%	25%	25%		

Source: NSI

Table G6: Mobility

Dec 2000 (thousands)	Total	Employed	Unemployed
Total	3272,2	2735,5	536,7
Higher degree - Bachelor, Mastor and Doctor	465	435,6	29,4
Higher degree -Specialist	229	210,8	18,2
Upper secondary	1873,1	1588,1	285
Lower secondary, primary and primary unfinished	705,1	501	204

Table G7: ICT infrastructure in secondary education

Region	Computer laboratories	PCs	Low-middle class PCs	Higher class PCs	Students per high-class PC ratio	Schools with Internet access
Blagoevgrad	76	339	68	271	74,7	24
Bourgas	51	483	65	418	58,7	19
Gabrovo	30	313	22	291	22	9
Dobrich	21	589	437	152	37,1	1
Kardjali	40	279	25	254	33,5	4
Kyustendil	42	382	152	230	43,3	4
Lovech	30	301	112	189	41,3	9
Montana	40	268	122	146	19,2	4
Pazardjik	45	903	558	345	50,6	18
Pernik	26	281	22	259	48,8	4
Pleven	49	379	135	241	47,5	5
Plovdiv	79	651		651	36,8	15
Razgrad		240	126	114	69,9	6
Russe	43	424	41	383	41,3	19
Silistra	22	229		229	33,3	7
Sofia city	200	490		490	40,6	53
Sofia region	42	589	284	305	78,9	10
Sliven	36	263		263	40,6	9
Smolyan	36	231		231	220,8	8
Stara Zagora	49	467	52	415	39	16
Targoviste	32	465	312	153	73,8	6
Haskovo	47	536	288	248	62,7	8
Shoumen	26	198	67	131	28,9	9
Varna	104	946	396	550	32,3	28
Veliko Turnovo	57	616	69	547	40,8	21
Vidin	22	437	289	148	34,4	3
Vratza	37	642	480	162	54,1	9
Yambol	30	261		261	53,2	8
TOTAL	**1312**	**12202**	**4122**	**8077**	**66,4**	**336**

Reference: MEC, ARC Fund

Table G8: Educational structure of population (25-64 years old)

Educational structure of population (25-64 years old) %	1995	1996	1998	1999	2000	2001
Primary education	38,1	36,8	34,1	32,4	31,8	28,9
Secondary education	44,4	46,1	47,8	49,5	49,9	49,7
Higher education, incl	17,5	17,1	18,1	18,1	18,3	21,3
- college	5,2	5,1	5	5,1	6,4	6,8
- University	12,3	12	13,1	13	11,9	14,5

Reference: BIHS 2001

Table G9: Highest Level of Education Attained (% of population 15 and above)

Highest Level of Education Attained (% of population 15 and above)	2001
No education	7
Basic	33,9
Secondary general	17,6
Secondary technical	17
Secondary vocational	7,2
University and post secondary	17,3

Reference: BIHS 2001

Table G10: Case Study: Technical University-Sofia 2000-2002

	2000	2001	2002
Number of students to be enrolled			
Full-time	1 830	1 870	1 739
Part-time	400	372	361
Number of applications	6 333	7 322	6 941
Applications by area (first choice)	Number of applications		
1. Computer Systems and Technologies	2 902	3 852	2 786
2. Communication Technologies	1 098	1 163	1 190
3. Electronics	132	191	184
4. Automatics	158	166	187
5. Electromechanics	51	64	60
6. Industrial Management	381	368	408
7. Aviation Engineering and Technologies	248	171	156
8. Electrical Engineering and Electrical Equipment	95	140	119
9. Transport Engineering and Technologies	119	134	105
10. Machine Technology	33	27	28
Reference: Technical University-Sofia			

Table G11: ICT-related education: institutional resources, Budget Transfers for 2003

Technical University - Sofia		
Items	**million BGN**	**million EUR**
Subsidy - TOTAL (I+III+IV+V)	19,83	10,14
I. Subsidy for education	14,33	7,33
1. Maintainance for 2003	2	1,02
2. Salaries.	7,9	4,04
3. Social insurance contributions	2,71	1,39
II. Expenditures for maintainance of students education		0,00
FIRST AND SECOND COURSE	8	4,09
III. R&D, Publications	0,43	0,22
IV. Social Expenditures	4,7	2,40
1. Scholarships	1,8	0,92
2. Children Allowance	0,01	0,01
3. Dormitories	1,6	0,82
4. Healthcare contributions for students and PhD students	1,26	0,64
V. Capital Expenditures	0,38	0,19
Technical University Sofia- Plovdiv Branch		
Items	**million BGN**	**million EUR**
Subsidy - TOTAL (I+III+IV+V)	3	1,53
I. Subsidy for education	1,9	0,97
1. Maintainance for 2003	0,1	0,05
2. Salaries	1,13	0,58
3. Social insurance contributions	0,39	0,20
II. Expenditures for maintainance of students education		
FIRST AND SECOND COURSE	1,09	0,56
III. R&D, Publications	0,03	0,02
IV. Social Expenditures	0,59	0,30
1. Scholarships	0,27	0,14
2. Children Allowance	0,02	0,01
3. Dormitories	0,22	0,11
4. Healthcare contributions for students and PhD students	0,1	0,05
V. Capital Expenditures	0,52	0,27
Technical University-Varna		
Items	**million BGN**	**million EUR**
Subsidy - TOTAL (I+III+IV+V)	7,11	3,64
I. Subsidy for education	5,3	2,71
1. Maintainance for 2003	0,39	0,20
2. Salaries	2,93	1,50
3. Social insurance contributions	1	0,51
II. Expenditures for maintainance of students education		0,00

FIRST AND SECOND COURSE	3,13	1,60
III. R&D, Publications	0,09	0,05
IV. Social Expenditures	1,65	0,84
1. Scholarships	0,7	0,36
2. Children Allowance	0,01	0,01
3. Dormitories	0,45	0,23
4. Healthcare contributions for students and PhD students	0,47	0,24
V. Capital Expenditures	0,08	0,04
Technical University-Gabrovo		
Items	**million BGN**	**million EUR**
Subsidy - TOTAL (I+III+IV+V)	4,43	2,27
I. Subsidy for education	3,37	1,72
1. Maintainance for 2003	2,93	1,50
2. Salaries	1,75	0,89
3. Social insurance contributions	0,6	0,31
II. Expenditures for maintainance of students education		0,00
FIRST AND SECOND COURSE	2,04	1,04
III. R&D, Publications	0,06	0,03
IV. Social Expenditures	0,72	0,37
1. Scholarships	0,43	0,22
2. Children Allowance	0	0,00
3. Dormitories	0,04	0,02
4. Healthcare contributions for students and PhD students	0,24	0,12
V. Capital Expenditures	0,28	0,14
Russe University "Angel Kunchev"		
Items	**million BGN**	**million EUR**
Subsidy - TOTAL (I+III+IV+V)	7,37	3,77
I. Subsidy for education	5,9	3,02
1. Maintainance for 2003	0,21	0,11
2. Salaries	3,61	1,85
3. Social insurance contributions	1,24	0,63
II. Expenditures for maintainance of students education		0,00
FIRST AND SECOND COURSE	3,37	1,72
III. R&D, Publications	0,05	0,03
IV. Social Expenditures	1,32	0,67
1. Scholarships	0,87	0,44
2. Children Allowance	0,01	0,01
3. Dormitories	0	0,00
4. Healthcare contributions for students and PhD students	0,44	0,22
V. Capital Expenditures	0,1	0,05

Table G11 (cont.)

University of Chemical Tecnology and Metallurgy -Sofia		
Items	**million BGN**	**million EUR**
Subsidy - TOTAL (I+III+IV+V)	5,44	2,78
I. Subsidy for education	4,13	2,11
1. Maintainance for 2003	0,24	0,12
2. Salaries	2,87	1,47
3. Social insurance contributions	0,99	0,51
II. Expenditures for maintainance of students education		0,00
FIRST AND SECOND COURSE	2,08	1,06
III. R&D, Publications	0,05	0,03
IV. Social Expenditures	1,17	0,60
1. Scholarships	0,63	0,32
2. Children Allowance	0	0,00
3. Dormitories	0,32	0,16
4. Healthcare contributions for students and PhD students	0,22	0,11
V. Capital Expenditures	0,08	0,04

Table G12: International migration of Bulgarians

Period	**Total number**
1904-1907	21012
1920	74841
1921-1926	91182
1927-1930	55509
1931-1935	63275
1936-1940	106611
1941-1945	56103
1946-1950	100121
1951-1955	101454
1956-1960	1063
1961-1965	429
1966-1970	14280
1971-1975	27139
1976-1980	73890
1981-1988	684
1989	218000
1990	88000
1991	45000
1992	65000
1993	54000
1994	64000
1995	54000
1996	66000

H. NATIONAL AND REGIONAL DEMOGRAPHIC DATA AND PROSPECTIVE

Figure H1: Population Density

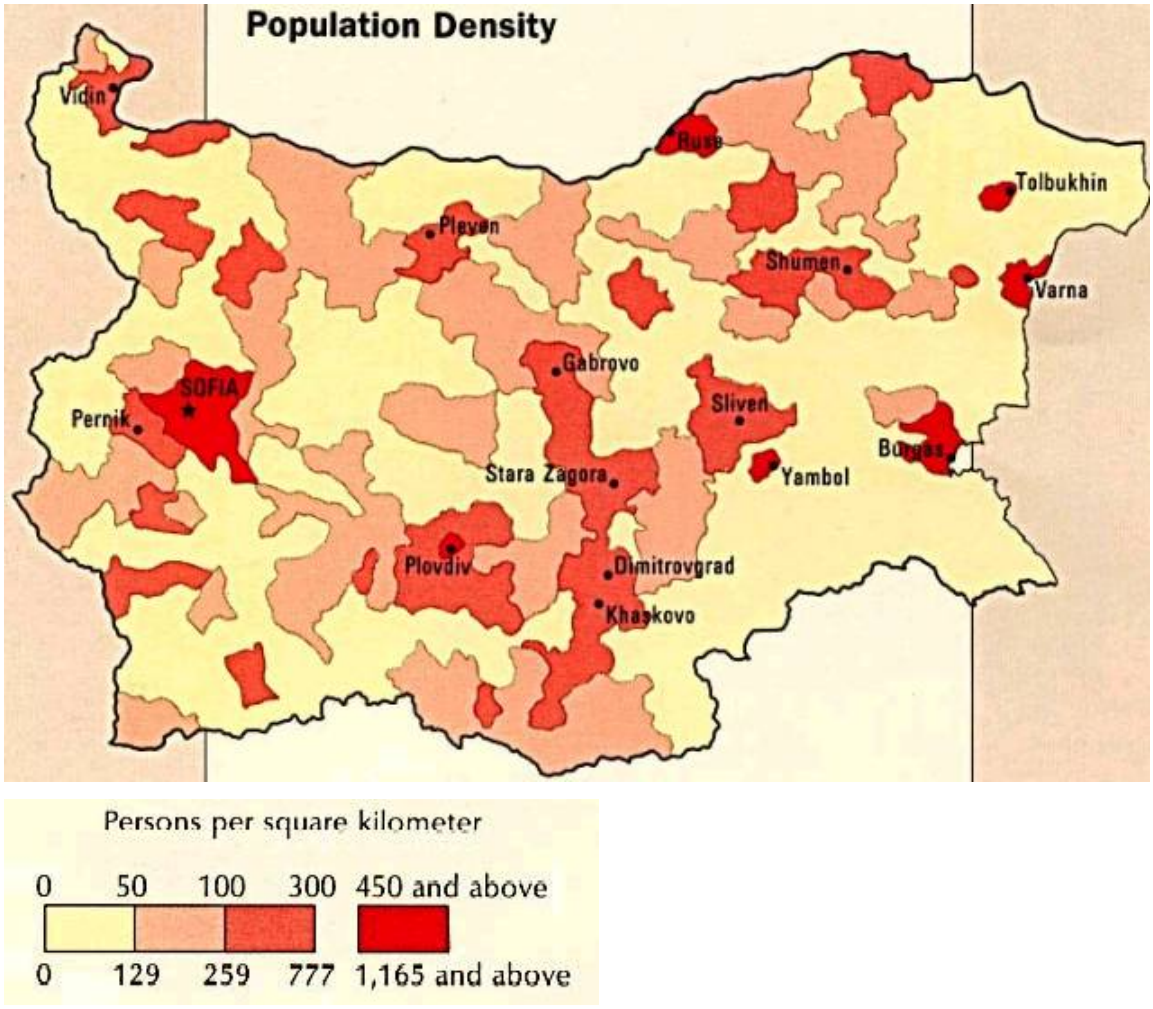


Table H1: Life Expectancy at Birth

Period	1989-1991	1993-1995	1995-1997	1997-1999	1998-2000	1999-2001
Total	71,22	70,64	70,48	71,01	71,7	71,85
Men	68,02	67,11	67,07	67,6	68,15	68,58
Women	74,66	74,85	74,31	74,64	75,34	75,28

Table H2: Average life expectancy by age and sex in the period 1999 - 2001

Age	Total	Men	Women
x			
0	71,85	68,58	75,28
1	71,82	68,59	75,20
2	70,91	67,68	74,29
3	69,95	66,72	73,34
4	68,98	65,76	72,35
5	68,02	64,79	71,40
6	67,04	63,82	70,42
7	66,07	62,84	69,45

8	65,09	61,87	68,47
9	64,11	60,89	67,48
10	63,13	59,91	66,49
11	62,14	58,92	65,51
12	61,16	57,93	64,52
13	60,17	56,95	63,53
14	59,18	55,97	62,55
15	58,21	55,00	61,56
16	57,24	54,03	60,59
17	56,26	53,06	59,61
18	55,30	52,10	58,63
19	54,34	51,15	57,66
20	53,38	50,21	56,69
21	52,43	49,27	55,72
22	51,47	48,33	54,75
23	50,51	47,38	53,77
24	49,56	46,43	52,80
25	48,60	45,48	51,83
26	47,63	44,53	50,86
27	46,67	43,58	49,88
28	45,71	42,63	48,91
29	44,76	41,69	47,93
30	43,81	40,75	46,96
31	42,86	39,81	46,00
32	41,91	38,88	45,04
33	40,96	37,95	44,07
34	40,02	37,03	43,11
35	39,09	36,11	42,15
36	38,15	35,19	41,19
37	37,21	34,27	40,23
38	36,28	33,36	39,28
39	35,37	32,46	38,34
40	34,45	31,56	37,40
41	33,54	30,67	36,47
42	32,64	29,80	35,53
43	31,74	28,93	34,60
44	30,86	28,07	33,68
45	29,98	27,24	32,75
46	29,11	26,41	31,83
47	28,25	25,59	30,92
48	27,40	24,78	30,01
49	26,55	23,98	29,11
50	25,73	23,21	28,22
51	24,92	22,46	27,35
52	24,10	21,70	26,46
53	23,28	20,94	25,57
54	22,49	20,21	24,70
55	21,70	19,50	23,82
56	20,90	18,77	22,95

57	20,14	18,08	22,09
58	19,38	17,41	21,24
59	18,62	16,72	20,39
60	17,89	16,07	19,57
61	17,17	15,43	18,76
62	16,45	14,79	17,95
63	15,75	14,17	17,15
64	15,08	13,59	16,38
65	14,40	13,00	15,62
66	13,74	12,43	14,87
67	13,10	11,87	14,14
68	12,45	11,30	13,40
69	11,82	10,76	12,68
70	11,20	10,22	11,99
71	10,59	9,68	11,31
72	10,01	9,18	10,66
73	9,47	8,71	10,05
74	8,95	8,26	9,46
75	8,44	7,83	8,89
76	7,94	7,40	8,33
77	7,47	6,98	7,81
78	7,01	6,56	7,31
79	6,57	6,19	6,83
80	6,16	5,84	6,38
81	5,78	5,51	5,95
82	5,29	5,04	5,44
83	4,76	4,54	4,90
84	4,39	4,19	4,52
85	4,26	4,07	4,38
86	4,09	3,91	4,19
87	3,81	3,66	3,89
88	3,50	3,39	3,56
89	3,36	3,26	3,41
90	3,11	3,04	3,15
91	2,95	2,92	2,97
92	2,72	2,69	2,73
93	2,50	2,45	2,52
94	2,41	2,36	2,43
95	2,28	2,26	2,28
96	2,13	2,06	2,16
97	1,85	1,78	1,88
98	1,51	1,49	1,52
99	1,02	1,03	1,01
100	0,47	0,47	0,46

Table H3: Age Distribution by Regions (December 31, 1999)

Groups by Age	0	1-4	5-9	10-14	15-19	20-24	25-29	30-34	35-39	40-44	45-49	50-54	55-59	60-64	65-69	70+
Total	0,87%	3,28%	5,30%	6,43%	6,89%	7,67%	7,30%	6,71%	6,75%	6,97%	7,22%	7,12%	5,79%	5,53%	5,74%	10,43%
Blagoevgrad	0,95%	3,61%	6,20%	7,62%	7,70%	7,83%	7,32%	7,35%	7,58%	7,41%	6,99%	6,23%	5,37%	5,11%	4,93%	7,78%
Burgas	0,98%	3,68%	5,70%	6,81%	7,38%	7,74%	7,43%	6,59%	6,77%	7,19%	7,40%	6,94%	5,55%	5,39%	5,41%	9,06%
Varna	1,04%	3,62%	5,19%	6,32%	6,86%	8,20%	7,64%	6,63%	6,76%	7,09%	7,58%	7,45%	6,00%	5,36%	5,50%	8,73%
Veliko Tarnovo	0,78%	2,92%	4,70%	5,89%	6,66%	8,04%	7,24%	5,97%	6,22%	6,76%	7,25%	7,40%	6,17%	5,55%	6,27%	12,20%
Vidin	0,79%	2,95%	4,83%	5,50%	5,74%	6,07%	6,16%	5,92%	5,81%	5,70%	6,83%	7,73%	6,21%	6,24%	6,95%	16,57%
Vratza	0,91%	3,40%	5,61%	6,38%	6,34%	6,45%	6,63%	6,59%	6,59%	6,58%	6,75%	7,15%	5,70%	5,66%	6,31%	12,96%
Gabrovo	0,74%	2,63%	4,47%	5,57%	6,15%	7,44%	6,91%	6,19%	6,28%	6,41%	7,41%	8,03%	6,59%	6,23%	6,50%	12,45%
Kurdzhali	0,73%	3,22%	6,67%	8,15%	8,73%	8,60%	7,52%	7,57%	7,66%	7,54%	6,78%	5,50%	5,24%	4,96%	4,48%	6,64%
Kyustendil	0,71%	2,96%	4,92%	5,95%	6,45%	6,72%	6,53%	6,60%	6,78%	6,74%	7,27%	7,21%	6,05%	6,08%	6,33%	12,70%
Lovech	0,86%	3,41%	5,24%	5,93%	6,15%	6,63%	6,07%	6,19%	6,29%	6,39%	6,70%	7,51%	6,09%	6,16%	6,57%	13,82%
Montana	0,81%	3,06%	5,07%	5,98%	6,19%	6,28%	6,19%	5,95%	6,12%	6,10%	6,66%	7,08%	5,77%	6,37%	7,11%	15,28%
Pazardzhik	0,99%	3,63%	6,05%	7,48%	7,44%	7,10%	6,69%	7,08%	7,41%	7,51%	6,74%	6,65%	5,48%	5,41%	5,32%	9,04%
Pernik	0,69%	2,60%	4,69%	5,85%	6,42%	6,70%	6,64%	6,52%	6,84%	7,34%	7,22%	7,19%	6,08%	6,40%	6,70%	12,14%
Pleven	0,84%	3,27%	5,22%	6,24%	6,42%	6,46%	6,00%	6,12%	6,40%	6,83%	7,11%	7,56%	6,09%	5,97%	6,50%	12,97%
Plovdiv	0,88%	3,23%	4,98%	6,23%	6,85%	7,91%	7,51%	6,79%	6,81%	7,11%	7,00%	7,02%	5,82%	5,80%	5,91%	10,12%
Razgrad	0,92%	3,71%	6,41%	7,00%	7,22%	7,26%	7,59%	7,36%	6,93%	6,82%	6,82%	6,99%	5,96%	5,05%	5,17%	8,78%
Ruse	0,78%	2,98%	4,80%	6,19%	6,71%	7,72%	7,06%	6,56%	6,57%	6,88%	7,25%	7,61%	6,26%	5,60%	6,17%	10,86%
Silistra	0,82%	3,27%	5,72%	7,00%	6,99%	7,04%	6,92%	7,12%	7,04%	6,60%	7,10%	7,51%	6,89%	5,71%	5,29%	8,96%
Sliven	1,14%	4,11%	6,42%	7,34%	7,78%	7,67%	6,90%	6,51%	6,97%	6,86%	7,11%	6,65%	5,32%	5,28%	5,21%	8,73%
Smolyan	0,81%	2,98%	5,59%	7,66%	8,07%	7,84%	6,58%	6,99%	7,92%	8,36%	7,78%	6,80%	5,35%	5,08%	4,63%	7,56%
Sofia capital	0,79%	3,04%	4,52%	5,61%	6,37%	9,14%	9,16%	7,24%	6,55%	7,07%	7,88%	7,48%	5,56%	4,95%	5,06%	9,57%
Sofia	0,81%	3,24%	5,17%	6,32%	6,47%	6,67%	6,33%	6,23%	6,63%	6,73%	7,05%	7,27%	5,75%	6,05%	6,45%	12,83%
Stara Zagora	0,94%	3,35%	5,31%	6,46%	6,96%	7,47%	6,95%	6,53%	6,73%	6,98%	7,33%	7,12%	5,73%	5,71%	5,97%	10,46%
Dobrich	0,90%	3,37%	5,72%	6,96%	7,20%	7,59%	7,39%	6,90%	6,90%	6,84%	7,42%	7,31%	6,16%	5,20%	5,18%	8,95%
Targovishte	0,91%	3,83%	6,22%	6,80%	7,13%	7,17%	6,92%	6,77%	6,84%	6,64%	6,82%	6,81%	5,86%	5,35%	5,51%	10,40%
Haskovo	0,78%	3,18%	5,41%	6,44%	7,21%	7,21%	6,43%	6,25%	6,73%	7,14%	7,19%	6,50%	5,54%	5,69%	6,55%	11,74%
Shumen	0,92%	3,51%	5,90%	6,82%	7,44%	8,11%	7,86%	6,75%	6,77%	6,82%	6,69%	6,83%	5,68%	5,13%	5,38%	9,39%
Yambol	0,90%	3,06%	5,37%	6,45%	6,97%	7,15%	6,34%	6,22%	6,67%	6,78%	7,22%	6,80%	5,67%	6,29%	6,77%	11,34%
Reference: NSI																

Age Distribution by Regions (December 31, 2000)

Groups by Age	0	1-4	5-9	10-14	15-19	20-24	25-29	30-34	35-39	40-44	45-49	50-54	55-59	60-64	65-69	70+
Total	0,87%	3,33%	5,00%	6,34%	6,80%	7,57%	7,44%	6,91%	6,67%	6,93%	7,07%	7,39%	5,91%	5,44%	5,65%	10,68%
Blagoevgrad	0,93%	3,66%	5,72%	7,57%	7,69%	7,69%	7,35%	7,33%	7,46%	7,51%	7,07%	6,45%	5,42%	5,15%	4,94%	8,04%
Burgas	0,99%	3,70%	5,45%	6,70%	7,23%	7,63%	7,65%	6,71%	6,65%	7,14%	7,22%	7,35%	5,58%	5,35%	5,33%	9,32%
Varna	1,05%	3,73%	4,95%	6,16%	6,81%	7,88%	7,65%	6,88%	6,66%	6,94%	7,50%	7,77%	6,17%	5,34%	5,42%	9,09%
Veliko Tarnovo	0,75%	2,99%	4,39%	5,78%	6,69%	8,07%	7,41%	6,17%	6,15%	6,59%	7,16%	7,60%	6,28%	5,51%	6,08%	12,37%
Vidin	0,73%	3,01%	4,64%	5,54%	5,61%	6,02%	6,19%	6,22%	5,79%	5,65%	6,54%	8,05%	6,48%	5,91%	6,90%	16,74%
Vratza	0,83%	3,48%	5,33%	6,40%	6,30%	6,31%	6,71%	6,83%	6,51%	6,57%	6,63%	7,44%	5,88%	5,44%	6,18%	13,18%
Gabrovo	0,69%	2,73%	4,24%	5,51%	5,94%	7,25%	7,13%	6,48%	6,29%	6,29%	7,11%	8,27%	6,75%	6,20%	6,44%	12,67%
Kurdzhali	0,82%	3,07%	6,21%	7,96%	8,54%	8,67%	7,66%	7,51%	7,70%	7,60%	6,71%	5,83%	5,26%	5,05%	4,53%	6,90%
Kyustendil	0,72%	2,93%	4,65%	5,94%	6,40%	6,65%	6,62%	6,85%	6,64%	6,86%	7,03%	7,48%	6,14%	5,90%	6,24%	12,95%
Lovech	0,90%	3,46%	5,01%	5,92%	6,07%	6,45%	6,30%	6,34%	6,19%	6,38%	6,49%	7,73%	6,22%	6,06%	6,50%	13,97%
Montana	0,81%	3,12%	4,81%	5,91%	6,24%	6,12%	6,26%	6,13%	6,08%	6,13%	6,40%	7,48%	5,91%	6,07%	7,07%	15,47%
Pazardzhik	0,95%	3,69%	5,64%	7,42%	7,46%	7,07%	6,71%	7,14%	7,31%	7,56%	6,66%	6,93%	5,52%	5,26%	5,32%	9,36%
Pernik	0,66%	2,66%	4,25%	5,84%	6,35%	6,64%	6,75%	6,69%	6,71%	7,34%	7,02%	7,58%	6,17%	6,08%	6,74%	12,50%
Pleven	0,85%	3,26%	4,99%	6,23%	6,34%	6,30%	6,18%	6,18%	6,32%	6,82%	6,87%	7,87%	6,31%	5,81%	6,41%	13,26%
Plovdiv	0,87%	3,29%	4,71%	6,13%	6,73%	7,83%	7,65%	7,00%	6,69%	7,14%	6,85%	7,24%	5,93%	5,68%	5,87%	10,40%
Razgrad	0,89%	3,61%	6,21%	6,91%	7,20%	7,23%	7,54%	7,59%	7,00%	6,72%	6,82%	6,97%	6,14%	5,06%	5,08%	9,02%
Ruse	0,76%	3,03%	4,55%	6,00%	6,69%	7,48%	7,34%	6,73%	6,56%	6,74%	7,13%	7,75%	6,48%	5,54%	6,09%	11,15%
Silistra	0,81%	3,26%	5,46%	6,87%	7,00%	6,92%	7,12%	7,16%	7,11%	6,59%	6,89%	7,50%	7,27%	5,66%	5,23%	9,13%
Sliven	1,10%	4,20%	6,07%	7,28%	7,66%	7,62%	7,17%	6,56%	6,86%	6,87%	7,03%	6,94%	5,25%	5,25%	5,19%	8,94%
Smolyan	0,76%	3,06%	5,07%	7,40%	8,02%	7,89%	6,64%	6,96%	7,69%	8,47%	7,70%	7,20%	5,43%	5,07%	4,48%	8,15%
Sofia capital	0,85%	3,11%	4,27%	5,53%	6,21%	9,07%	9,24%	7,77%	6,46%	6,90%	7,60%	7,80%	5,74%	4,87%	4,91%	9,69%
Sofia	0,85%	3,20%	4,77%	6,32%	6,40%	6,50%	6,30%	6,28%	6,53%	6,80%	6,85%	7,61%	5,90%	5,94%	6,33%	13,42%
Stara Zagora	0,91%	3,45%	5,05%	6,37%	6,80%	7,30%	7,21%	6,68%	6,65%	6,92%	7,18%	7,44%	5,78%	5,68%	5,86%	10,72%
Dobrich	0,91%	3,39%	5,39%	6,82%	7,16%	7,33%	7,51%	7,20%	6,82%	6,81%	7,21%	7,59%	6,44%	5,06%	5,12%	9,24%
Targovishte	0,89%	3,73%	6,08%	6,70%	7,17%	7,08%	7,07%	6,87%	6,82%	6,66%	6,71%	6,99%	5,96%	5,29%	5,48%	10,51%
Haskovo	0,79%	3,18%	5,12%	6,37%	7,09%	7,20%	6,74%	6,28%	6,62%	7,11%	7,09%	6,86%	5,56%	5,59%	6,31%	12,12%
Shumen	0,93%	3,52%	5,58%	6,75%	7,28%	8,00%	7,94%	7,06%	6,72%	6,83%	6,56%	6,98%	5,84%	5,12%	5,29%	9,60%
Yambol	0,87%	3,22%	4,98%	6,37%	6,87%	7,08%	6,67%	6,22%	6,58%	6,77%	7,14%	7,08%	5,63%	6,07%	6,69%	11,77%
Source: NSI																

Age Distribution by Regions (December 31, 2001)

Groups by Age	0	1-4	5-9	10-14	15-19	20-24	25-29	30-34	35-39	40-44	45-49	50-54	55-59	60-64	65-69	70+
Total	0,84%	3,23%	4,65%	6,25%	6,78%	7,21%	7,32%	6,98%	6,54%	6,92%	7,16%	7,37%	6,34%	5,48%	5,77%	11,16%
Blagoevgrad	0,87%	3,51%	5,27%	7,38%	7,69%	7,49%	7,28%	7,44%	7,42%	7,65%	7,22%	6,53%	5,67%	5,15%	5,10%	8,32%
Burgas	0,91%	3,56%	4,99%	6,59%	6,97%	7,30%	7,91%	7,18%	6,61%	7,07%	7,36%	7,38%	5,89%	5,24%	5,40%	9,63%
Varna	0,95%	3,48%	4,60%	6,03%	6,85%	8,51%	8,62%	7,48%	6,55%	6,69%	7,23%	7,28%	6,23%	5,07%	5,16%	9,27%
Veliko Tarnovo	0,75%	2,92%	4,10%	5,69%	6,73%	7,97%	6,77%	6,27%	6,05%	6,62%	7,28%	7,54%	6,89%	5,65%	6,20%	12,58%
Vidin	0,74%	2,83%	4,13%	5,51%	5,57%	5,08%	6,13%	6,49%	5,56%	5,77%	6,59%	7,98%	7,29%	6,10%	7,18%	17,05%
Vratza	0,83%	3,34%	4,97%	6,39%	6,16%	5,68%	6,48%	6,98%	6,44%	6,68%	6,82%	7,45%	6,55%	5,42%	6,20%	13,59%
Gabrovo	0,69%	2,72%	3,97%	5,43%	5,72%	6,70%	6,64%	6,45%	6,09%	6,26%	7,05%	8,25%	7,39%	6,40%	6,70%	13,55%
Kurdzhali	0,92%	3,41%	5,61%	7,42%	7,93%	7,81%	7,11%	7,14%	7,32%	7,52%	7,41%	6,06%	5,44%	5,59%	5,13%	8,18%
Kyustendil	0,70%	2,72%	4,27%	5,82%	6,17%	6,12%	6,52%	6,78%	6,43%	6,83%	7,09%	7,53%	6,83%	6,11%	6,62%	13,48%
Lovech	0,85%	3,19%	4,58%	5,97%	6,03%	5,34%	6,46%	6,63%	6,25%	6,48%	6,60%	7,59%	6,87%	6,17%	6,70%	14,29%
Montana	0,77%	3,10%	4,56%	6,03%	6,07%	5,21%	6,06%	6,30%	5,92%	6,30%	6,66%	7,53%	6,57%	6,17%	7,12%	15,63%
Pazardzhik	0,89%	3,61%	5,19%	7,17%	7,52%	6,83%	6,82%	7,21%	7,07%	7,65%	6,92%	6,79%	5,92%	5,35%	5,53%	9,53%
Pernik	0,66%	2,64%	3,93%	5,65%	6,15%	6,38%	6,65%	6,51%	6,42%	7,33%	7,23%	7,57%	6,69%	6,16%	6,88%	13,14%
Pleven	0,77%	3,17%	4,66%	6,16%	6,25%	5,75%	6,45%	6,57%	6,19%	6,75%	6,89%	7,68%	6,78%	5,79%	6,53%	13,61%
Plovdiv	0,85%	3,16%	4,49%	6,09%	6,84%	7,72%	7,41%	6,96%	6,57%	7,15%	6,98%	7,10%	6,29%	5,60%	5,92%	10,87%
Razgrad	0,89%	3,55%	5,73%	7,02%	6,95%	6,55%	7,02%	7,50%	7,03%	6,81%	7,04%	7,27%	6,59%	5,43%	5,38%	9,25%
Ruse	0,72%	2,93%	4,32%	5,93%	6,88%	6,97%	7,23%	6,85%	6,55%	6,70%	7,22%	7,58%	6,95%	5,57%	6,15%	11,46%
Silistra	0,81%	3,22%	5,06%	6,81%	6,79%	6,01%	6,65%	7,12%	6,95%	6,69%	7,16%	7,66%	7,40%	6,20%	5,77%	9,69%
Sliven	1,15%	4,15%	5,79%	7,34%	7,43%	6,94%	7,04%	6,53%	6,64%	6,92%	7,06%	7,04%	5,71%	5,30%	5,43%	9,52%
Smolyan	0,67%	3,03%	4,69%	7,11%	7,77%	6,83%	6,57%	7,14%	7,47%	8,47%	8,12%	7,34%	5,96%	5,37%	4,90%	8,55%
Sofia capital	0,84%	2,97%	3,95%	5,39%	6,61%	9,25%	8,78%	7,41%	6,26%	6,76%	7,45%	7,82%	6,22%	4,80%	4,81%	10,67%
Sofia	0,79%	3,24%	4,76%	6,24%	6,35%	6,19%	6,59%	6,83%	6,51%	6,71%	6,90%	7,30%	6,45%	5,91%	6,42%	12,81%
Stara Zagora	0,86%	3,29%	4,67%	6,32%	6,68%	6,64%	7,20%	6,75%	6,50%	6,90%	7,24%	7,52%	6,28%	5,69%	6,05%	11,44%
Dobrich	0,85%	3,30%	4,88%	6,77%	7,12%	6,60%	7,28%	7,29%	6,80%	6,95%	7,36%	7,66%	6,79%	5,37%	5,39%	9,59%
Targovishte	0,90%	3,61%	5,53%	6,95%	6,74%	6,58%	6,91%	7,15%	6,77%	6,71%	6,83%	6,99%	6,29%	5,59%	5,71%	10,74%
Haskovo	0,81%	3,09%	4,76%	6,19%	6,78%	6,31%	6,80%	6,44%	6,47%	7,07%	7,36%	7,05%	5,95%	5,69%	6,49%	12,74%
Shumen	0,94%	3,50%	5,38%	6,79%	7,24%	7,27%	7,35%	7,29%	6,62%	6,91%	6,77%	7,08%	6,15%	5,29%	5,48%	9,96%
Yambol	0,77%	3,33%	4,63%	6,46%	6,85%	5,81%	6,30%	6,15%	6,58%	6,87%	7,47%	7,43%	6,09%	6,08%	6,93%	12,25%
Source: NSI																

Age Distribution 1990 - 2001												
Groups by Age	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001
0 - 4 y.	6,26%	5,99%	5,68%	5,44%	5,17%	4,87%	4,68%	4,42%	4,23%	4,15%	4,19%	4,07%
5-9y.	6,54%	6,48%	6,39%	6,33%	6,26%	6,17%	5,97%	5,80%	5,57%	5,30%	5,01%	4,65%
10-14 y.	7,31%	7,13%	6,96%	6,82%	6,71%	6,62%	6,58%	6,53%	6,50%	6,43%	6,34%	6,25%
15-19y.	7,29%	7,39%	7,49%	7,57%	7,48%	7,38%	7,24%	7,11%	7,00%	6,89%	6,80%	6,78%
20-24y.	6,68%	6,87%	6,99%	7,01%	7,13%	7,26%	7,44%	7,64%	7,75%	7,67%	7,57%	7,21%
25-29y.	6,53%	6,38%	6,26%	6,36%	6,56%	6,75%	6,96%	7,12%	7,17%	7,30%	7,44%	7,32%
30-34y.	6,83%	6,74%	6,69%	6,65%	6,62%	6,54%	6,43%	6,37%	6,50%	6,71%	6,91%	6,98%
35-39y.	7,01%	7,05%	6,98%	6,92%	6,87%	6,83%	6,78%	6,79%	6,78%	6,75%	6,67%	6,54%
40-44y.	7,44%	7,34%	7,37%	7,30%	7,18%	7,02%	7,08%	7,04%	7,01%	6,97%	6,93%	6,92%
45-49y.	6,13%	6,44%	6,63%	6,88%	7,17%	7,43%	7,34%	7,37%	7,33%	7,22%	7,07%	7,16%
50-54y.	5,89%	5,80%	5,82%	5,85%	5,93%	6,05%	6,36%	6,55%	6,82%	7,12%	7,39%	7,37%
55-59y.	6,50%	6,49%	6,32%	6,11%	5,82%	5,72%	5,64%	5,65%	5,70%	5,79%	5,91%	6,34%
60-64y.	6,19%	6,08%	6,18%	6,17%	6,27%	6,18%	6,17%	5,97%	5,79%	5,53%	5,44%	5,48%
65-69y.	5,58%	5,70%	5,69%	5,74%	5,63%	5,62%	5,53%	5,64%	5,62%	5,74%	5,66%	5,77%
70-74y.	2,87%	3,34%	3,98%	4,40%	4,65%	4,74%	4,85%	4,82%	4,89%	4,81%	4,83%	4,81%
75-79y.	2,71%	2,49%	2,14%	2,07%	2,02%	2,21%	2,59%	3,02%	3,29%	3,50%	3,58%	3,76%
80 and over 80 y.	2,23%	2,29%	2,43%	2,37%	2,55%	2,60%	2,37%	2,15%	2,05%	2,13%	2,25%	2,58%

Table H4: Population Dynamics (Year-on-year)

Year	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002
Population Growth	-1,12%	-0,85%	-1,29%	-0,30%	-0,38%	-0,51%	-0,52%	-0,69%	-0,64%	-0,48%	-0,51%	-3,17%	-0,60%
Urban	-1,72%	-0,86%	-0,98%	-0,44%	0,10%	-0,28%	-0,71%	-0,66%	-0,36%	-0,29%	-0,18%	-1,53%	-0,41%
Rural	-1,92%	-1,24%	-1,26%	-1,52%	-1,24%	-0,79%	-0,10%	-0,48%	-1,30%	-1,13%	-1,16%	-6,00%	-2,53%
Source: NSI													
Population structure													
Year	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002
Urban	67,04%	67,12%	67,19%	67,43%	67,72%	67,83%	67,70%	67,66%	67,87%	68,05%	68,26%	69,26%	69,72%
Rural	32,96%	32,88%	32,81%	32,57%	32,28%	32,17%	32,30%	32,34%	32,13%	31,95%	31,74%	30,74%	30,28%
Reference: NSI													

Table H5: Population Dynamics by Regions

District	2000	2001
Vidin	-1,86%	-5,71%
Vratza	-0,98%	-4,41%
Montana	-1,39%	-3,91%
Veliko Tarnovo	-0,85%	-2,25%
Gabrovo	-0,76%	-6,20%
Lovech	-1,09%	-3,14%
Pleven	-1,37%	-1,89%
Ruse	-0,84%	-2,97%
Varna	-1,14%	6,47%
Dobrich	-0,59%	-4,51%
Razgrad	-0,59%	-7,30%
Silistra	-0,37%	-6,86%
Targovishte	-0,59%	-4,25%
Shumen	-0,44%	-4,57%
Burgas	-0,42%	-0,15%
Sliven	-0,47%	-4,19%
Yambol	-0,74%	-7,14%
Kurdzhali	0,10%	-18,23%
Pazardzhik	-0,44%	-1,00%
Plovdiv	-0,16%	-1,08%
Smolyan	-0,95%	-3,80%
Stara Zagora	-0,58%	-3,18%
Haskovo	-0,67%	-4,63%
Blagoevgrad	-0,35%	-0,68%
Kyustendil	-0,93%	-4,35%
Pernik	-1,01%	-1,90%
Sofia capital	0,88%	-3,25%
Sofia	-2,24%	6,05%

Note: Because of a new regional division data is available since 2000
Reference: National Statistical Institute (NSI)

Table H6: Main Demographic Indicators

Year	Marriage rate			Birth rate			Mortality			Natural increase			Infant mortality rate			Total fertility rate
	Total	Urban	Rural	Total	Urban	Rural	Total	Urban	Rural	Total	Urban	Rural	Total	Urban	Rural	
	per 1000															
1990	6,7	7,3	5,9	11,7	12,6	10,9	12,1	9,4	18,6	-0,4	3,2	-7,7	14,8	13,8	17,1	1,81
1991	5,4	6	4,8	10,7	11,3	10,7	12,3	9,8	18,7	-1,6	1,5	-8	16,9	16,4	18,1	1,65
1992	5,2	5,7	4,4	10,4	10,6	10,1	12,6	9,7	18,6	-2,2	0,9	-8,5	15,9	15,4	17	1,54
1993	4,7	5,2	3,8	10,0	10,2	9,5	12,9	10	19	-2,9	0,2	-9,5	15,5	14,9	16,9	1,46
1994	4,5	5	3,5	9,4	9,7	8,8	13,2	10,4	19,2	-3,8	-0,7	-10,4	16,3	15,2	18,9	1,37
1995	4,4	4,9	3,3	8,6	8,8	8	13,6	10,7	19,9	-5,0	-1,9	-11,9	14,8	14	16,7	1,23
1996	4,3	4,8	3,1	8,6	9	7,9	14,0	11,0	20,2	-5,4	-2	-12,3	15,6	14,8	17,5	1,24
1997	4,2	4,8	2,9	7,7	8,1	6,8	14,7	11,8	20,7	-7,0	-3,7	-13,9	17,5	15,7	22	1,09
1998	4,3	4,9	3	7,9	8,5	6,7	14,4	11,5	20,3	-6,4	-3	-13,6	14,43	12,9	18,5	1,11
1999	4,3	5,0	2,9	8,8	9,3	7,8	13,6	11,1	18,9	-4,8	-1,8	-11,1	14,62	13,40	17,60	1,23
2000	4,1	4,8	3,3	9,0	9,5	8,1	14,1	11,5	19,6	-5,1	-2	-11,5	13,3	12,4	15,5	1,27
2001	4,0	4,5	3,1	8,6	8,8	8	14,2	11,4	20,2	-5,6	-2,6	-12,2	14,4	12,9	18,2	1,24
2002	3,7	4,2	2,6	8,5	8,8	7,9	14,3	11,7	20,5	-5,8	-2,9	-12,6	13,2	11,9	16,6	1,23
Reference: NSI																