SIBIS

Bulgaria

Country Report No.1

No.1

Information Society
Technologies

European Commission

Preface

This report represents an important deliverable of the project 'Statistical Indicators Benchmarking the Information Society' (SIBIS), running from January 2001 to September 2003 and funded by the European Commission under the 'Information Society Technology' Programme. The overall goal of SIBIS is to develop and pilot indicators for monitoring progress towards the Information Society, taking account of the 'e-Europe action lines'. On this basis SIBIS focuses on nine topics of interest, i.e. Telecommunications and Access, Internet for R&D, Security and Trust, Education, Work-Employment and Skills, Social Inclusion, e-Commerce, e-Government and e- Health. This report is part of an extension of the SIBIS project 'SIBIS+: Statistical Indicators for Benchmarking the Information Society in the NAS: The eEurope+ Indicators'. The objective of SIBIS+ is to geographically expand the SIBIS activities from the EU Member States to the Newly Associated States.

Within this part of the SIBIS+ project a General Population Survey (GPS) was conducted in January 2003 on five of the nine topics: Telecommunications and Access, Social Inclusion, Education, Work-Employment and Skills and e-Government. Although limited in their scope, some questions have been asked for two other topics, Security and Trust and e-Commerce, as well. This report analyses the outcomes with respect to BULGARIA comparing it to the other NAS but also to EU-15 countries, Switzerland and the USA, for which the same survey was already carried out in 2002. The document has two main objectives, namely to be a support tool for views shared by experts in the area and, at the same time, to define indicators for quantifying some of the most critical indicators related to the five topics.

The report is organised in ten chapters. The first three chapters are designed to give the reader an idea of the main outcomes (Executive Summary) and the context (introduction to the country and the topics). The core of the report is the analysis of indicators, provided in chapters 4 to 9. Those chapters focus on an analysis of ICT infrastructure and security issues, e-society and social inclusion, the e-economy, e-education, e-work and e-government. Important findings are presented in the body of the document and additional data is shown in the annex.

The intended audience are policy makers and statistical offices at all levels (national, and supranational), industry leaders and researchers in the domains and those involved and interested in benchmarking the domains throughout Europe and the world. Those institutions should consider the questions and the subsequent indicators developed by SIBIS as an input for their yearly surveys. The project includes a series of workshops with such institutions in the countries represented by the SIBIS consortium. The report should also be of interest to the European Commission (in particular DG INFSO) and to government officials dealing with information society programs.

Within SIBIS+, another report (WP2) has been developed during 2002/2003. This report was aimed at setting the scene on the topics, identifying existing indicators for the several topics that already exist in BULGARIA and defining the gaps in the statistical coverage.

SIBIS is led by Empirica (Germany), and includes the following project partners: RAND Europe (The Netherlands), Technopolis Ltd. (United Kingdom), Databank Consulting (Italy), Danish Technological Institute (Denmark), Work Research Centre Ltd. (Ireland), Fachhochschule Solothurn Nordwestschweiz (Switzerland), University of Ljubljana (Slovenia), ASM Market Research and Analysis Centre (Poland), Budapest University of Economic Sciences and Public Administration (Hungary), Faculty of Management of the Comenius University Bratislava (Slovakia), "Dunarea de Jos" University (Romania), Institute of Economics at the Bulgarian Academy of Sciences (Bulgaria), Estonian Institute of Economics at Tallinn Technical University (Estonia), Social Policy Unit (Sozialinnen Politicus Group) (Lithuania), Computer Science Institute of the University of Latvia (Latvia), SC&C Ltd. Statistical Consultations and Computing (Czech Republic).

The SIBIS+ project offers an excellent opportunity for international comparisons as an extension of the SIBIS (Statistical Indicators: Benchmarking Information Society) project within Fifth Framework Programme, where extensive elaboration of contemporary indicators was performed. The indicators were first tested in 2002 for 15 EU countries (plus Switzerland and USA) in General Population Survey (GPS) and Decision Maker Survey (DMS). The survey of public R&D personnel was piloted in 2003. Within SIBIS+ project only GPS was performed in 10 NAS countries in early 2003. These countries are: Bulgaria, Czech Republic, Estonia, Hungary, Lithuania, Latvia, Poland, Romania, Slovakia and Romania.

The Bulgarian partner is the Institute of Economics at the Bulgarian Academy of Sciences. It is the oldest organization in economic sciences of authority, having a long history dating from the beginning of the 20th century when the Bulgarian Economic Society to the Bulgarian Academy of Sciences was established and later became the Institute of Economics to the Bulgarian Academy of Sciences in 1949.

The Institute has profound experience in researching economic developments during different periods of time being always oriented to the economic and social needs of the country. It can be maintain that the Institute is accepted within the economic society in Bulgaria as the National Economic Institution.

The Institute of Economics is a scientific unit within the system of Bulgarian Academy of Sciences, which under its statutes enjoys independence in the organization, fulfilment and popularisation of its activities. The Institute's activities are mainly directed towards the organization of theoretic and applied research guided by the national and international priorities.

The changes that have come in Bulgaria and in the world in the present decade determined the problematic orientation of the Institute's research work, directing them foremost to the transition to a market economy and EU enlargement.

The training of highly qualified staff is a long-lived tradition and represents important part of the Institute's activities. Some 40-45 doctorate-candidates have been trained annually at the Institute, almost half of them foreigners. In the Institute there is also Master Programs in Finance and Business Administration. At the moment there are 150 M.Sc. students.

The Institute has competent scientists. The scientific staff numbers 59: 47 senior research fellows, 8 doctors of economic sciences, and 49 holders of a doctor's degree (Ph.D.).

The Institute has established experience in cooperation with different institutions (Agencies, National Statistical Institute, Ministry of Finance, Labor Ministry, Ministry of Science and Education, etc.), managers of companies and non-government organizations.

The main research in the Institute of Economics is focused on problems of the national economy and the outcome is widely distributed not only in scientific journals, but to the wider audience of practitioner, to the whole population (by press conferences, article in newspapers, interviews of fellows, papers issued for the special purpose of deepening economic knowledge).

For more information about Institute of Economics or this document, please contact: Dr. Rossitsa Chobanova, Senior research fellow, e-mail: rossich@infotel.bg, Institute of economics, 3 Aksakov Str., 1040 , Sofia, Bulgaria1.

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CONTENTS

1. Executive summary

1.1 Specific framework for Information Society development in Bulgaria

The performance of information society development is nationally specific. It is defined by many factors like historical background, success in the transition to market economy, levels of macro and micro economic performance indicators, policy impact, traditions, etc.

Historical background

Until 1990, under the Council for Mutual Economic Assistance (CMEA) Bulgaria was the only country in Eastern Europe that specialised in high technologies. Three generations of Bulgarian professionals gained recognition in Western countries in the field of mainframes of 5th generation, high-speed matrix processors and parallel systems. In the established research and development institutes a number of groups were organized to work in the area of software development, firmware, system hardware, digital and analogue PC design, etc. In the past Bulgaria was called "the Silicon Valley of Eastern Europe" because of its strategic specialisation in high-tech and ICT products. After the political and economic changes in 1990, the powerful Bulgarian electronic industry lost many of its traditional markets and the production was dynamically restructured. The big state-owned electronic enterprises collapsed and at the same time a great number of small and flexible private companies appeared on the Bulgarian market. There are a large number of scientists in the business sector in Bulgaria, which are skilled in electronics and communications, as well as mechanical engineering[1].

Political framework for Information Society development in Bulgaria

In 2002 we can consider the first phase of transition process in Bulgaria as over, with the most important political and economic institutions re-established. Indeed, in its 2002 Opinion the Commission concluded that Bulgaria is a functioning market economy[2]. The main challenges now are to cope with the competitive pressure and market forces within European Union (EU) in the medium term. Innovation has to play a major role in meeting these challenges. This premise is supported by the fact that Bulgarian economy is going into its sixth year of stable conditions, having established a satisfactory track record of macroeconomic performance.

Despite being the leading in the past and still keeping high level in education of specialists in Information and Communication Technologies (ICT), the position of Bulgaria generally moved bellow of EU-15 and NAS –10 average of IST benchmark. There are too many reasons for this state of the art. The major among them are defined by the lack of demand (and connected investments), specific to previous periods, and leading to high levels of brain drain of ICT specialists.

The **development of communications and high technologies** is one of the pillars for sustainable economic growth in the country. The strategic objectives in this respect are:

- Promote investments in the ICT sector and development of R&D networks;
- Create a competitive, export-oriented software industry;
- Capitalize on Bulgarian strong educational traditions;
- Encourage the small and medium enterprises in the ICT sector;
- Encourage young graduates to start their own businesses in Bulgaria.

But the achievements in IS development in the country are not sufficient on its early stage.

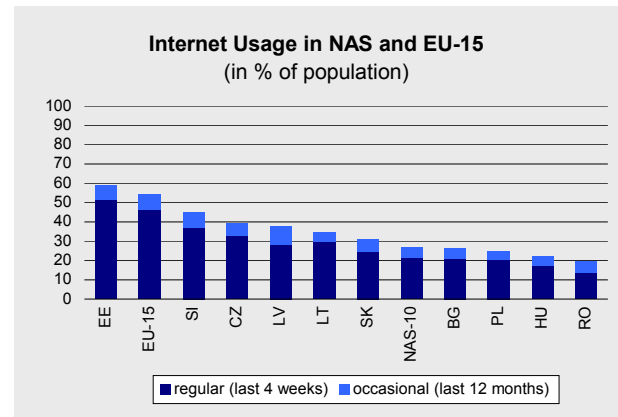[1] Statistical Yearbook, Bulgaria, 2001
[2] See: Report of the European Commission on the progress towards accession by each of candidate countries, Brussels, 09.10.2002, SEC/2002/1400-1412

1.2 Key findings of the SIBIS+ for Bulgaria

The SIBIS + GPS (January 2003) confirmed a general lag in Information society development in Bulgaria, and helped to identify some potentials for catching-up in the future. Following the SIBIS+ methodology key findings are defined in five topics.

1.2.1.Telecommunications and access

This is a topic area, which underpinned the advancement in the Information society. The country is approximately well performed in Internet usage comparatively to other NAS countries, but still lag from EU. The low level of PC penetrations is among the major constraints to faster Internet growth. New computers cannot compensate the depreciation of older machines. The high-bandwidth, multi platform ideal access environment is still very far away in Bulgaria. Information and communication technologies uptake is still unevenly distributed across various subgroups of population.

Internet Usage in NAS and EU-15
(in % of population)

regular (last 4 weeks)   occasional (last 12 months)

The approximately well developed fixed network and high rate of mobile subscribers are a solid precondition for the development of Internet services and wireless applications. According to the GPS survey results the basic access to telecommunication networks is well performed in Bulgaria in fixed telephones and faxes. But the level of access and usage of mobile phones is approximately low comparatively to the levels of NAS-10.

Internet users in Bulgaria are 267 out of 1000 (264.12 weighted), which number is higher than in Hungary, Poland, and Romania. The country's level is lower than the best-performed NAS countries according to this indicator such as Estonia (591.23 – w.), or Slovenia. In % the Internet users are 26.7% of the population in Bulgaria in January 2003. Some positive expectations may take place, as this level is twice higher than a year ago (taking into account results of Vitosha research survey in January, 2002 which says that 12.2% of population aged 18+ are Internet users, which is tripled since early 2000). The rate of increasing Internet users in the country is fast and it will be accelerated as mostly young people use the Internet. Age structure of Internet users is: half of those having access to a PC and the Internet are aged 18 to 30, and about ¼ fall in the 31-40 age group. There is a very large group of Internet users in the country, who are younger then the age group of 18. The number of PC users is expected to grow substantially over the next few years due to the wider Internet penetration among young people.

1.2.2. Citizens' inclusion into IS development (access to and use of Internet)

It is the main social policy concern of e-society development. Bulgaria has potential, which is not effectively used for citizen's inclusion in IS development in the country. The potential is connected with long – term traditions in hi-quality education in ICT. There are 47 Universities, located in 26 cities and towns. Around 50% of them have computer specialties. **Over 6,000 Bulgarian students** are currently majoring in Computer Science; another 5,000 have chosen electric engineering, mathematics, physics and biotechnology. The external evaluation of quality of the education in Bulgaria would be summarised as follow: the secondary education is among the best in the world: 5th in the world in sciences, 11th in mathematics (World Bank and The Economist ranking); Bulgarians rank second in international IQ tests (MENSA International); they are among the top university students worldwide (2nd in the world in SAT scores). Developed by education potential for citizen's inclusion in IS development is realised mainly in IT branch. The Global IT IQ Report of March

2002 of Brainbench Inc. ranks Bulgaria (with 8,844 Certified Professionals) at eight place among the top 10 countries as to the number of certified IT professionals. According to the same report, in Europe, Bulgaria places a strong third with over 6,800 certifications. Romania takes a surprising lead over its continental countries, earning more than 16,000 certifications in 2001, which outpaces the United Kingdom in the number-two spot, while Germany and Latvia are in a virtual dead heat for fourth[3]. The ICT Development Agency is committed to stimulate and actively establish Bulgaria as a leading European ICT Research and Development centre.

In spite of potential, availability of professionals and political efforts, the citizen's inclusion in IS development in Bulgaria is low. In January 2003 the level of participation in lifelong learning in % of labour force is 5.06%, which is higher than Romania only. In comparison the leaders (Finland and the US) have levels of over 37%. The participation in any learning during the four weeks previous to the survey, in % of labour force is the lowest in Europe – 7.56%, and far away from the leader – Finland with 59.86%. The level of self-directed learning in % of labour force in the lowest among countries – 5.51%, which is about 8 -9 times less then leaders such as Germany - 51.73%, Austria – 47.6%, and Finland – 44.45%. The total (online and offline) usage of e-Learning as a percentage of labour force is lowest among countries – 3.17%, included in SIBIS+ General Population Survey. But the level of on-line usage of e-learning in Bulgaria is higher then in Greece and Poland. This picture is corresponding to the level of penetration of computers at schools and training provided by companies in Bulgaria. A lack of necessary financial resources is the main reason not to be launched plans for education according to 45.7% of managers in the companies.

1.2.3. e-economy and e-commerce

The state of the art of e-economy and e-commerce implementation in the country has sharply changed for the last year, but its level is still low. Compared to all surveyed countries Bulgaria is positioned in the middle in percentage of e-commerce users among NAS-10.

According to the Information Society Index, which rates 55 countries, comprising 96% of World GDP and 99% of World's expenditure, Bulgaria falls in the Sprinter Group (where investments surge and retreat on the whims of social, political, and economic change), together with countries like the Czech Republic, Poland and Hungary.

The potential for e-economy and e-commerce implementation in Bulgaria is connected with traditions and experience in the IT sector and well-structured private companies, which cover almost the whole spectrum of IT applications. According to research of the IDG group, the **yearly growth of the IT sector in Bulgaria is about 35%.** IT spending for 2001 is about USD 188.4 million and estimated total revenues will be around USD 270 million. There are **more than one thousand** IT small and medium sized enterprises in Bulgaria now. The software companies cover almost the whole spectrum of software applications from Enterprise Resource Planning to CAD/CAM/CAE. Working for a number of big corporate clients in Western Europe and the US has proved that Bulgarians are able to develop design work, maintenance and testing as well as fully integrated systems and solutions. Customers of Bulgarian firms include Canadian government agencies such as the Department of Transport, Department of Environment and others, as well as global blue chip firms such as: BMW, Boeing, Ford, Lockheed Martin, Nortel, Hasbro, Siemens, Pricewaterhouse Coopers, Xerox and Telesis Technologies. More than 7 000 IT professionals are working in small ICT companies. The forthcoming challenge is how to use effectively such potential for e-economy and e-commerce implementation.

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[3] Source: Global IT IQ Report of March 2002 of Brainbench, Inc.

1.2.4. e-Work

The recent use of ICT leads to possibilities for 'multi-locational eWork' – that is, working from more than one location while staying connected to the company and work colleagues. In January 2003 the interest in telework (current teleworkers in % of employed population) is high in Bulgaria. It is higher than EU-15 average and NAS-10 average. This interest could be explained with relatively high share of ICT specialists[4], but it is not directly connected with the ICT skills requirements for jobs in national companies. The feasibility of teleworking is estimated as less than 10%. In comparison with other countries – the feasibility of teleworking in NAS – 10 is almost 15% and for EU-15 – more then 30%. It may be concluded that the existing working places in Bulgaria do not suggest enough opportunities to meet interest of employees in and potential for teleworking.

1.2.5. e-Government

According to 'Global e-Government survey 2001', World Market Research Centre, Bulgaria occupies 40th position in 169 countries. This is a good staring position for implementation of e-government strategy in the country as an integrated part of e-Europe 2005. According to the action plan proposed more then ½ of the population 18+ to use e-government services in 5 years period. Several times the costs and the time needed for e-government services have to be reduced. The main achievements in e-government introduction are connected with services Government to Citizen (GtC) and Government to Business (GtB).[5] Over 90% of central government agencies and public institutions have websites. The number of websites is of about 150 in 2002. In the beginning of 2002 on average[6] 20% of computers in public administration have access to the Internet. There is a differentiation in levels of access to computers with Internet connection between central and local Government administration bodies. More concretely 80-100% of computers in regional administrations, 70-80% of ministries, and less then 20% of local administrations are connected to the Internet. Most government websites are not yet interactive and do not allow for e-payments or electronic submissions of forms.

But, as GPS has said, the level of preference, availability, and usage of e-government in Bulgaria is low in tax declaration, requests for personal documents, car registration, declaration to the police, search for books in public libraries, and announcement of the change of address. Job search service is rather popular for on-line usage. In general, citizens are not very willing to use Internet, but for those citizens who prefer to use the Internet the awareness of availability and usage of the on-line services is relatively high.

1.3 Conclusions

The SIBIS added value to the state-of-the-art in Bulgaria is the implementation of the new methodology, including new statistical indicators for monitoring IS development. The SIBIS+ data confirms the specific pattern of the IST development in the country. With the rapid developments in 80s Bulgaria slowed down in 90s. The GPS confirmed a general lag in Information society development in Bulgaria. The country strengths now are defined by traditionally high interest for ICT services and developments. They result from the level of supply of educated and skilled personnel, and developed competencies of small and medium sized IT companies covering almost the whole spectrum of software applications from Enterprise resource Planning to CAD/CAM/CAE.
But the interests/potentials are not sufficient for better performance in IS development in the country. The constraints are connected with low level of on-line preference of interacting with

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[4]DG Enterprise. Innovation policy profile. Bulgaria. March, 2003, www.cordis.lu
[5] Information society, 2002, ½, p. 03
[6] See: Bulgaria. E-Readiness Assessment 2001, www.arc.online.bg

government services, low level of e-learning, low level of searching of heath-related information online. This can be observed through the disintegrated governmental web presence, limited offer of G2C services, insufficient support for ICT in schools and the absence of additional stimulating measures (restricted domain registration, lack of tax support for household PC purchase).

At the end we may conclude, that fulfilment of ambitious political goals connected with effective usage of available potentials for IS development in Bulgaria is real if coordinated efforts with EU and other European countries take place. Developing of measures, based on reliable data is a precondition for developing efficient policy. SIBIS+ project is an effective attempt in this direction.

2. Introduction

2.1 Background

Statistical Indicators Benchmarking the Information Society (SIBIS) is a project funded under the 'Information Society Programme' of the European Commission (IST-2000-26276). SIBIS, which runs from January 2001 to September 2003, has taken up the challenge of developing innovative information society indicators to take account of the rapidly changing nature of modern societies and to enable the benchmarking of progress in European Union (EU) Member States. The indicators have been tested and piloted in a representative survey held in 2002 in all EU Member States, Switzerland and the United States. As a result, nine Topic Reports assessing the current state of the European information society and benchmarking individual countries have been published in 2003. The topics covered by SIBIS include: *telecommunications and access, Internet for research and development, security and trust, education, work- employment and skills, social inclusion, e-Commerce, e-Government and e-Health*.

In 2003 the SIBIS project has been extended with the SIBIS+ initiative. The objective of SIBIS+ is to geographically expand the SIBIS activities from the EU Member States to the following Newly Associated States (NAS): Slovenia, Poland, Slovakia, Hungary, Czech Republic, Bulgaria, Romania, Estonia, Lithuania, Latvia. This parallels the extension of eEurope to eEurope+, an Action Plan by and for the candidate countries.

This report analyses the results of the surveys conducted in the ten NAS countries in 2003. In order to produce comparable results, the survey questions have been extracted from the surveys conducted in the EU member states in 2002.

2.2 Country and Topic Areas

National topic report presents an overview of contemporary and most comprehensive indicators of Information Society (IS) for all EU countries and Newly Associated States (NAS). The analysis of indicators presented will contribute to the positioning of Bulgaria in EU and NAS with regard to the IS. Accordingly, since the main target audiences are policy makers and NSI's (National Statistical Institutes), the report seeks to have an impact on both, the making of policies and the development of official IS statistics.

Five key topics are covered in the report: telecommunication and access; e-education; e-work/ skills/ employment; social inclusion, and e-Government. The main reasons for selecting these topics include their high level topical relevance for the NAS, high ranking on the political agenda in the EU and the countries themselves, and the good coverage of indicators for these topics in the General Population Survey (GPS). Beside that the topic of e-economy and e-work are analysed as interesting for Bulgaria.

Telecommunication and Access

The topic of telecommunication and access is a physical core stone of the information society and is both wide range and 'horizontal' in nature. In many ways the topic can be considered as the fundamental 'enabler' – it allows the other e-Europe domains to 'happen'. 'Access' is another loose defined topic. It can be defined formally as 'the ability to retrieve data, graphics, sound, text etc. while on-line'. Translated into the context of eEurope, this topic covers wide range of devices by which users access electronic 'information' – e.g. computers, telephones, multimedia kiosks, televisions and other hybrid devices. In Bulgaria the National Statistical Institute (covering periods, longer then 10 years) provides some indicators. Agencies like Vitosha research, Information Society Project Office and others, produce indicators as well. The results of the research are published in 'Information Society'

and on-line regularly since 2000. Some leaflets (mainly for the purposes of Internet and IT exhibitions) are produced regularly as well.

Education

In the SIBIS context education is understood as a formally institutionalised process of knowledge transfer and knowledge development, as opposed to informal learning arrangements taking place through various community of practice arrangements, on-the-job training and peer learning. At present stage Bulgaria is performing continuous measurements of the development of ICT infrastructure in educational system by the Ministry of education and science.

Work/skills/employment

For the third topic, skills are defined as the 'learned power of doing something competently'. Work is defined here as aimed productive activity, and the structure of employment refers in particular to the sectoral and occupational distribution of employment, as well as unemployment and labour force participation. This topic has some coverage in the Statistical Yearbook of Bulgaria. Dome indicators are available from survey agencies.

e-Society and social inclusion

Social inclusion is inextricably linked to the issues of (accessing and maintaining) employment, education, housing and healthcare. At the same time, these issues / phenomena provide the basis for more tangible indicators for measuring inclusion. Against this background there has been a predisposition to view divisions in relation to the Information society as being just an extension of divisions from 'pre-Information Society'. This requires a multi-perspective view that includes attention to differential levels of access (to the ICTs) across various subgroups of population whilst also looking at issues such as 'unpacking' of the very concept of access. The measurement of social inclusion in though included within other areas, which is true also for Bulgaria. Most data can be found in the reports of surveys, provided by different sociological agencies in Bulgaria, mainly Vitosha research on this stage, and some NGOs, like Centre for economic development.

e-Government

E-government designates any transaction that involves the government and that is carried out, even partly, using electronic means. E-government plays an important role in mediating government actions, which will continue to grow as communication technologies become widespread. Already, communication technologies change the way that government operates by facilitating information dissemination, communications and transactions. As e-government in Bulgaria is slowly evolving, the indicator coverage is limited. The most focused research in e-government has been done by agencies, like Vitosha research, and publicised by 'Information society' magazine.

The coverage of IS indicators in Bulgaria is good and in many cases comparable to EU. With recent policy efforts, which bring impetuses for the acceleration of all areas of IS, Bulgaria is in its best way to re-change the Bulgarian position once again. However, since the ICT phenomena and consequently IS itself are changing rapidly, it is of great importance to asses those changes. On the other hand it brings the challenge for researchers to determine the gaps in present indicator coverage. In this account the issues are scientific and place emphasis on the methodology of the research and on the validity of the data. On the other hand, it brings challenge to policy makers, as the policies have to embrace all the phenomena of contemporary society. SIBIS project addresses both the scientific and policy challenges. Indicators presented in the report will serve as benchmarks of IS and pilots for

further methodological elaboration. On this behalf the collaboration of practitioners in the field is highly welcome. Further more, since IS benchmarks are high on policy agenda due to their comparison value, presented indicators will provide added value by enabling IS in Bulgaria to be compared with EU / NAS countries.

2.3 Overview of the Report

The report is based mainly on SIBIS / SIBIS+ surveys conducted in 2002 (SIBIS) and 2003 (SIBIS+). The topic related to IS issues are presented and analysed: ICT infrastructure and access; e-society and social inclusion; e-education and life – long learning; e-economy and e-commerce; e-work; e-government. The first topic contains analysis of relevant indicators on Telecommunications, Access and Usage of ICT (use of e-mail, internet access and use, methods of Internet access, effects of Internet use, barriers to using the Internet, access to mobile phone, effects of mobile phone use, internet prices/affordability (OECD statistics), network access (telephone lines, ISPs, bandwidth) as well as analysis of indicators such as security concerns, reporting of security violations and security-related awareness and behaviour. Second topic focuses on analysis of all relevant results on social inclusion and some cross-analysis, such as combining results on Internet users by socio-economic characteristics like Internet use by place of access is carried out. The third topic, e-Education and Life-long-learning focuses on relevant indicators on Education and Skills. It contains analysis of indicators like computers at schools and universities (data from national/other sources), company-provided training, training provided by other organisations, self-directed learning, modes of training (use of eLearning). The e-economy and e-Commerce chapter contains analysis of all relevant indicators like on-line activities and barriers to buying online. E-work and Employment part of the report presents analysis of indicators like home-based telework, intensity of home-based teleworking, interest in telework, perceived feasibility, mobile work (Intensity), mobile telework, co-operation with external contacts using ICTs, etc. The e-Government part contains analysis of indicators like preference for e-Government services, e-Government experience and barriers to e-Government.

3. General Information about the Country

This chapter provides some general information for Bulgaria, stressing attention to the achieved success in transition process. After that the focus is on data on international ratings and IS policy development analysis.

Table 1 General information for Bulgaria

Area	110,993.6 square km	
Population	7.9 million	
Exchange rate	1 BGN = 0.511249€[7]	
Economy	**2000**	**2001**[8]
- GDP growth	**5.8%**	4.0%[9]
- Inflation	11.3%	4.8%
- Unemployment rate	16.2%[10]	19.5%[11]

The country is placed in the south-eastern part of Europe. As of January 2001, the population of the Republic of Bulgaria was 7.9 million. By 2002, the first phase of transition process in Bulgaria can be considered as over; with the most important political and economic institutions re-established. Indeed, in its 2002 Opinion the Commission concluded that Bulgaria is a functioning market economy[12]. The main challenges now are to cope with the competitive pressure and market forces within European Union (EU) in the medium term. Innovation has to play a major role in meeting these challenges. This premise is supported by the fact that Bulgarian economy is going into its sixth year of stable conditions, having established a satisfactory track record of macroeconomic performance.

Overall, the recent progress of economic transition in Bulgaria[13], is characterised by the following:

- Functioning market economy;

- High level of macroeconomic stability;

- Sufficiently working market mechanisms, which allow for a better allocation of resources;

- Good progress in structural reforms, especially as regards procedures for market entry, the restructuring of the financial sector and privatisation, thus setting the microeconomic basis for a process of sustained growth.

For the period after 1990 this is the sixth year when the GDP has a positive growth rate. According to the EC estimations the real growth of GDP for 2003 will be 4.5% and 5% for 2004. [14]

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[7] The Law fixes this exchange rate. Bulgaria has introduced the currency board regime 0n 5th of July, 1997, when Bulgarian Lev was fixed to German Mark and when the Euro was introduced – to Euro.
[8] Ideally we get figures for 2001 and 2002
[9] National Statistical Institute (2002), Bulgaria 2001, Sofia
[10] EUROSTAT, Statistical yearbook on candidate and south-east European countries, 1996-2000
[11] National Statistical Institute(2002), Bulgaria 2001, Sofia
[12] See: Report of the European Commission on the progress towards accession by each of candidate countries, Brussels, 09.10.2002, SEC/2002/1400-1412
[13] See: previous source, and Report of the European Commission on the progress towards accession by each of candidate countries" (Brussels, 13.11.2001, SEC/2001/1744-1753).
[14] EC, http://europa.eu.int/comm/economy_finance/index_en.htm

But GDP per capita remains among the lowest in the Candidate Countries at only 24 % of EU average in 2000, limiting significantly the potential demand for new innovative products and services at national level.

The inflation in the country is not high and is a positive factor for development of the national economy. Partly it is due to the introduction of the currency board in July 1997 (see footnote 7). But the hyperinflation shock at the beginning of 1997 has affected negatively innovation activities in the country. More specifically, business R&D expenditures, for the period 1995–1999 decreased from approximately half to one fifth total R&D expenditures. Decreasing inflation since 2000 provides new opportunities, but the level is still relatively high comparatively to the level of inflation in1998. The average inflation rate for the period 1997-2001 was 9.8 %, which is very high; however Hungary with 12.4 %, Poland with 9.9%, Romania with 46.3% and Turkey with 69.9% are all worse placed. According to the EU expectations the inflation will be 4.5% at the end of 2003 and 4.0% at the end of 2004 in Bulgaria[15].

The general government budget balance stood at 1.7% % of GDP in 2001 and was the only positive one among the NAS. This is a positive characteristic of macroeconomic performance however government budget restriction may be at the expense of being able to develop a more pro-active government policy.

Unemployment is a major concern with Bulgaria having the highest rate amongst the NAS countries in 2001 at 19.7% of labour force. The unemployment rate was 3.7% higher compared to June 1995. The unemployment rates were considerably lower for groups with higher education level – 7.9% for 'Bachelor', 'Master' and 'Doctor' degrees. Such high levels of unemployment are a drag on productivity and suggest a significant waste in terms of the human capital potential. According to EU the growth of employment will be 1.5% in 2003 and 2.0% in 2004.[16]

State of the art of Information society development in Bulgaria

The state of the art if IS development would be assessed by some publicly available indexes.[17] According to available data the recent state of the art of information society (IS) development in the country would be summarised as good. The country best performance is in IT IQ ranking – 8th of 100.

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[15] the same

[16] as above

[17] For example: Technology achievement index (TAI) measures achievements, not potential, effort or inputs. It is not a measure of which the country is leading in global technological development, but focuses on how well the country as whole is participating in creating and using technology. The TAI focuses on four dimensions of technology capacity that are important for reaping the benefits from the network age:

-      Creation of technology refers to the number of patents granted per capita, and receipts of royalty and license fees from abroad per capita;

-      Diffusion of recent innovations refers to the diffusion of the Internet and to the exports of high-tech and medium – technology products as share of all exports

-      Diffusion of old innovations refers to penetration of telephones and electricity. Both indicators are expressed as logarithms and capped at the average OECD level

-      Human skills refers to a mean years of schooling and gross enrolment ratio of tertiary students enrolled in science, mathematics and engineering (for more info. On TAI see http://www.undp.org/hdr2001/techindex.pdf)

The Network readiness Index (NRI) is defined as the degree to which a community is prepared to participate in the Networked World as well as community potential to participate in the Networked World in the future (see http://cid.harvard.edu/cr/pdf/gitrr2002 _ch02.pdf)

Table 2 Ratings of IS development in Bulgaria

Index	Rank	Source
Information Society Index 2000	34 of 55 countries	IDC
Information and Communication Index 2001	50 of 75 countries	WEF
Technological Achievement Index (TAI) 2001	28 of 72 countries	UNDP
Global IT IQ ranking 2002	8 of 100 countries	Brainbench
E-readiness ranking 2001	48 of 60 countries; (score: 3.38 out of 10)	Economist Intelligence Unit and Pyramid Research
Network Readiness Index (NRI) 2001-2002	53 of 75 countries (score: 3.38 out of 10)	Center for International Development, Harvard University

Index	WWW	Source
Information Society Index 2000 or later	http://www.worldpaper.com/2002/feb02/isi.jpg	IDC
Networked Readiness Index 2002-2003	http://www.weforum.org/pdf/Global_Competitiveness_Reports/Reports/GITR_2002_2003/GITR_Rankings.pdf http://www.cid.harvard.edu/cr/profiles.html http://www.cid.harvard.edu/cr/pdf/gitrr2002_ch02.pdf	World Economic Forum
Technological Achievement Index 2001 or later	http://www.undp.org/hdr2001/techindex.pdf http://www.undp.org/hdr2001/popupmap.html	UNDP
Global IT IQ ranking 2002	-/-	Brainbench
E-readiness ranking 2001 or later	http://www-1.ibm.com/services/strategy/files/IBM_Consulting_The_2002_e_readiness_rankings.pdf	Economist Intelligence Unit and Pyramid Research

State of the art of IS policy development in Bulgaria

The adopted in 1999 **Strategy for Information Society development in the Republic of Bulgaria[18]** defines the national priorities for the transition to the IS at legislative, technological, economical and social levels, and outlines the basic related activities. The target is to develop a more democratic, accountable and inclusive information society using information and communication technologies. Some of the initiatives aimed at improving the level of diffusion and uptake of ICTs in the economy chronologically are as follow:

1. National strategy for education in ICT. (1998). Programme (1999) **.** Objective: Improving education in ICT. In May, 2000 all requirements to the teaching programmes have been published.

2. National strategy for Information society development. Objectives to be achieved are: open IS infrastructure; implementation of new ICT in management, economy, education, culture and healthcare, national security and ecology; development of ICT sector as a leading sector in Bulgarian economy; improving quality of ICT human resources. (September, 1999).

3. National strategy for hi-tech development in Bulgaria. Tasks: to develop dynamic hi-tech sector, which will improve the competitiveness of Bulgarian economy (December, 1999).

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[18] National Strategy for Information Society Development, adopted by the Government in 1999, updated in 2002. Source: www.mtc.government.bg

4. Project for a Law for hi-tech parks and hi-tech activities. Passed the first reading in the Parliament in 2000.

5. National strategy for eGovernment – project, 2002.

6. Establishment of 2 new agencies to coordinate IS development in Bulgaria – Agency 'Development of ICT'[19] and Coordination centre on information, communication and management technologies in 2002[20].

7. The initiative eEurope+.
The plan for 2005 intends every pupil in secondary school in Bulgaria to posses 'electronic literacy' and 100% of schools, universities and institutes to have good access to Internet. During the period 2002-2003 for both - educational programme and network development programme - a budget of between €25 and €45 million (minimum and optimum) is required. The period 2003 - 2005 requires between €29 million (minimum) and €44 million (optimum - including replacement of depreciated computers in the schools) [21].

The above policy is on its early stage of implementation, as the GPS results suggest.

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[19] www.ict.bg
[20] www.ccit.government.bg
[21] www.arc.online.bg

4. ICT Infrastructure and Security

The topic of telecommunications is a physical cornerstone of the information society and is both wide-ranging and 'horizontal' in nature. In many ways the topic can be considered as the fundamental 'enabler' – it allows the other e-Europe domains to 'happen'. Telecommunications and access does not stop with infrastructure, there are already great changes and innovations taking place in accessing Internet technologies, mobile telephony, multimedia and other emerging technologies, all of which contribute to the current state-of-play in Europe.

For the purposes of indicator development in SIBIS the term 'telecommunications' has been interpreted very broadly to include all the networks (cable, data, sound, image) is carried. So, although the main focus is on telephony networks computer networks and Internet, the cable (TV as well as telephony), and wireless forms of transmission are also included. Overall, a more accurate descriptor in these circumstances would be 'communication networks'. 'Access' is another loose defined topic. It can be defined formally as 'the ability to retrieve data, graphics, sound, text etc. whether on-line'. Translated into eEurope, this topic covers the wide range of devices by which users access electronic 'information' – e.g. computers, telephones, multimedia kiosks, televisions, and other hybrid devices. Only few of these types of access are subjects of the recent analysis. The investigation and indicator development here focuses mainly on issues of access and usage, which at their most basic can be described in a binary form. Firstly, users either have access to a particular service or not. Secondary, there are also a potentially limited number of ways in which services can be used. The study does not expand to examine the technical quality or perceived value of such services. For example, it does not attempt to analyse the percentage of time a connection to the Internet working at 100% of its capacity, which is a very important characteristic, affecting productivity in different countries. A large number of innovative telecommunications and access indicators were identified within the work of the SIBIS project, but only few of them – more basic, were piloted in the SIBIS+ survey of NAS – 10 (Bulgaria, Czech republic, Estonia, Hungary, Lithuania, Latvia, Poland, Romania, Slovakia, and Slovenia) in order to provide a better context for the latter.

This part of the report is aimed to describe the national context of ICT development and access to IS as policy and sate of the art, according to existing statistical data, and GPS.

4.1 Telecommunications and Access

After presenting the national policy context of telecommunications and access this chapter focuses on analyses of relevant indicators on use of computers, use of e-mail, Internet access and use, methods of Internet access, effects of Internet use, access to mobile phone and effects of mobile phone use. Besides the latest figures from SIBIS GPS – NAS survey (module A) it presents also some of the time series data from other sources identified in WP2 Bulgaria.

Policy aspects:

ICT is a priority sector and **development of communications and high technologies** is one of the pillars for sustainable economic growth according to the program of the government. The strategic objectives are as follow:

- Promote investments in the ICT sector and the development of R&D networks;
- Create a competitive, export-oriented software industry;
- Capitalize on Bulgarian strong educational traditions;
- Encourage the small and medium enterprises in the ICT sector;

- Encourage young graduates to start their own businesses in Bulgaria.

By setting up research and development centres in the country, capable of working from a distance on large corporate projects around the globe, the emigration will be reduced. To facilitate the implementation of the Program the **ICT Development Agency** was established to support the investments in communications and information technology projects, as well as scientific research studies, university research and development programs and marketing the Bulgarian ICT sector. In 2002 the agency invested up to **2m EUR** in ICT projects. Among its priority areas lay the implementation of ICT in higher education and research areas, liberalisation of radio spectrum for civil needs, promotion of Bulgarian ICT human potential and innovation efforts worldwide as well as encouraging ICT penetration in every aspect of social and economic life.

Internet and Services

The support of the Government for the development of the Internet is focused in three directions:

- **Establishment of appropriate legal and regulatory environment of the Internet and services;**

To be in line with the new technologies and market requirements, a Law on electronic document and electronic signature was adopted in March 2001. It sets the framework for the use of electronic documents and electronic signatures, as well as the procedures and conditions for providing certification services. A Law on Personal Data Protection is prepared to provide a general framework for protection of individuals with regard to personal data processing. In order to stimulate the development of high technologies in the country and the flow of foreign investment in the high tech productions and services, a High Tech Parks Act was submitted to the National Assembly. Currently the Internet is not formally regulated and does not require licensing, nor registration. The free regime for Internet services has led to a dynamic expansion of Internet Service Providers (ISPs) and great reduction of prices. Around a dozen big and more than 200 small ISPs are currently operating in the country.

- **Supporting the development of the telecommunications infrastructure and building up of ATM backbone network;**

A highly reliable high-speed backbone, based on ATM technologies, has been established for exchange of information between the administrations in view of the e-Government targets and the ongoing initiative for complete on-line transfer of the administrative management through ICT implementation on a national level. The Bulgarian Telecommunication Company has started the building up of high-speed backbone for Internet and multimedia. The well developed fixed network (telephone density 36%) and the high rate of growth of the mobile subscribers (more than 1,600,000 for a period of 9 years) are a solid precondition for the future development of Internet services and wireless applications. The building of a new telecommunication infrastructure on the basis of advanced digital technologies is one of the main priorities for the incumbent operator. The Bulgarian Telecom plans to invest intensively and to reach a 60% digitalisation by 2005.

The market of mobile telephone services is undergoing a rapid development. There are three mobile operators on the market - one analogue NMT-450i (Mobikom) and two GSM operators (Mobiltel and Globul) using frequencies in the 900 MHz and 1800 MHz range. The market shares of the operators (in number of subscribers) as of the end of 2001 amount to 78% for Mobiltel and 12% of Mobikom. The second GSM operator (Globul) has been in operation since September 2001 and its market share is 10%.

The frequency bands for the Universal Mobile Telecommunication System (UMTS) (a total of 230 MHz) are not yet released in Bulgaria. A time-schedule for a phased release of

frequency bands for UMTS is currently in preparation. As a first priority, frequency blocks of a minimum of 2x10 MHz in the frequency bands 1920-1980 MHz and 2110-2170 MHz should be available by mid-2003. Thereafter, the issues of the licensing method (tender or contest) and the number of 3G operators (two or three) will be resolved, so that the licenses to be awarded by the middle of 2004.

- **Supporting the investment process.**

The state is currently one of the most important investors in this area. At the same time it plays a leading role in the process of attracting foreign investors and the establishment of venture capital funds. As a result, a modern digital transit and international telecommunication infrastructure, in addition to the traditionally high level of skilled personnel in ICT, has been constructed in order to create conditions for the stable Internet Industry growth. However, the insufficient level of investments – both – private and public ones, at present is still a restraining factor to the creation of competitive IT products and there is a potential for all foreign investors willing to take substantial share of the future European IT market. Having in mind the overall development of Bulgaria's EU accession process, it is now the time to invest in ICT R&D innovation facilities in order to create a critical mass of competitive products and advanced information services till year 2006.

Bulgaria's long-term ICT strategy is not focused on the current market development and nearest reality, but rather on the advanced technologies and products that will be market leaders in 5-6 years. Educating the most perspective human potential to catch up with the cutting-edge technologies and predict the future trends requires more or less massive and coordinated efforts on behalf of the universities, companies and Bulgarian institutions.

In the e-commerce area Internet accessible virtual shops have been established. The number of on-line transactions, however, is still small, with consumers still preferring cash payments according to the GPS. Although, the opportunity to make business transactions on the Internet is available through the ePay.bg electronic environment and its use increases with stable rates. A second e-payment system - BGPay.bg - was launched in mid-2000. Another new service of on-line payments by prepaid cards, called Net-Card, is rapidly gaining popularity. About 3,000 users have registered for this service in just 3-4 months.

Nevertheless the above political efforts in the country are not sufficient for better access to electronic information.

Basic access to electronic information in Bulgaria

The level of basic access to electronic information has defined the potential for information society development in any country. Indicators describing at home access to telephone and fax, ownership of mobile phone and PC usage define it.
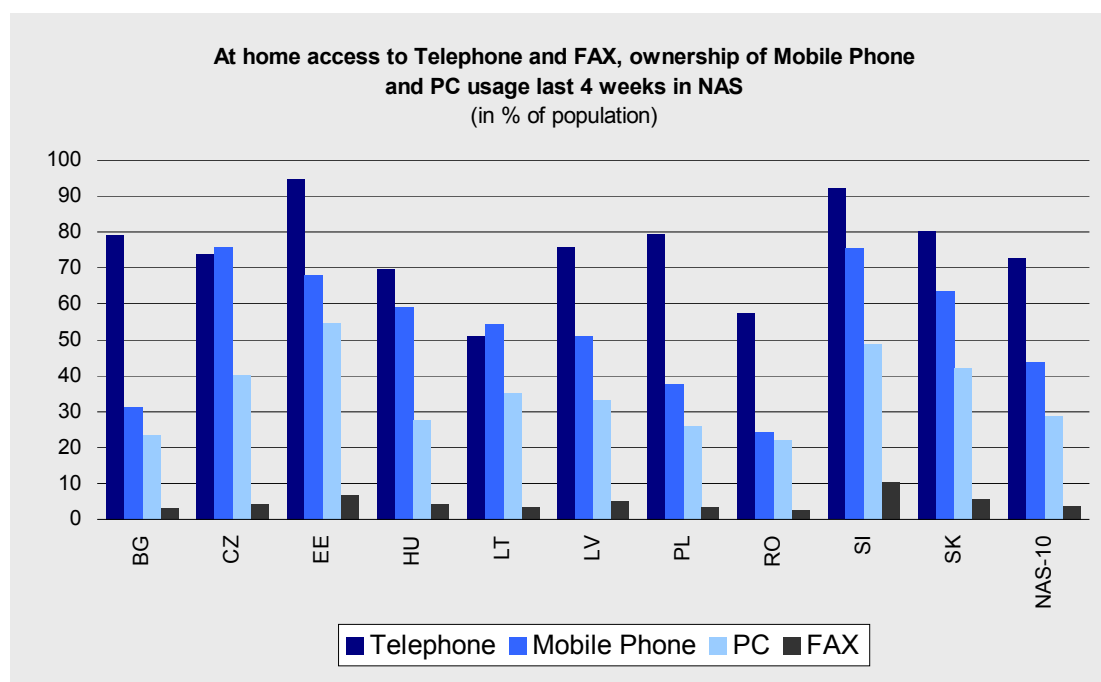
**At home access to Telephone and FAX, ownership of Mobile Phone
and PC usage last 4 weeks in NAS**
(in % of population)

Table 3 At home access to Telephone and Fax, ownership of mobile phone and PC usage last 4 weeks in NAS
Base: all respondents, weighted column percentages
Questions: A1, A19a, A19b, A19c,
Source: SIBIS 2003, GPS-NAS

The population in Bulgaria is approximately well equipped with fixed telephone, which is the basic telecommunication network in the country. In January 2003 79.18% of Bulgarians has fixed telephones, which is above the NAS-10 average – 72.69%. The fax owners are 3.02%, which is similar as NAS-10 average – 3.78%. According to another source 83 % of households have a telephone line and 48 % have access to cable television. ISDN penetration is still low, accounting to a mere 0.34%. In 2001 there are 7 first level ISPs and around 50-60 second level ISPs currently active on Bulgaria's Internet market. A broad range of services, including pre-paid accesses and VoIP, is offered with a more or less satisfactory quality. Instant access via dedicated lines is also available in most large cities and middle-sized towns. Total international bandwidth per capita is 6.5 bps. Total national bandwidth per capita is 20 bps.[22]

The country is characterised by the lowest levels of equipment with mobile telephony. In January 2003 the level of mobile phone owners are 316 among 1000 (313.85 – weighted). Only Romania is performed worse in this indicator with 257.52 –w. among NAS –10. In % – 31.13% of Bulgarians own mobile phones, when for the NAS – 10 the average is 43.68%. For comparison, no nation in Europe has a mobile phone penetration level less then 50%. The variations are from those of France - 54% to Finland- 82%. The trend of fast penetration of mobile phones may cover the gap in the future. The current level is in 50% higher then a year ago. In February, 2002 mobile users were around 20 % (19.6%)[23]. Mobile Internet is still rather expensive (6 to 10 times the cost of a regular dial-up connection) and somewhat poorer in quality. With the increased competition among mobile operators and the digitalisation of conventional telephone lines, the gap between the prices of fixed and mobile Internet will be closed to a reasonable level in two to tree years.

Usage of telecommunication networks – the Internet usage

As might be expected there is a clear positive association between PC usage and home access to the Internet and regular Internet users in Bulgaria. PC users for last 4 weeks

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[22] Bulgaria. E-readiness Assessment 2001. www.arc.online.bg
[23] Source: ISPO, ITU, Vitosha research, mobile operators

before the period 6-17th of January 2003 are 237.43 per thousand of population. Only Romania is worse performed. But the level of usage is similar to that one of Poland (258.75) and Hungary (275.82) and is almost the same like NAS-10 average. In comparison with the results, obtained by Vitosha research in October 2001, the access to personal computers is almost twice higher (14.4% in Oct., 2001). Internet users in Bulgaria are 26.7% of the population, which number is higher then in Hungary, Poland, and Romania, but less than Estonia and Slovenia.
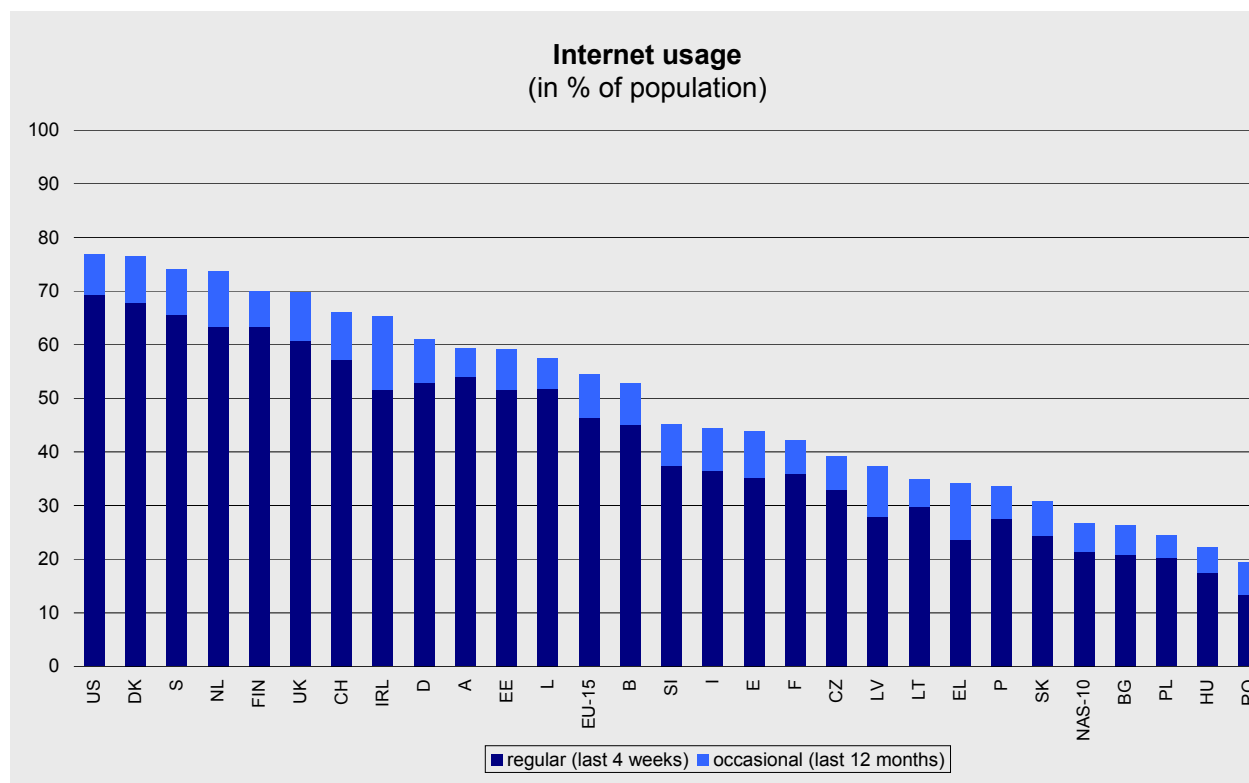
Internet usage
(in % of population)

Table 4 Internet usage
Base: *all respondents, weighted column percentages*
Questions: *A7, A8*
Sources: *SIBIS 2002, GPS, SIBIS 2003, GPS-NAS*

In % the Internet users are 26.7% of the population in Bulgaria in January 2003. This level is twice higher than a year ago. According to Vitosha research 2002 in January 2002 12.2% of population aged 18+ are Internet users, which is tripled since early 2000. According to estimates in the beginning of 2002[24], some 16,2 % of the population is computer literate. It allows assuming that the rate of increasing Internet users in the country is very fast. It does not strongly depend on the job requirements, since as of the beginning of 2002 only around 15% of jobs require ICT skills in Bulgaria. One of the factors, affecting this state is that end-user price of access to the Internet dropped down 3 times for the period 2000-2002 and 10 times for the period 1997 - 2002. Still telephone costs represent a large relative share in total access costs.

Regular Internet users (i.e. persons who used the Internet in the last 4 weeks) in Bulgaria are 212 of 1000, according to GPS or 20.8% of the population. The place of the country among 10 NAS is similar to the above indicator, but it is slightly bettered by levels. It would be summarized that the prevailing part of Internet users in Bulgaria is regular ones and this share is increasing. Only 55 are occasional users for last 12 months. 20.77% of Internet users in Bulgaria are regular ones; occasional users are 5.43 and non-users – 73.8%. The

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[24] See: Bulgaria. E-Readiness Assessment 2001, www.arc.online.bg

total % of Internet users is 26% of the population, which is higher than in Poland, Romania, Hungary and is close to the NAS average – 27%.

9.5% of the population has Internet access at home. This level is higher than in Romania and Lithuania, similar to the level in Hungary, Slovakia, Latvia and Poland, but less than in Slovenia and Estonia. The non-Internet users (off-liner) are 7.4%. The higher numbers are in Romania, Slovakia, Hungary and Poland. In January 2002, the Internet is typically used in the workplace and specialised locations[25]. Public access is essential to making the Internet available to greater numbers of individuals and companies in Bulgaria. Computer games rooms, telecentres, cyber cafes and community information centres have acquired great importance in making the Internet available to those who cannot afford personal access at home, in school, at the workplace or elsewhere The Internet usage by place of access is as follow: public places – 46%, work – 41.7%, home – 30.2%, friends – 19.8%, school – 16.6%. Mostly young people use the Internet. Half of those having access to a PC and Internet are aged 18 to 30, and about one-fourth fall in 31-40 age group. The majority of Internet users live in larger cities, and fewer then 3% are residents of small towns. Internet access is very limited in rural areas. This points is substantial regional disparities and a growing 'digital divide'. Cost, availability and local conditions limit the use of Internet for electronic banking, electronic commerce, or personal activity planning. Barely 3 percent of Internet users in Bulgaria shop online, and 10% plan their vacations on the net. Internet is most commonly used for information gathering purposes, entertainment, alternative sources of international news, and for personal communication (email and chat).

4.1.2 Security

The level of regular Internet users, who are concerned regarding on-line security, both about privacy and about data security in the country, is lower than NAS, EU and US average. It would be explained with the main purposes of Internet access in the country – as a source of information, for entertainment purposes, and, on third place, for business and education purposes. Financial transactions operations and on-line shopping are still used rarely.
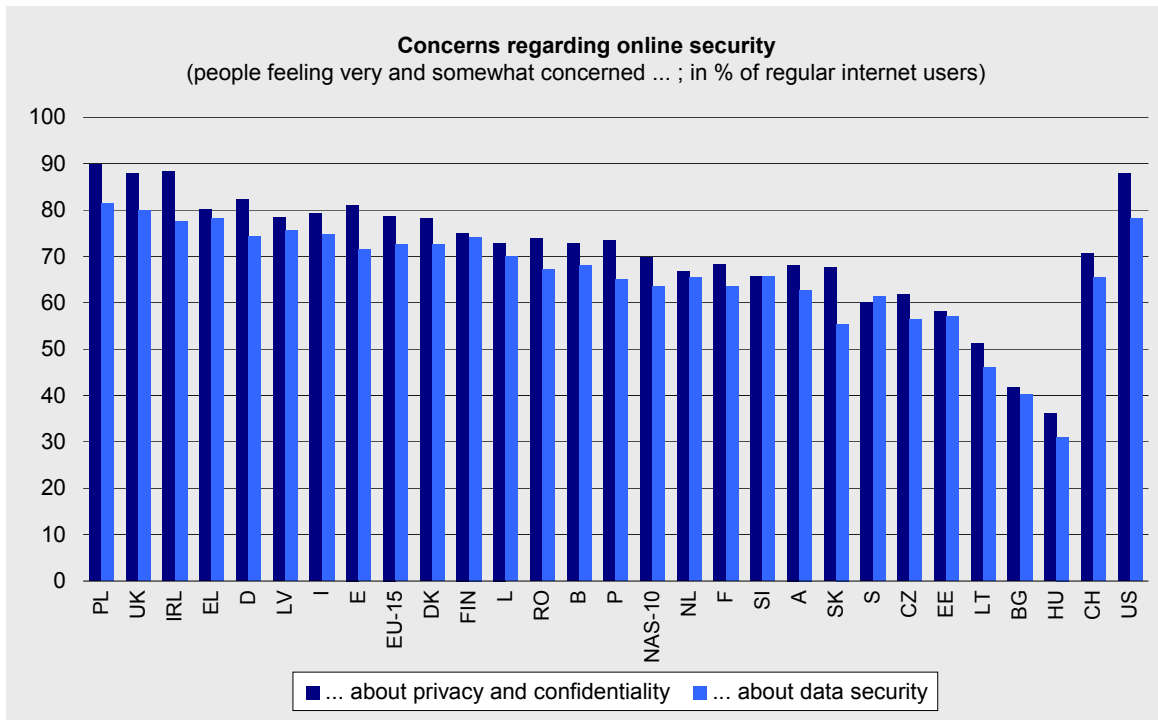
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[25] Ibid.

Concerns regarding online security
(people feeling very and somewhat concerned ... ; in % of regular internet users)

Table 5 Concerns regarding on-line security
Bases: all respondents, weighted column percentages
Questions: J1a, J1b
Source: SIBIS 2002, GPS, SIBIS 2003, GPS-NAS

5. E-Society and Social Inclusion

The citizen's inclusion in ICT usage and development is the main social policy concern of e-society development. It is inextricably linked to the issues of (accessing and maintaining) employment, education, housing and healthcare. Against this background there has been a predisposition to view divisions in relation to the Information society as being just an extension of divisions from 'pre-Information Society'. This requires a multi-perspective view that includes attention to differential levels of access (to the ICTs) across various subgroups of population whilst also looking at issues such as 'unpacking' of the very concept of access. This chapter focuses firstly on indicators, presenting the levels of citizen's inclusion in ICT usage, providing some socio-economic analysis of the results. After that the focus is on GPS data of the patterns of barrier perception development in relation to the intensity of Internet usage.

Internet users (majority of which are regular ones) are 26.4% of the population and the rate of increasing Internet users in the country is fast and it will be accelerated. This is resulting from the fact that mostly young people use the Internet. Half of those having access to a PC and the Internet are aged 18 to 30, and about ¼ fall in the 31-40 age group. There is a very large group of Internet users in the country, who are younger then the age group of 18. Another factor, affecting this state is that end-user price of access to the Internet dropped down 3 times for the period 2000-2002 and 10 times for the period 1997 - 2002. Still telephone costs represent a large relative share in total access costs. The majority of Internet users live in larger cities, and fewer then 3% are residents of small towns. Internet access is very limited in rural areas. This points to substantial regional disparities and a growing 'digital divide'. Cost, availability and local conditions limit the use of Internet for electronic banking, electronic commerce, or personal activity planning. Barely 3 percent of Internet users in Bulgaria shop on-line, and 10% plan their vacations on the net. Internet is most commonly used for information gathering purposes, entertainment, alternative sources of international news, and for personal communication (email and chat).

Barriers to Internet usage

The percentage of population who at least somewhat agree that the Internet requires advanced computer skills is the highest among all measured barriers. In almost all countries the population percentage is above 50%. Although the figure does not represent the accurate comparison due to different populations for EU (only occasional and non-Internet users) and NAS (regular, occasional Internet users and all who have ever heard of the Internet), a clear picture of Bulgarian position can be grasped. Bulgarians are positioned higher compared to NAS and EU average.
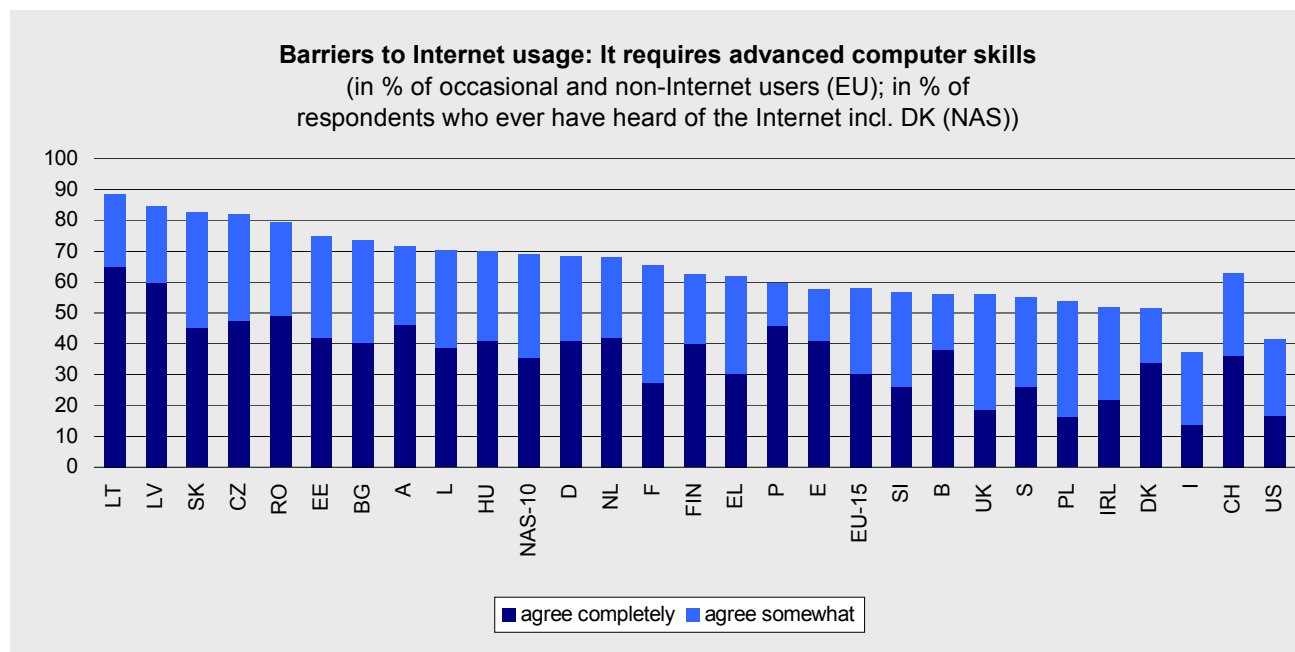
Barriers to Internet usage: It requires advanced computer skills
(in % of occasional and non-Internet users (EU); in % of
respondents who ever have heard of the Internet incl. DK (NAS))

Table 6 Barriers to Internet usage: It requires advanced computer skills
Bases: EU-15 countries: occasional and non Internet users, NAS-10 countries: respondents who ever have heard of the Internet
(inc. don't know), weighted column percentages
Questions: A5a, A7, A8, A18a
Sources: SIBIS 2002, GPS, SIBIS 2003, GPS-NAS

It seems that the prejudice of too expensive usage of the Internet prevents the proliferation of the usage among occasional / non – Internet users. This can be clearly observed in the countries with lower Internet penetration such as Bulgaria, which are more likely to perceive the costs as a barrier, and vice versa. But this barrier is not so important for the country comparatively to NAS –10 average.
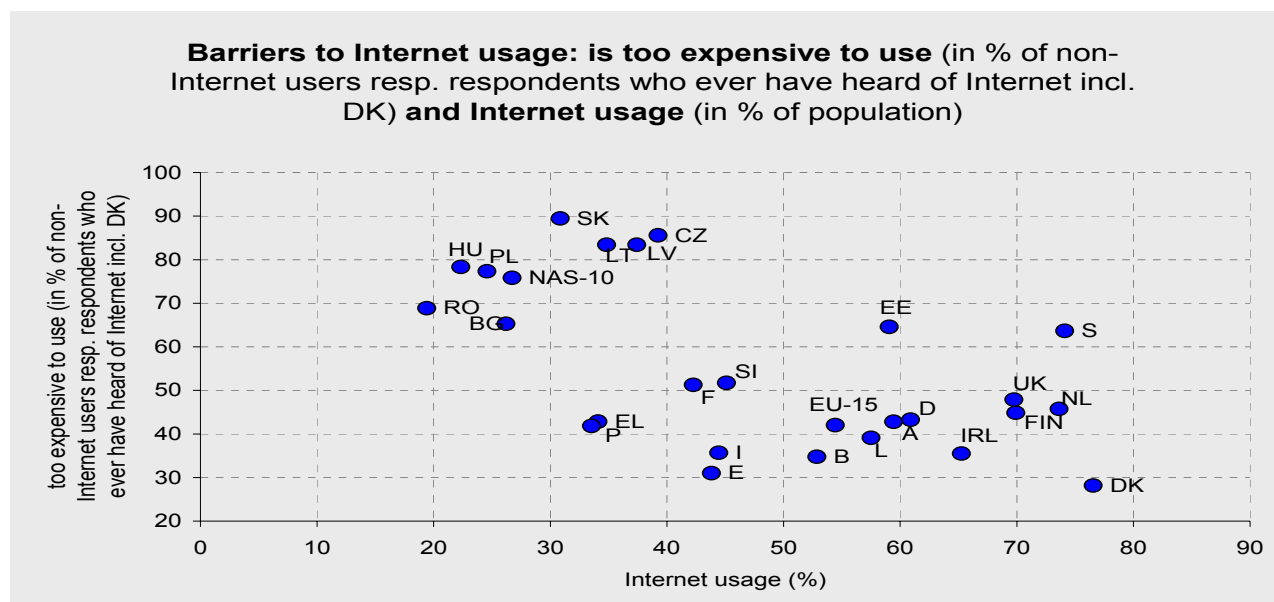
Barriers to Internet usage: is too expensive to use (in % of non-Internet users resp. respondents who ever have heard of Internet incl. DK) **and Internet usage** (in % of population)

Table 7 Barriers to Internet usage: is too expensive to use
Bases: EU-15 countries: occasional and non Internet users resp. all respondents, NAS-10 countries: respondents who ever have heard of the Internet (inc. don't know) resp. all respondents, weighted column percentages
Questions: A5a, A8, A18d
Sources: SIBIS 2002, GPS, SIBIS 2003, GPS-NAS

Here, some outliers might be observed, e.g. Estonia, Slovakia, Czech republic, Lithuania and Latvia, where the costs are very important barrier. The percentage of occasional Internet users who agree with the statement 'Internet lacks useful or interesting information' is higher in countries with higher Internet usage. In NAS countries this is thus a smaller barrier compared to EU – 15 with higher Internet penetration.
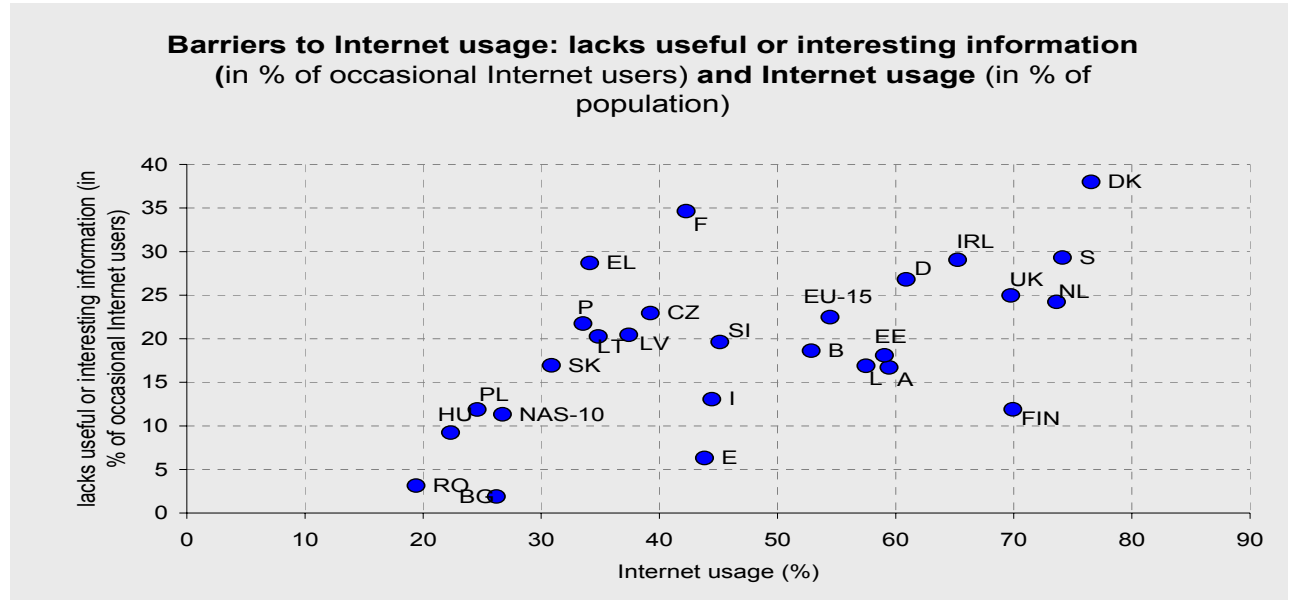

Barriers to Internet usage: lacks useful or interesting information (in % of occasional Internet users) **and Internet usage** (in % of population)

Table 8 Barriers to Internet usage: lacks of useful or interesting information
Bases: EU-15 countries: occasional and non Internet users resp. all respondents, NAS-10 countries: respondents who ever have heard of the Internet (inc. don't know) resp. all respondents, weighted column percentages
Questions: A5a, A8, A18e
Sources: SIBIS 2002, GPS, SIBIS 2003, GPS-NAS

Bulgaria is the country with the lowest level of agreement that the lack of useful information is a barrier to Internet usage among occasional users.
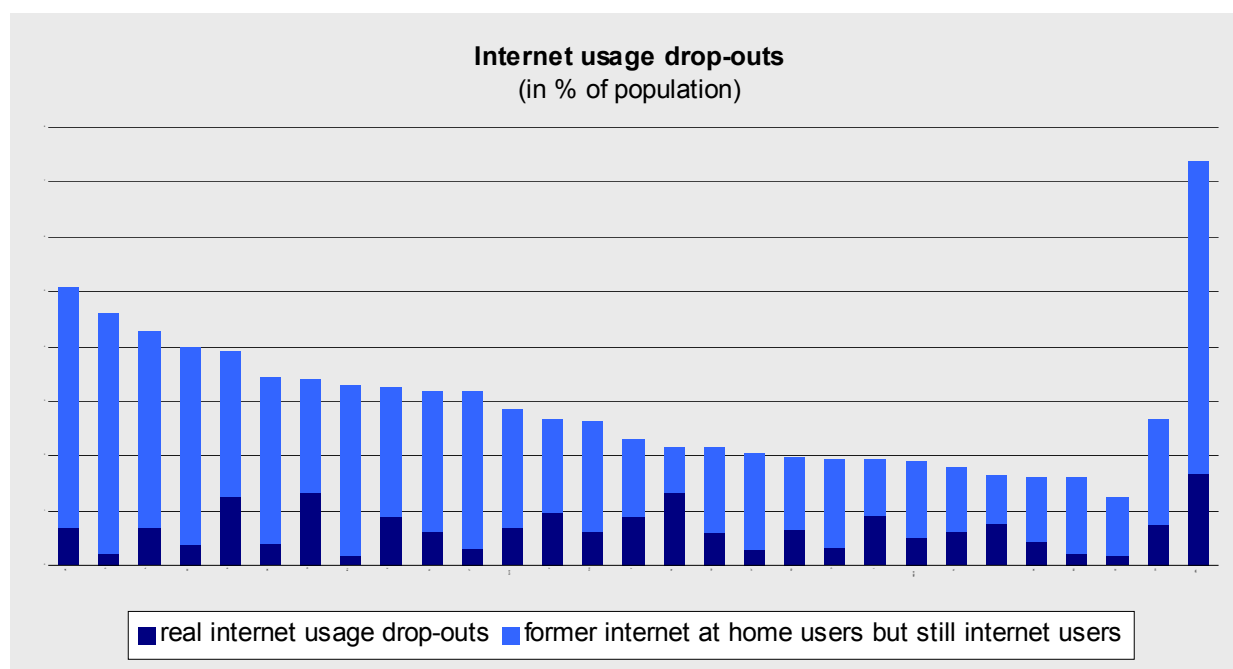
Table 9 Internet usage drop-outs
Base: all respondents, weighted column percentages
Questions: A5a, A5b, A6
Sources: SIBIS 2002, GPS, SIBIS 2003, GPS-NAS

Persons who once used the Internet, but stopped to use it are in the SIBIS context understood as the 'drop-outs', and are divided into 'real drop-outs' and 'at home drop-outs'. The former are those who do not use Internet anymore (regardless of location of usage) and the latter stopped to use Internet at home, but otherwise still use it. Bulgaria is among the lowest real Internet dropouts. Higher is the percentage of former Internet at home users, who still use the Internet at other locations.

Another gap is represented with the Digital divide index (DIDIX). DIDIX is a compound indicator consisted of three selected indicators (in the table below) presenting the dependent variable, and four independent variables.

Indicator	Definition	Weight
Percentage of computer users	Data are based on the SIBIS survey question: 'Have you used a PC, Mac or any other computer, for work or for private purposes - in the last four weeks?'	50%
Percentage of Internet users	Data are based on the SIBIS survey question: 'Have you used the Internet at least once in the last four weeks, at home, at school or work or at any other place?' 'Internet users' are defined as those who use a computer at least at one of the given locations, e.g. 'at work', 'at home' ...	30%
Percentage of Internet users at home	Data are based on SIBIS survey question: 'Do you have access to the Internet in your home?'	20%

© *empirica (Selhofer and Hüsing, 2003)*

Independent variables are presented in the table below and refer to the 'risk group'.

Independent variable	*Definition of the disadvantaged group ('risk group')*	*Percentage of population in EU (2000)*
Gender	Women	~ 52%
Age	people aged 50 years or older ("50+")	~ 40%
Education	low education group (= people who finished formal school education at an age of 15 years or below)	~ 30%
Income	low income group (= the lowest quartile of the survey respondents)	~ 25%

© *empirica (Selhofer and Hüsing, 2003)*[26]*.*

It presents the ratio between average population percentage and the percentage of the risk group. The larger the gap (100% means no gap) the lower is the likelihood of the risk group to use computer/Internet compared to population average. NAS countries are measured the first time for DIDIX in the SIBIS 2003 survey, whereas the measurement of DIDIX for EU was already conducted in 1997 and 2000 (see annex 1). In EU countries the risk groups are on average 53% as likely to use PC/Internet as the average population. In NAS countries the risk groups are on average 41.9% as likely to use them. Bulgarian DIDIX (33%) is below the NAS average and far below EU average (52.9%). Compared to other NAS and EU countries Bulgaria DIDIX is higher only than Romania, Greece and Portugal. In Bulgaria a dramatic gap is observed by education in SIBIS terms: 5% vs. 27% EU-15. The second largest gap is observed by age: 35% vs. 53% EU-15, and is even larger compared to NAS-10 age gap.

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[26] For further considerations on DIDIX see the paper 'The Digital Divide Index – A Measure of social inequalities in the Adoption of ICT' (Selhofer and Hüsing, 2003).

6. e-Education and Life-long-learning

This chapter provides an overview of the traditions and policy aspects of education and learning and their e-aspect taking into account the results of the GPS. The first part of the analysis uses mainly data obtained before GPS. In the second one the SIBIS context of the education is fully implemented, understood as a formally institutionalised process of knowledge transfer and knowledge development, as opposed to informal learning arrangements taking place through various communities of practice arrangements, on-the-job training and peer learning. The indicators of lifelong learning, usage of e-learning, and ICT skills are presented. Some analyses of Internet penetration in relation to lifelong learning are carried out as well.

6.1. Traditions in education and policy aspects in Bulgaria

There are 47 Universities in Bulgaria, located in 26 cities and towns. Around 50% of them have computer specialties. **Over 6,000 Bulgarian students** are currently majoring in Computer Science; another 5,000 have chosen electric engineering, mathematics, physics and biotechnology. The research and development in the area of ICT is concentrated in the Schools of higher education and the scientific laboratories of the Bulgarian Academy of Sciences. The quality of human potential, produced by educational system is recognised by external evaluation. It would be summarised as follow: the secondary education in the country is among the best in the world: 5th in the world in sciences, 11th in mathematics (World Bank and The Economist ranking). Bulgarian team in mathematics obtains first place in 2003 world competition. Bulgarians are among the top university students worldwide (2nd in the world in SAT scores). Higher supply of human IT resources is defined by the **higher interest of young people in ICT education.** It is resulted from traditions of favouring education, fast developing IT markets in EU and USA, and that the Bulgarian experts have combination of skills in hardware and software.[27] The number of students in the area of Information and Communication technologies is currently 6 485 (about 3 % of total number of students). Young people, who apply to study at the Technical university - Sofia prefer on the first place following specialties: Computer systems and technologies –3836 of applicants; Communication equipment and technologies –1784 of applicants. There are between 12 and 530 applications for the remaining 32 specialties. Existing foreign demand and lack of enough internal one for skilled human resources in ICT sector has led to brain drain from the country[28]. According to some analysis the ICT demand in EU is for 1.7 million, and in USA – for 1.6 million specialists in 2003. Additional reasons for this process is weak practical knowledge of young people to develop own business in IT sector, weak collaboration between universities, business and research institutes.[29]

The concern of 'Education' in Bulgaria is changing along with the changes from the formal and pre-defined curriculum in industrial society to education as life-long learning in the information society. The focus is changing from learning to do (or know) towards learning to learn. In this context, education is understood as a formally institutionalised process of knowledge transfer and knowledge development. It is crucial in the new economy, where the innovation cycles are getting shorter[30]. This concern reflects several policy documents like Action plan of the Government 'People are the wealth of Bulgaria', Strategy for training the state administration etc. The measures of the Ministry of education and science in Bulgaria to improve human resources in IT sector include:

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[27] Data is for 2002. Source: www.minedu.government.bg
[28] Enterprise Directorate – General. Innovation policy profile: Bulgaria, Final report, March 2003, www.cordis.lu
[29] Enterprise Directorate – General. Innovation policy profile: Bulgaria, Final report, March 2003, www.cordis.lu)
[30] IPTS (2000),: The New Economy

National strategy for education in ICT (1998); Programme (1999) in order to improve the level of education in ICT; Order of 30.08.1999 to include informatics and IT as two obligatory for all pupils. The education started on 1st of Sept. 1999. In May 2000 all requirements to the teaching programmes have been published. Nevertheless in January 2003 the level of participation in lifelong learning in % of labour force is 5.06%, which is higher from Romania only (3.51%). In comparison the leaders' have level of 37% (Finland – 37.32% and USA – 37.34%). The participation in any learning in the last 4 weeks before the GPS in January 2003 in % of labour force is the lowest in Europe – 7.56%, and far away from the leader – Finland with 59.86%. The level of self-directed learning in % of labour force in the lowest among countries – 5.51%, which is about 8 -9 times less then leaders like Germany - 51.73%, Austria – 47.6%, and Finland – 44.45%. The total (online and offline) usage of e-learning as an percentage of labour force is lowest among countries – 3.17%, included in SIBIS+ General Population Survey. But the level of on-line usage of e-learning in Bulgaria is higher then in Greece and Poland. This picture is corresponding to the level of penetration of computers at schools and training provided by companies in Bulgaria.

The number of computers at schools and universities is insufficient[31]. Penetration of ICT in Bulgarian schools is still at a relatively low level but is growing - the number of PCs at secondary schools doubled in 2001. There are 5 643 computers and 989 computer labs in a total of 1016 schools. About 20 000 computers are available at 48 universities nation-wide. Most universities are connected to the Internet but this capacity is limited and Internet resources are not yet integrated into learning process. Bulgaria has drafted an ambitious programme to introduce Internet education in schools, including free Internet access and ICT training at all educational levels by the end of 2005. Teaching training will be critical to the success of this initiative.

Another reason for the low level of life – long learning is connected with insufficient training provided by companies[32]. Most of the managers of enterprises in Bulgaria (72.5%) believe that it is necessary to improve the employed persons' qualification. At the same time the activities for continuous vocational training are not their main priority. 12.6% of enterprises only have previously drawn plan for education, as 6.6% of them – budget of financial providing for continuous vocational training activities. A lack of necessary financial resources is the main reason not to be launched plans for education according to 45.7% of managers. During the period 2000 – first half of 2001 36.4% of the organised activities for education of the employed person are courses for continuous vocational training. Among them predominant are the courses, organised by external organisations – 62.7%. Besides courses, different other activities for continuous vocational training have been organised. The most frequently carried out activities are: instructions at workshops, lectures and seminars – 40.4% of all activities. The activities for continuous vocational training are provided in less then ¼ of the total number of enterprises. The coverage of continuous vocational training is higher in the public sector – 58.2% of all carried out courses for professional qualification and 55% of other activities for continuing vocational training. The participants in courses for continuous vocational training in the public sector are more than participants of the private sector – the proportion in 2000 is 59.1% as against 40.9% in the first half of 2001 – respectively 58.8% and 41.2%. The bigger parts of participants in all forms of continuous vocational training are men – 64.3%. Most of the employed have attended the activities for training on technology and production, including operation and maintenance of automated systems, quality control and elaboration of new materials and products – 39.0% of the all participants in courses. The average time spent for education is 20 hours per participant in 2000 and 21 hours – in the first half of 2001.
Self-directed learning is not well performed in Bulgaria. Only 7% of the labour force is included in this activity in January 2003, which is far behind EU average – which is more than

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[31] Bulgaria E-Readiness Assessment 2001, www.arc.online.bg
[32] National Statistical Institute (2002), Bulgaria 2001, Socio-economic development, Sofia

30%. It would be connected with the level of access to PCs and Internet in the business[33]. Only 1/3 of Bulgarian companies have used computers in their daily work. Only 7.3% of workplaces have PCs installed. Only 20% of companies with computers have built their own intranets. Around 12% of the companies are connected to the Internet. In the majority of companies, computers are used for document processing, accounting and legal information systems. Fax machines and telephone, as well as personal contacts, are still perceived as key to doing business. Signed paper documents are required almost everywhere.

6.2. Life-long learning and e-Education according to GPS survey results

The level of e-Education and Life-long-learning in Bulgaria is low.

Table 10 Participation in lifelong learning
Bases: labour force, weighted column percentages
Questions: C2
Source: SIBIS 2002, GPS, SIBIS 2003, GPS-NAS

In Information Society the importance of the knowledge is constantly increasing. The shortening of innovation cycle rapidly produces new knowledge, and to stay competitive on the market these knowledge has to be applied. It is of great importance that the labour force assesses new knowledge through permanent education. This improves the chances for job applicants as well as the productivity of employed. The differences in participation in lifelong learning between EU and NAS countries are larger compared to T&A indicators. In EU 23% of labour force participate in this kind of learning, while for the NAS this is the case for 10% of population. In the SIBIS context the education is understood as a formally institutionalised process of knowledge transfer and knowledge development, as opposed to informal learning arrangements taking place through various communities of practice arrangements, on-the-job training and peer learning. Here indicators of lifelong learning, usage of e-learning, and ICT skills are presented.

In Bulgaria the level of participation in lifelong learning in % of labour force is 5.06%, which is higher than Romania only (3.51%). In comparison the leaders' have level of 37% (Finland –

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[33] See: Bulgaria. E-Readiness Assessment 2001, www.arc.online.bg

37.32% and USA – 37.34%). The participation in any learning last 4 weeks in % of labour force is the lowest in Europe – 7.56%, and far away from the leader – Finland with 59.86%. The level of self-directed learning in % of labour force in the lowest among countries – 5.51%, which is about 8 -9 times less then leaders like Germany - 51.73%, Austria – 47.6%, and Finland – 44.45%. The total (online and offline) usage of e-learning as an percentage of labour force is lowest among countries – 3.17%, included in SIBIS+ General Population Survey. But the level of on-line usage of e-learning in Bulgaria is higher then in Greece and Poland. This picture is corresponding to the level of penetration of computers at schools and training provided by companies in Bulgaria. A lack of necessary financial resources is the main reason not to be launched plans for education according to 45.7% of managers in the companies.
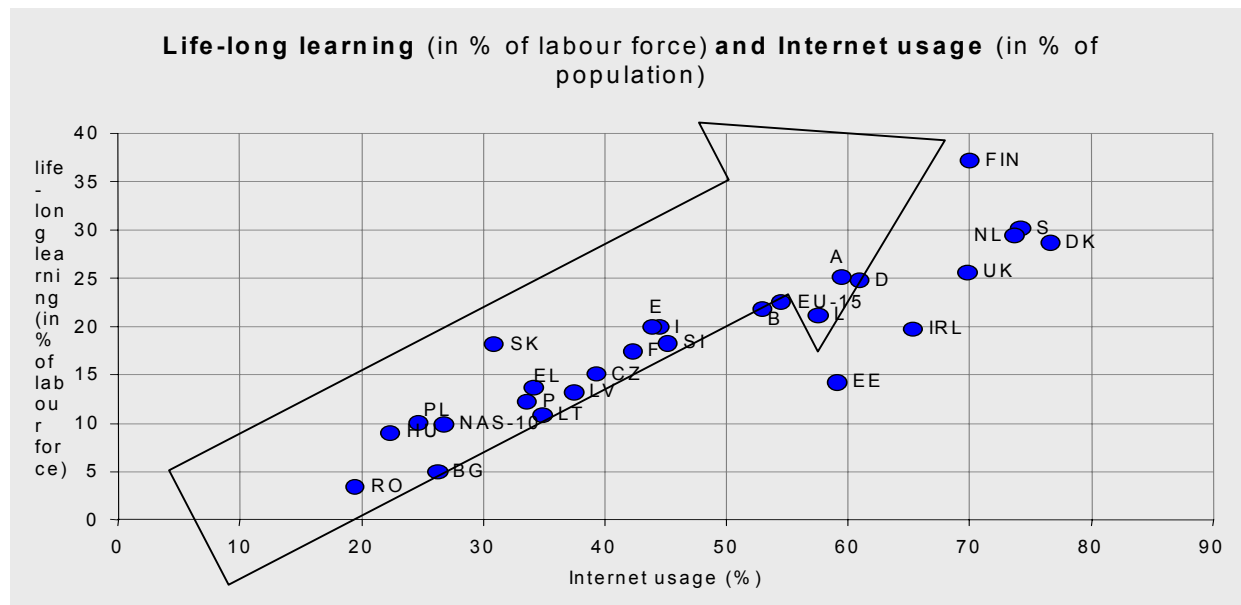

Table 11 Life-long learning and Internet usage
Bases: labour force resp. all respondents, weighted column percentages
Questions: A7, A8, A18e
Source: SIBIS 2002, GPS, SIBIS 2003, GPS-NAS

The above figure clearly displays the strong correlation between low Internet usage and participation in lifelong learning. Instead of causality, here perhaps the common general IST development factor is strongly correlated with both variables. The usage of e-learning in Bulgaria is low as well. on-line usage is higher than those of offline in opposite of the case of Poland.
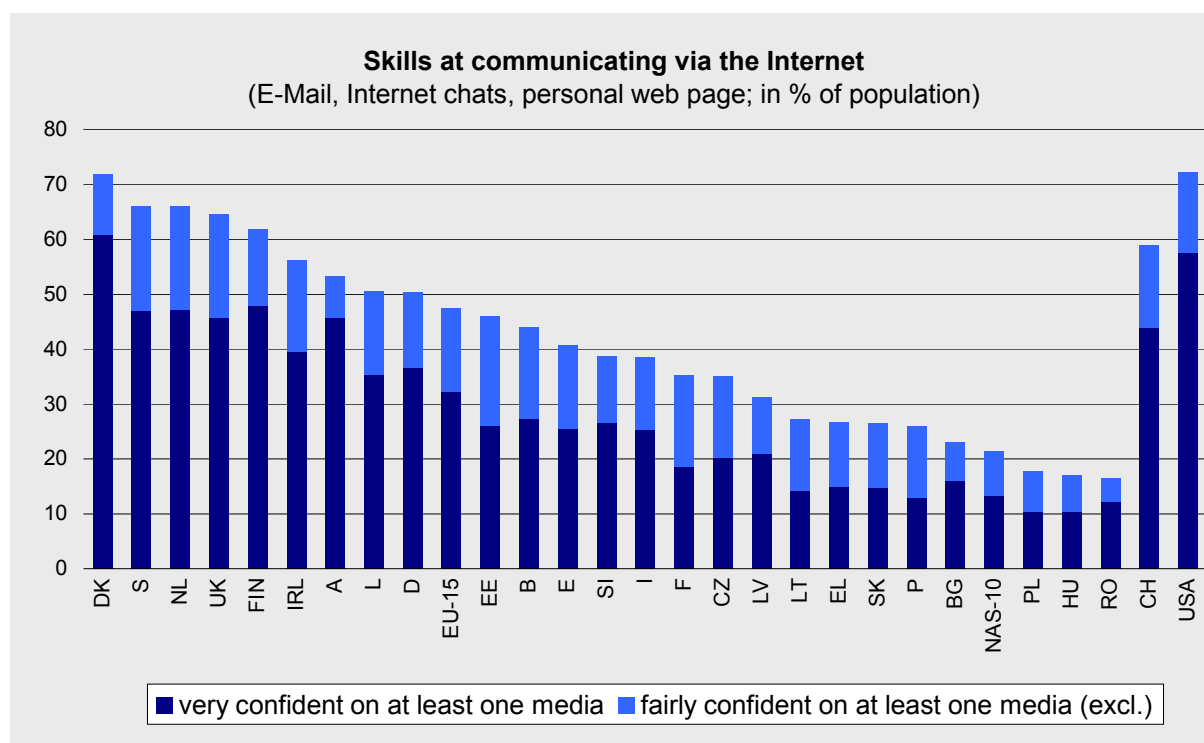
Skills at communicating via the Internet

(E-Mail, Internet chats, personal web page; in % of population)

Table 12 Skills at communicating via the Internet
Base: all respondents, weighted column percentages
Questions: D1c, D1d, D1f
Sources: SIBIS 2002, GPS, SIBIS 2003, GPS-NAS

The Internet is build to communicate. The ability to communicate with others via the Internet (e-mail, Internet chats, personal web page) is a basic skill in Europe as an Information Society. Half of the EU population regard themselves as very or fairly confident in communicate with others via the Internet: being confident in using at least e-mail, chat rooms or personal web pages. A general North-South divide within EU can be found in regard confidence in communicate digitally. Bulgaria is positioned above NAS-10 average, but below EU average (47%). If the data was not based on % of population but on % of younger groups of population the country would be better performed, taking into account age distribution of the population.

7. e-Economy and e-Commerce

This chapter provides analysis of data concerning traditions and the state of the art of e-Economy and e-Commerce area, taking into policy development aspects. After that analysis of GPS results is provided.

7.1. Traditions in the IT sector in Bulgaria

(The Silicon Valley of the former communist block)

There are **more than one thousand** IT small and medium sized enterprises in Bulgaria now. This is exclusively due to the established **traditions (35 years of experience)** in this area, and very **well developed educational system** in electronics, engineering sciences and computer sciences.
Until 1990, under the Council for Mutual Economic Assistance (CMEA) Bulgaria was the only country in Eastern Europe that specialised in high technologies. Three generations of Bulgarian professionals gained recognition in Western countries in the field of mainframes of 5th generation, high-speed matrix processors and parallel systems. In the established research and development institutes a number of groups were organized to work in the area of software development, firmware, system hardware, digital and analogue PC design, etc. In the past Bulgaria was called "the Silicon Valley of Eastern Europe" because of its strategic specialisation in high-tech and ICT products.

After the political and economic changes in 1990, the powerful Bulgarian electronic industry lost many of its traditional markets and the production was dynamically restructured. The big state-owned electronic enterprises collapsed and at the same time a great number of small and flexible private companies appeared on the Bulgarian market.
There is a large number of scientists in the business sector in Bulgaria are skilled in electronics and communications, as well as mechanical engineering[34]. This means that the human resources for ICT development took a large share among all human potential, which is good precondition for e-economy and e-commerce development.

IT companies profile in Bulgaria

The high potential of Bulgarian IT resources (well-educated professionals and relatively good basis for development) was the reason for the designation of electrical engineering and electronics industry as a strategic sector and giving this sector priority in long-term development programs. These priorities are also due to the efficient export record of the sector. In 2000 this sector's production accounted for 3.1% of the total industrial output. The relatively small size of the domestic IT market is the reason for the growing number of IT companies, which are working on assignments entirely for foreign markets.
Among the major sources for optimism are the strong traditions of Bulgarian R&D sector. According to official surveys (carried out at the end of 2000) Bulgaria is very close to Slovakia in percent of scientists and engineers per capita.

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[34] Statistical Yearbook, Bulgaria, 2001

Table 13 S&E in R&D per million

Country	Bulgaria	Czech Republic	Hungary	Poland	Romania	Slovakia
Scientists and Engineers in R&D per million	7.47	7.11	7	7.21	7.24	7.53

The IT companies in Bulgaria cover almost the whole spectrum of IT development activities and services. Few specific areas could be mentioned, regardless of the fact that some of the IT companies work in more than one area:

- Software - computer system software, networking software and web-design, CAD/CAM/CAE software, telecommunications and wireless development software, application software, firmware;
- Hardware - computer and systems assembling, digital and analogue printed circuits design, PCB manufacture, analogue mixed engineering;
- Microelectronics - design ASIC's, front-end and back-end microelectronic activities;
- Automation - systems for industrial automation.

Working for a number of big corporate clients in Western Europe and US has proved that Bulgarians are able not only to develop design work, maintenance and testing but also fully integrated systems and solutions. Customers of Bulgarian firms include Canadian government agencies such as the Department of Transport, Department of Environment and others, as well as global blue chip firms such as: BMW, Boeing, Ford, Lockheed Martin, Nortel, Hasbro, Siemens, PricewaterhouseCoopers, Xerox and Telesis Technologies.

98% of the IT companies are private. Most of them are very flexible and innovative and are part of the SME-segment of the industry (with up to 100-120 employees). There are several IT associations incorporating the major IT players - Bulgarian Association for Information Technologies (BAIT), Bulgarian Association of Software Companies (BASSCOM), and the Bulgarian Internet Association (BAI).

The **UN 2001 global Human Development Report** has introduced a Technology Achievement Index (TAI) based on eight indicators in four dimensions; technology creation, diffusion of recent innovations, diffusion of old innovations and human skills. This index shows how well a country is creating and diffusing technology and building a human skills base, reflecting a given society's ability to participate in the network age. The TAI ranking is led by Finland, followed by the United States and Sweden. On this index Bulgaria ranks 28 ahead of economies, such as Poland and Malaysia, and is also considered being among the potential leaders in the field of information and communication technologies.

IT Market development

According to the Information Society Index, which rates 55 countries, comprising 96% of World GDP and 99% of World's expenditure, Bulgaria falls in the Sprinter Group (where investments surge and retreat on the whims of social, political, and economic change), together with countries like Czech Republic, Poland and Hungary. However, Bulgaria has the advantage of established traditions and experience in the IT sector and well-structured private companies, which cover almost the whole spectrum of IT applications. According to research of the IDG group, the **yearly growth of the IT sector in Bulgaria is about 35%.** IT spending for 2001 is about USD 188.4 million and estimated total revenues will be around USD 270 million.

For the period 1997-2001 the hardware part of IT sector shows a tendency to decrease and the software share increases each year. Software development is considered as one of the main forces driving the growth of the Bulgarian IT market. The really fast development of the companies, which include in their portfolio complex Internet/Intranet solutions, mobile applications, telecommunication software, dynamic database driven web sites, interactive communication environment solutions, development of CD and Web-based interactive and non-interactive multimedia solutions, should be underlined.

IT Market by segments

Like it is pointed out above, the software companies cover almost the whole spectrum of software applications from Enterprise Resource Planning to CAD/CAM/CAE. The constant and stable penetration of PCs and especially of mobile telephones (around 1,5M subscribers of the existing three mobile operators in 2001) in Bulgaria is a huge stimulating factor for such development.

Competitive advantages of the Bulgarian IT environment and companies

- Very high quality personnel. Combination of software and hardware skills;
- Very competitive pricing for IT expert manpower - 1: 4 difference in salary level;
- Long traditions in IT development;
- Third place in Europe and eight position worldwide according to the absolute number of certified IT professionals (**third place worldwide** according to percentage of certificates!);
- Strategic geographic location - a one hour time difference from Continental Europe;
- Integral part of the EU common market;
- Macroeconomic Stability;
- Expected full NATO membership by 2004;
- Expected full European Union membership by 2006.
- More than 6,000 students majoring in computer science. More than 5,000 graduating in engineering sciences. More than 7,000 IT professionals working in small ICT companies.
- Excellent Education:
    - Bulgaria's secondary education is among the best in the world: 5th in the world in sciences, 11th in mathematics (World Bank and The Economist ranking)
    - Bulgarians rank second in international IQ tests (MENSA International)
    - Bulgarians are among the top university students worldwide (**2nd in the world in SAT scores**)
- Excellent labour quality/labour cost ratio (average monthly salary of approximately 264 levs or USD120);
- Some of the lowest direct taxes in the region;
- Stable and predictable business environment;
- Sharply decreasing corruption, transparent privatisation;
- Effective free trade agreements with most countries in the region; liberalised access to a regional market of over 550 million consumers;
- 55 Agreements on Mutual Protection and Promotion of Investments, 45 are effective;
- 53 Double Taxation Avoidance Agreements, 48 are effective;
- WTO membership from 1996;
- Free Trade Area with Turkey from 01/01/1999;
- Free Trade Agreement with Macedonia from 01/01/2000
- Free trade agreements signed with Lithuania (08/05/2001), Israel (08/06/2001), Croatia (04/12/2001) and Estonia (11/12/2001), completed negotiations with Latvia
- EFTA Agreement from 01/07/1993
- CEFTA member from 01/01/1999

Nevertheless the recent state of the art of e-economy and e-commerce penetration in the country is not sufficient.

The level of access to PCs and Internet in the business in Bulgaria[35] is low. A year ago only 30 % of Bulgarian companies use computers in their daily work. Only 7.3% of workplaces have PCs installed. Only 20% of companies with computers have built their own intranets. Around 12% of the companies are connected to the Internet.

In the majority of companies, computers are used for document processing, accounting and legal information systems. Fax machines and telephone, as well as personal contacts, are still perceived as key to doing business. Signed paper documents are required almost everywhere.

E-payment instruments are available on the Bulgarian market, but e-commerce is still in its early stage in the beginning of 2002. Around 10% of the population use electronic cards but only 1.4% of debit cardholders is registered in ePay.bg – Bulgaria's most popular system for on-line payments. It was established in 1999 and now it has more then 20 000 registered consumers. The transactions for the period 7-13.06.2003 are more then 15 000. The electronic signature guarantees their security. on-line transactions are increasing but small and amount to about BGN 780 000 for the first quarter 0f 2003. Internet is predominantly used for processing orders and payment is done in the conventional manner upon delivery. All state administration uses electronic cards for receiving salaries at the end of 2002.

New Real Rime Interbank Gross-Settlement is introduced as of 2nd of June 2003. At the end of the first week of its usage is 6% of total interbank payments in the country.

7.2. e-Economy in Bulgaria according to GPS survey

In this part basic e-economy indicators are presented: e-commerce usage and e-banking usage. Some e-economy snapshots are also presented and the relation to Internet usage.
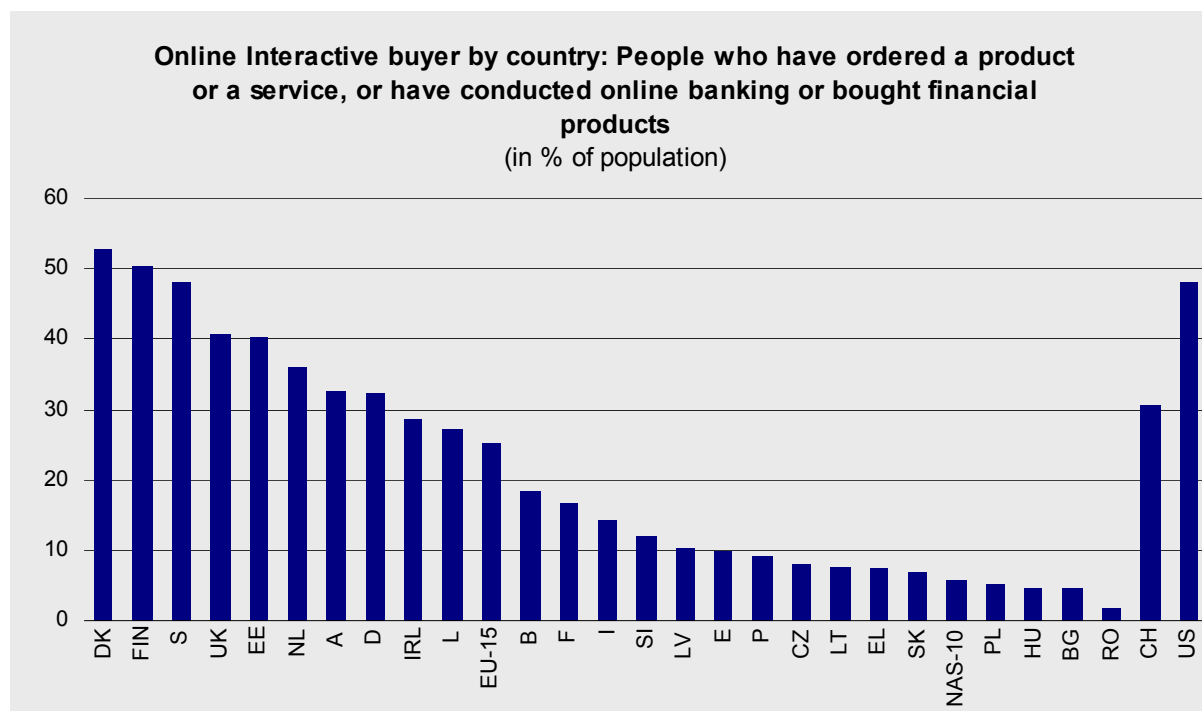

Online Interactive buyer by country: People who have ordered a product or a service, or have conducted online banking or bought financial products
(in % of population)

Table 14 on-line Interactive buyer by country
Base: all respondents, weighted column percentages
Questions: B1b, B1c
Sources: SIBIS 2002, GPS, SIBIS 2003, GPS-NAS

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[35] See: Bulgaria. E-Readiness Assessment 2001, www.arc.online.bg

Usage of the Internet is growing in Europe, with Nordic countries surpassing the US benchmark. With 25% of the EU's population being an interactive user, it is making headway to becoming a mass market service, but not quite. This is because a socio-demographic feature between Internet users exists displaying considerable divides, especially across age, income, and education. In Bulgaria 5% of population are interactive buyers, while this is true for 6% of NAS population. Buyers tend to display a more interactive use on the PC, suggesting a more sophisticated and pioneer Internet users procure on-line. Even so, occasional users are representing an increasing portion of e-commerce users, especially in those countries with increasing on-line tenure.
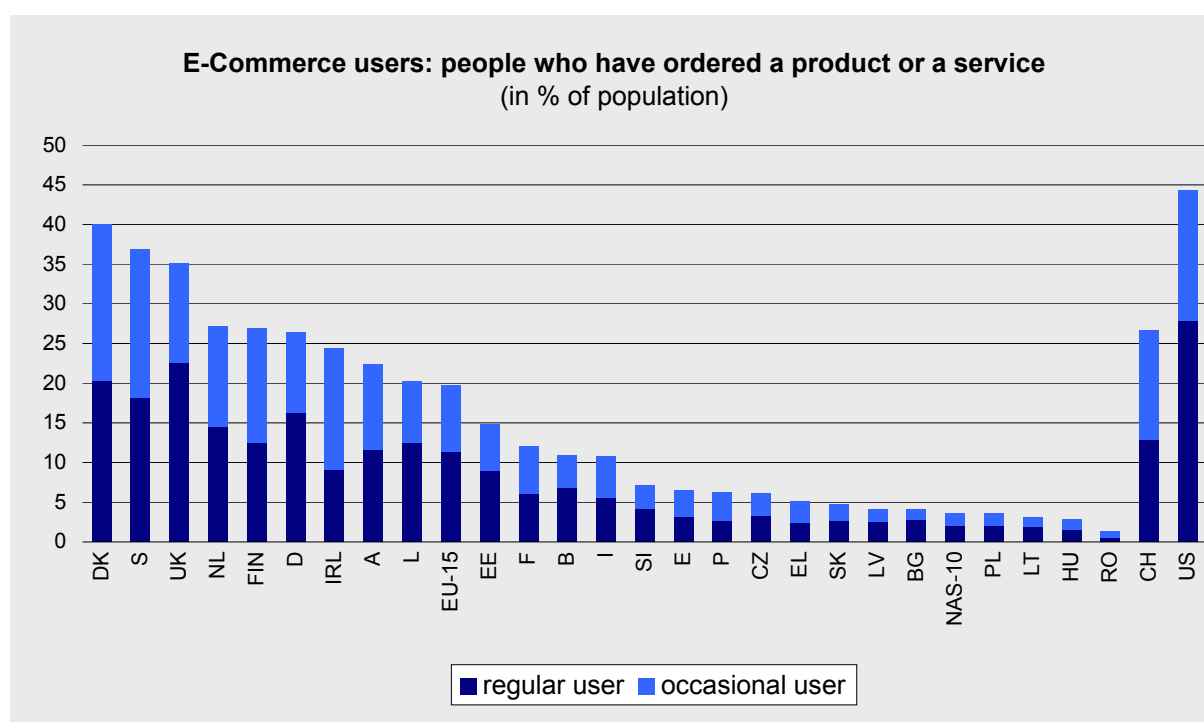

Table 15 E-commerce users: people who have ordered a product or a service
Base: all respondents, weighted column percentages
Questions: A7, A8, B1
Sources: SIBIS 2002, GPS, SIBIS 2003, GPS-NAS

Compared to all surveyed countries Bulgaria is positioned in the middle in percentage of e-commerce users among NAS-10. Here, again, Estonia has among NAS countries the highest percentage (15%).

8. e-Work

ICTs have led to profound changes to the organisation of work at micro level as well as labour markets at macro level over the last two decades. The ability of individuals, companies and government to adapt to these changes appears to largely determine their success in the Information Society. This is being reflecting eEurope initiative, and has led to increasing demand for timely data on issues such as ICT – enabled new ways of working, telework, work-related skills, employment in IT sectors and occupations and many others. The spread of teleworking has many different faces: home-based (working at home with PC, using ICT to transfer work results, permanent, alternating or supplementary), mobile (working away from main place of work, using on-line connections during business trips, or in the field, e-mail, Internet or remote access), self-employed in SOHOs (home is the main place of work or the base for trips into the field; using ICT to transfer work results; SOHO, i.e. Small Office, Home Office). Work is defined by SIBIS as aimed productive activity, and the structure of employment refers in particular to the sectoral and occupational distribution of employment, as well as unemployment and labour force participation.
This chapter focuses particularly on the work that relates to ICTs. Presented are indicators of home-based teleworking, interests in teleworking, mobile work, telework in SOHO (small office, home office). Also, analyses of different types of telework in relation to Internet usage are included.

8.1 Work Organisation

The recent use of ICT leads to possibilities for 'multi-locational eWork' – that is, working from more then one location while staying connected to the company and work colleagues. This possibility allows meeting one of the strategic objectives of European employment policy connected with the decrease of unemployment and the provision of employment to all population segments. The solution is sought in the new ways of employment, which are in close connection with the shortening of working time and the implementation of ICTs. Telework is one of them. Although the measuring of telework in complex, significant developments in measuring methodology have been made, accounting also the SIBIS surveys. Telework (or teleworking) has become increasingly popular in the end of 90's, particularly in EU countries.
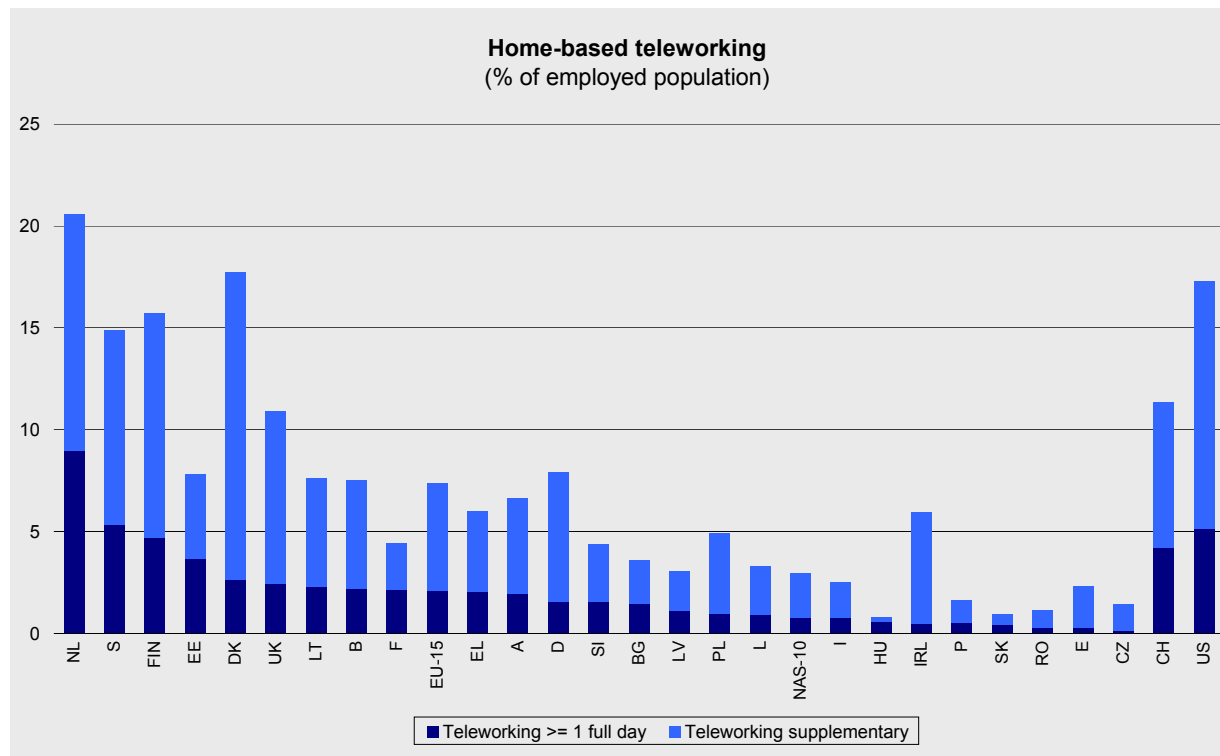
Home-based teleworking
(% of employed population)

Table 16 Home-based teleworking
Base: all persons employed, weighted column percentages
Questions: E1, E4
Sources: SIBIS 2002, GPS, SIBIS 2003, GPS-NAS

By the time of SIBIS survey in the Netherlands there is 9% of employed population regularly teleworking (persons who telework 1 day or more in a typical week). In Bulgaria there is 1.4% of regular teleworkers among employed population, which is below EU average (2%), but close to the EU countries such as Germany and Austria. Overall, there is 4% of employed population teleworking from home in Bulgaria (EU-15 7.3%).
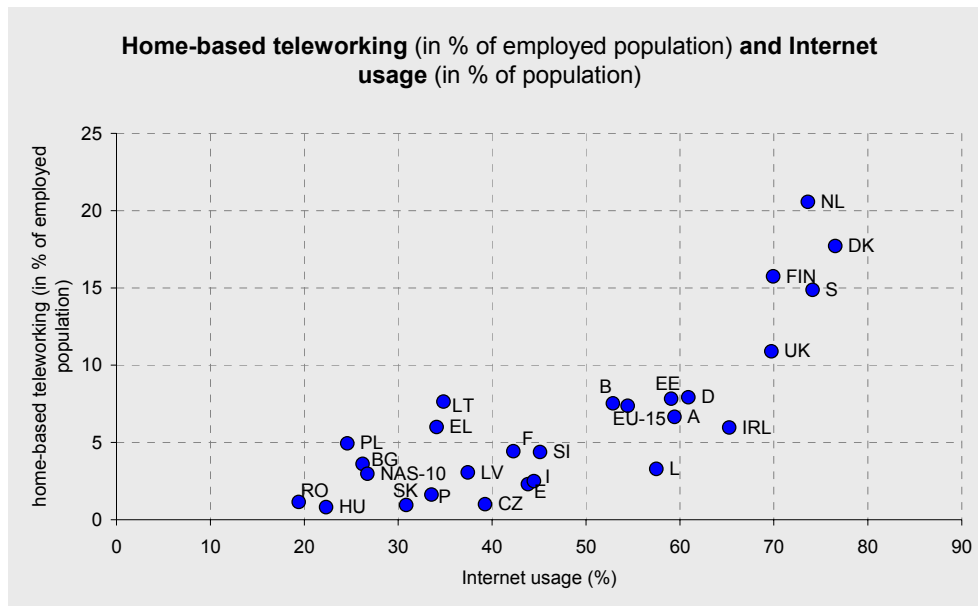
Home-based teleworking (in % of employed population) **and Internet usage** (in % of population)

Table 17 Home-based teleworking and Internet usage
Base: all persons employed resp. all respondents, weighted column percentages
Questions: A7, A8, E4
Sources: SIBIS 2002, GPS, SIBIS 2003, GPS-NAS

Again, there is a clear connection between Internet usage and the use of home-based telework. Countries with high individual Internet penetration have larger percentage of home-based teleworkers. Somewhat steeper increase of home-based teleworkers is found in countries with 60%+ Internet users.
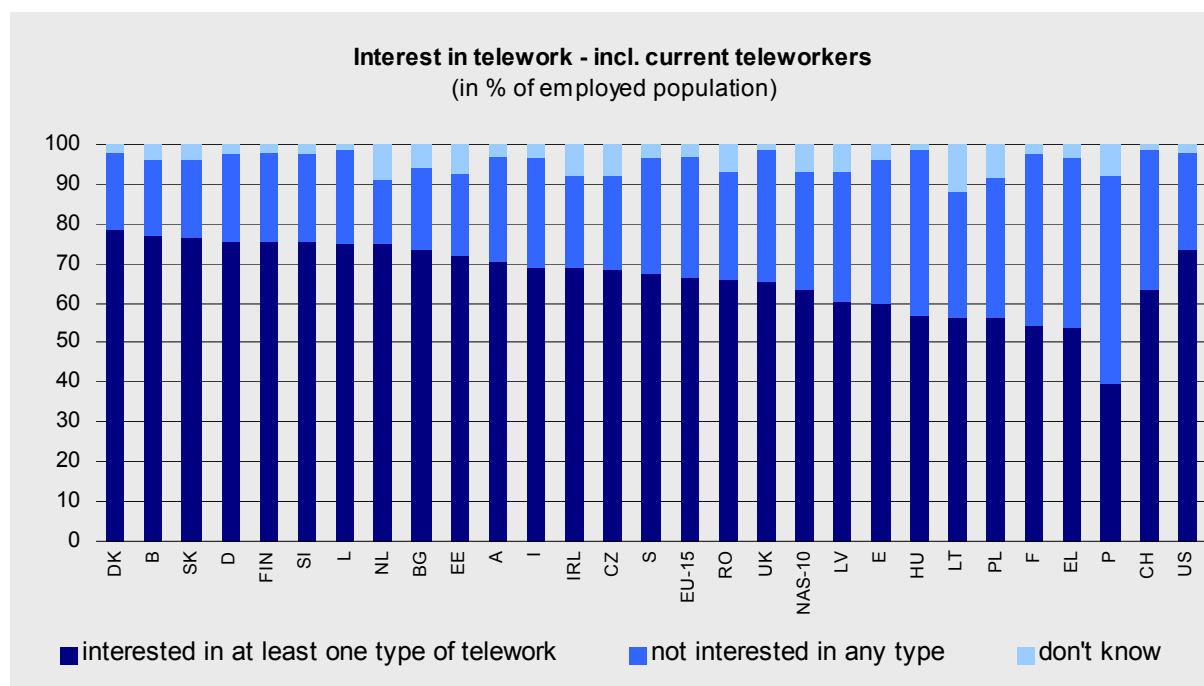
Interest in telework - incl. current teleworkers
(in % of employed population)

Table 18 Interest in telework – incl. current teleworkers
Base: all persons employed, weighted column percentages
Questions: E8
Sources: SIBIS 2002, GPS, SIBIS 2003, GPS-NAS

As the results of the General Population Survey show, in January 2003 the interest in telework, including current teleworkers in % of employed population, is high in Bulgaria. It is higher then EU-15 and NAS-10. This interest could be explained with relatively high share of ICT specialists and traditions in good quality of ICT education in higher schools in the country.[36] This state of the art is not directly connected with the ICT skills requirements for jobs in the companies in the country, as the feasibility of teleworking is estimated as less then 10%. In comparison with other countries – the feasibility of teleworking in NAS – 10 is almost 15% and for EU-15 – more then 30%.

The most important effect of telework seems to be making workers more effective by granting them greater flexibility in how to organise their work. Home-based teleworking in % of employed population is relatively high in Bulgaria (higher then in NAS-10). The full day teleworking at home is almost the same as the supplementary teleworking at home, which is something specific for the country, comparatively to all other European countries, where the supplementary teleworking at home is predominant. The home becomes a touchdown office, which is equipped for giving whenever needed to on-line access to company resources.

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[36]DG Enterprise. Innovation policy profile. Bulgaria. March, 2003, www.cordis.lu

Feasibility of teleworking (in % of employed population) **and Internet usage** (in % of population)
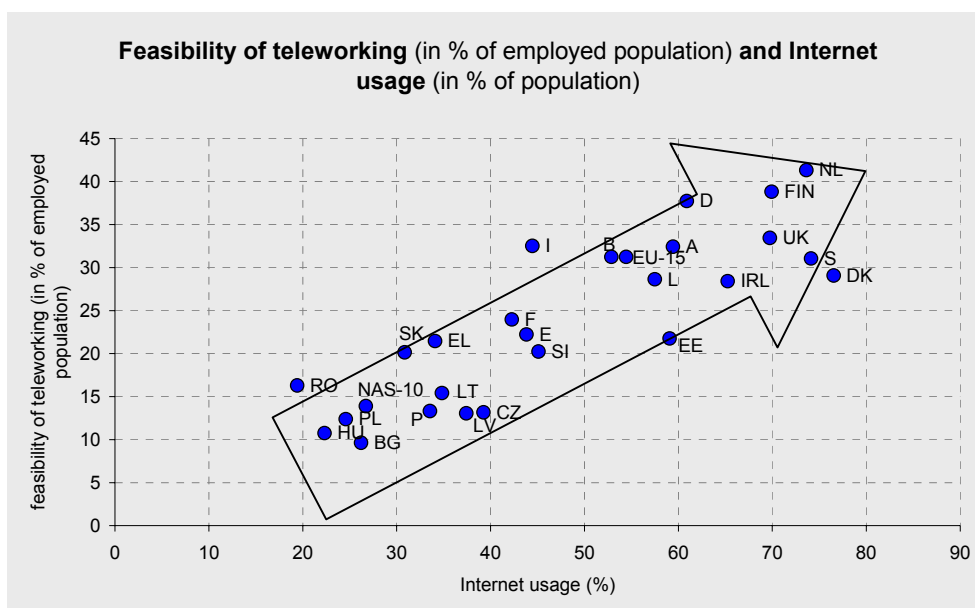

Table 19 Feasibility of teleworking and Internet usage
Bases :all persons employed reps. all respondents, weighted column percentages
Questions: A7, A8, E9a
Sources: SIBIS 2002, GPS, SIBIS 2003, GPS-NAS

The feasibility of teleworking depends on the access and usage of basic ICTs (PC, Internet access at home) and ICT skills, so the distribution of countries correlates with the individual Internet penetration – with the higher penetration the feasibility of teleworking also increases. Typically, Bulgaria is positioned in the lower level, with 10% of employed population feasible for teleworking (EU-15 32%). The tele-cooperation with external contacts in Bulgaria is practiced by 15.37% of all persons employed (which is almost the same as NAS–10 average – 15.83%).
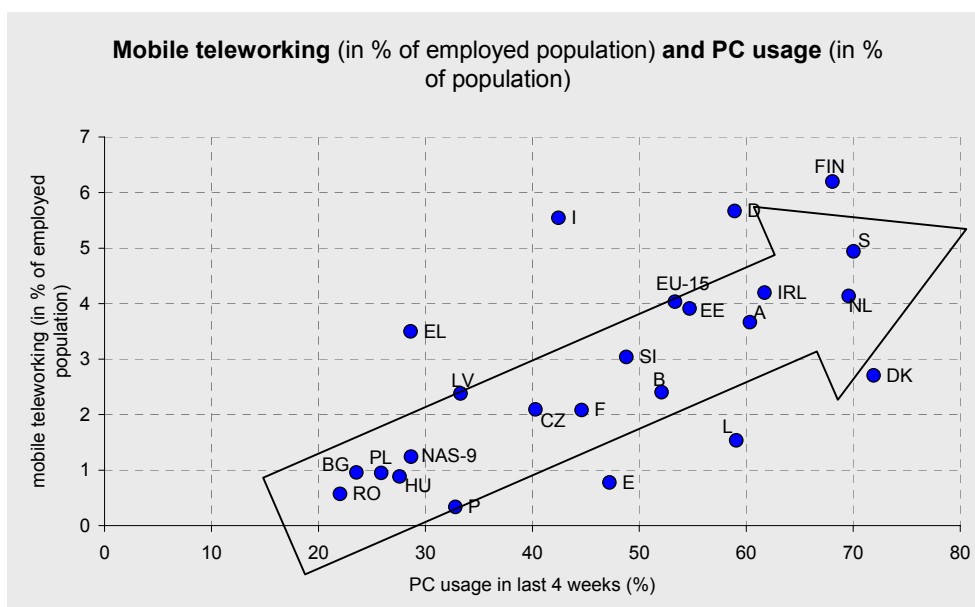
Mobile teleworking (in % of employed population) **and PC usage** (in % of population)

Table 20 Mobile teleworking and PC usage
Bases:'all persons employed reps. all respondents, weighted column percentages
Questions: A1, F1
Sources: SIBIS 2002, GPS, SIBIS 2003, GPS-NAS

In general, the percentage of mobile teleworkers[37] is low. The largest percentage is obtained in Finland (6%), while in Bulgaria 1% of employed population use it (EU-15 4%). The correlation between PC usage and mobile telework is observed, though it is not as obvious as the correlation between the feasibility and Internet usage.
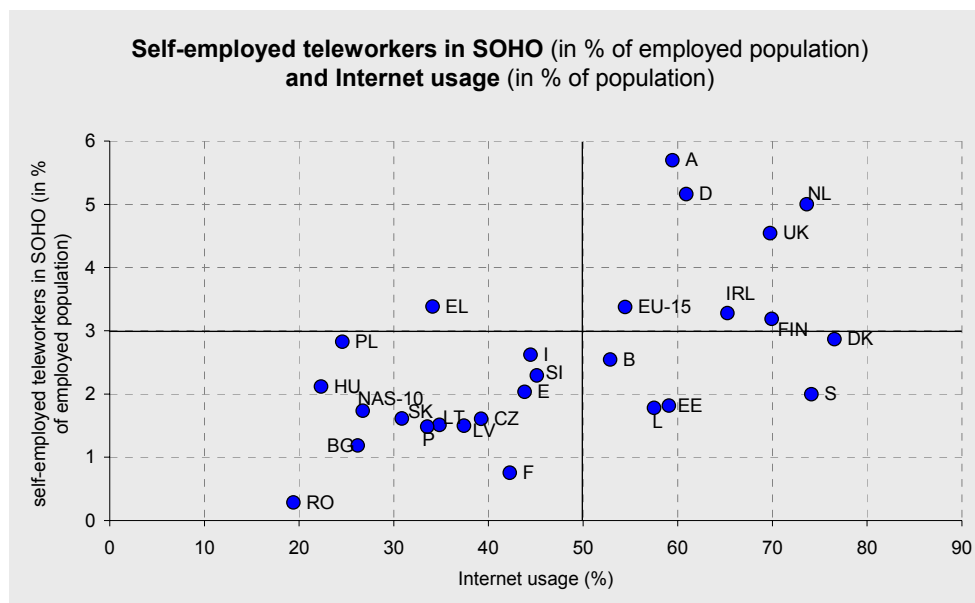
Self-employed teleworkers in SOHO (in % of employed population)
and Internet usage (in % of population)

Table 21 Self-employed teleworkers in SOHO and Internet usage
Bases: all persons employed reps. all respondents, weighted column percentages
Questions: A7, A8, IN6, E1
Sources: SIBIS 2002, GPS, SIBIS 2003, GPS-NAS

Considering self-employed teleworkers in SOHO (Small Office, Home Office) the countries might be divided into four groups, delimited by 50% Internet usage and 3% self-employed teleworkers in SOHO. While the majority of predominantly NAS countries (including Bulgaria, where 1.19% of employed population are self-employed teleworkers, and 1.74% for NAS – 10) are positioned in the lower left quadrant denoting the lower Internet usage and SOHO teleworkers percentage, some highly developed countries are also displaying below 3% of self-employed SOHO teleworkers (Sweden, Belgium, Luxemburg and Denmark). Among the most developed ICT countries the highest percentage of self-employed teleworkers in SOHO is found in Austria (5.7% vs. EU-15 3.4%; SI 2.3%), placing it in the upper right quadrant.

8.2 Structure and Outcomes of Employment

ICTs have played a significant role in forming a new structure of the employment. There are some specifics for national economy of Bulgaria, apart from the tendencies, described by the post-Fordist model, influenced by ICT as Kodratiev type base technology. They are connected with the fact, that Bulgarian society is a small-scaled one with characteristics like traditions in ICT education and production.

It defines supply of skilled and educated people in the country, which is higher, then those of the demand. But, from the other side, these specialists educated in Bulgaria are demanded in other countries in Europe, mostly Germany and last years – predominantly by USA.

That is why, the conclusions in this area has to be drawn not only on the base of the national, but on European context as well. The structure of employment in the country depends on a large extend on demand of nationally based hi-tech companies from EU and other advanced regions in addition to the structure of supply, developed by the structure of education.

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[37] Workers who spent any of their working time away from home and from main place of work, e.g. on business trips, in the field, travelling or on customer's premises

9. e-Government

The presence of e-Government in Bulgaria is growing as on-line activities become more wide spread. Generally, e-government designates any transaction that involves the government and that is carried out, even partially, using electronic means. E-government plays important function in mediating government actions ant its role will continue to grow as communication technologies become more wide spread. Already, communications technologies change the way that government operates by facilitating information dissemination, communications and transactions.

Government operates on several different levels: Government to citizen (GtC) Government to business (GtB), and Government to government (GtG). This chapter focuses firstly, on policy aspects and then – on analysis of the GPS survey results.

9.1 Policy aspects

The project for the National Strategy for e-government has been announced in 2002. But it has to be taken into account that the basis for functioning the e-government in Bulgaria already exists: the Law on electronic signature and the Law on protection of personal data are adopted; it is allowed to ask for public information electronically in the Law on access to public information; it is possible to use e-document as book-keeping document according to the Law on book-keeping; it is possible to declare electronically the required by the Law on duties and taxes, etc.

The realisation of e-government depends on two complementary aspects. First, the vision of e-government dictates the types of services that must be available on-line and the level of sophistication they must achieve. Second, the adoption of e-government by its intended users requires careful preparation, although this is not always possible, as the development of e-government may seem to just happen at times.

The main success in e-government introduction in Bulgaria is GtC and GtB.[38] Over 90% of central government agencies and public institutions have websites. They are of about 150 in 2002. In the beginning of 2002 on average[39] 20% of computers in public administration have access to the Internet. More concretely 80-100% of computers in regional administrations, 70-80% of ministries, and less then 20% of local administrations are connected to the Internet. Most government websites are not yet interactive and do not allow for e-payments or electronic submissions of forms.

According to 'Global e-government survey 2001', World Market Research Centre, Bulgaria occupies 40th position in 169 countries. This is a good staring position for implementation of e-government strategy in the country as an integrated part of e-Europe 2005. According to the action plan proposed more then ½ of the population 18+ to use e-government services in 5 years period. Several times the costs and the time needed for e-government services have to be reduced.

9.2 GPS indicators

This SIBIS GPS module focuses on one of the most exposed topic of Information Society. Due to its importance we included all measured indicators according to preference, availability, and usage of e-government. Included are following indicators: 'tax declaration', 'use of job search services', 'requests for personal documents', 'car registration', 'declaration

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[38] Information society, 2002, ½, p. 03
[39] See: Bulgaria. E-Readiness Assessment 2001, www.arc.online.bg

to the police', 'search for books in public libraries', and 'announcement of the change of address'.

Generally, e-government designates any transaction that involves the government and that is carried out, even partially, using electronic means. E-government plays an important function in mediating government actions and its role will continue to grow as communications technologies become more widespread. Already, communications technologies change the way that government operates by facilitating information dissemination, communications and transactions.
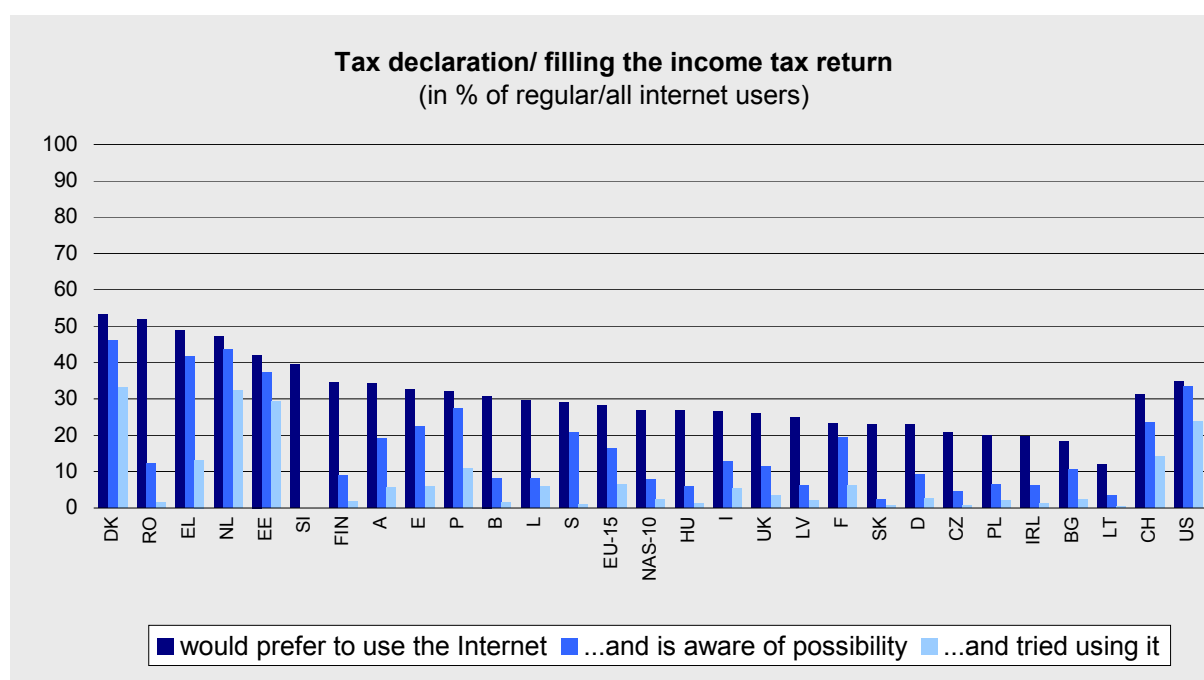
Tax declaration/ filling the income tax return
(in % of regular/all internet users)

Table 22 Tax declaration/filling the income tax return
Bases: EU-15 countries: regular Internet users, NAS-10 countries: all Internet users, weighted column percentages
Question: K1a
Sources: SIBIS 2002, GPS, SIBIS 2003, GPS-NAS

Citizens are asked whether they prefer to use the Internet to file their tax declaration; those who prefer to use the Internet for this service are asked whether this service is available on-line in the region where they live (as far as they know); if they believe that the service is available online, they are asked if they have ever tried to use this on-line tax declaration service. The same logic is used on other e-government indicators. In general, citizens are not very willing to use Internet, but for those citizens who prefer to use the Internet the awareness of availability and usage of the on-line services is relatively high. Bulgarians are not very interested in on-line tax declaration. There is no difference between EU and NAS average.
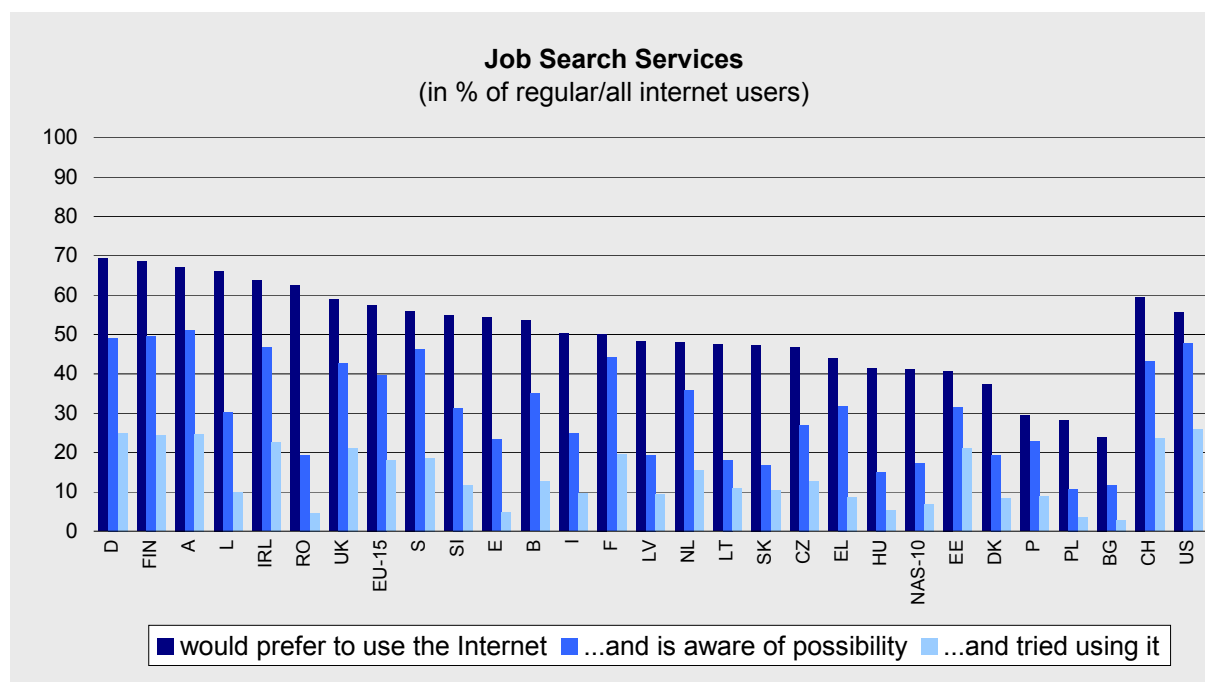
Job Search Services
(in % of regular/all internet users)

Table 23 Job Search Services
Bases: EU-15 countries: regular Internet users, NAS-10 countries: all Internet users, weighted column percentages
Question: K1b
Sources: SIBIS 2002, GPS, SIBIS 2003, GPS-NAS

In general, job search service is rather popular for on-line usage. Bulgarians have not very high interest for the service, and are somewhat lower in awareness and actual usage.
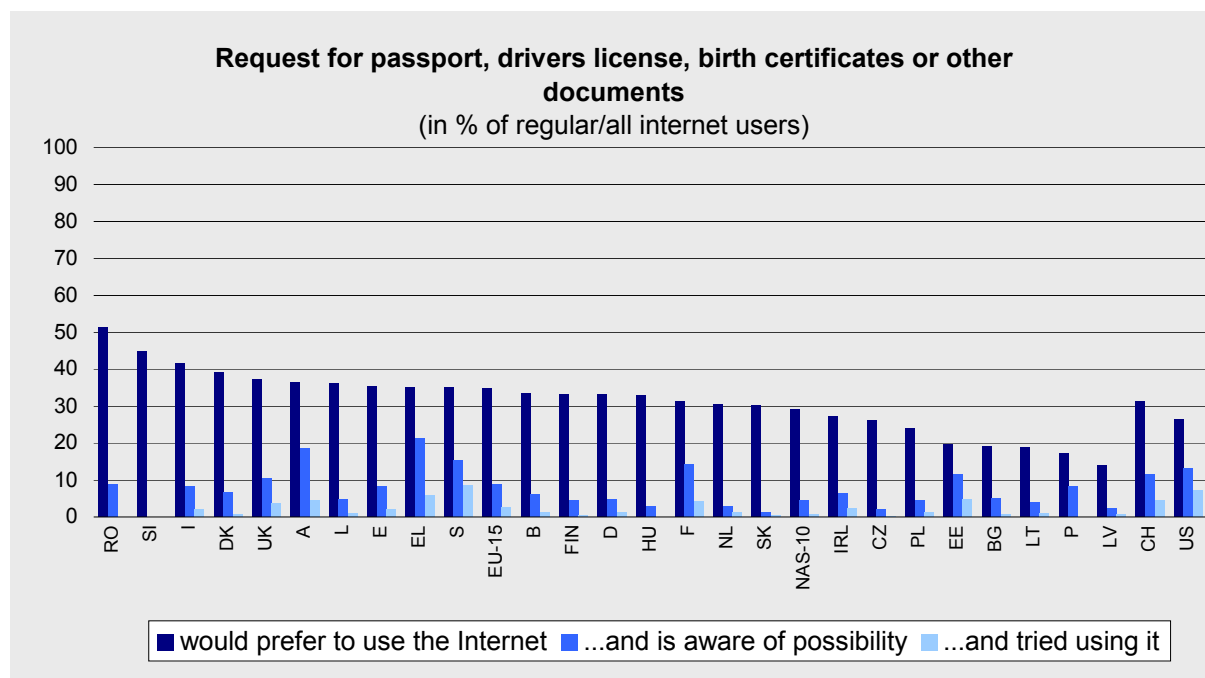
Request for passport, drivers license, birth certificates or other documents
(in % of regular/all internet users)

Table 24 Request for passport, drivers license, birth certificates or other documents
Bases: EU-15 countries: regular Internet users, NAS-10 countries: all Internet users, weighted column percentages
Question: K1c
Sources: SIBIS 2002, GPS, SIBIS 2003, GPS-NAS

In general citizens do not show a high preference for on-line document request service, and (awareness of) availability and usage are low.
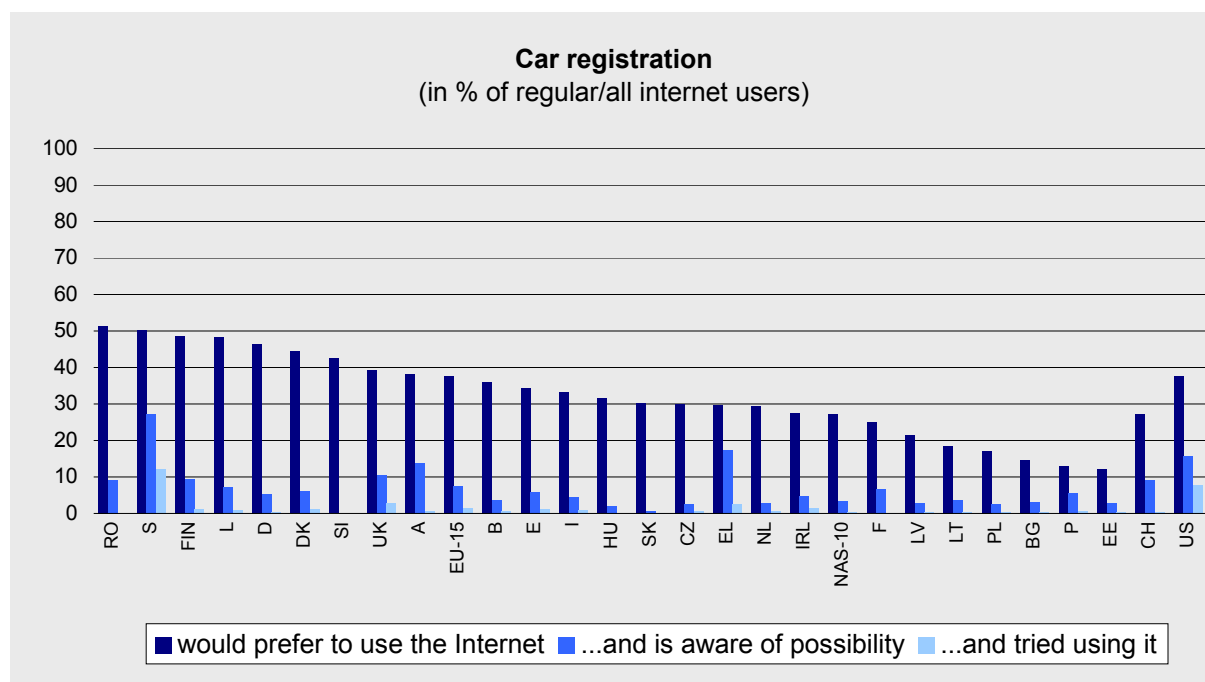
Car registration
(in % of regular/all internet users)

Table 25 Car registration
Bases: EU-15 countries: regular Internet users, NAS-10 countries: all Internet users, weighted column percentages
Question: K1d
Sources: SIBIS 2002, GPS, SIBIS 2003, GPS-NAS

For the car registration service Bulgarian Internet users display low interest compared to other countries. In general, awareness of the possibility to use this on-line service is rather low, and very few citizens tried to use this on-line service.
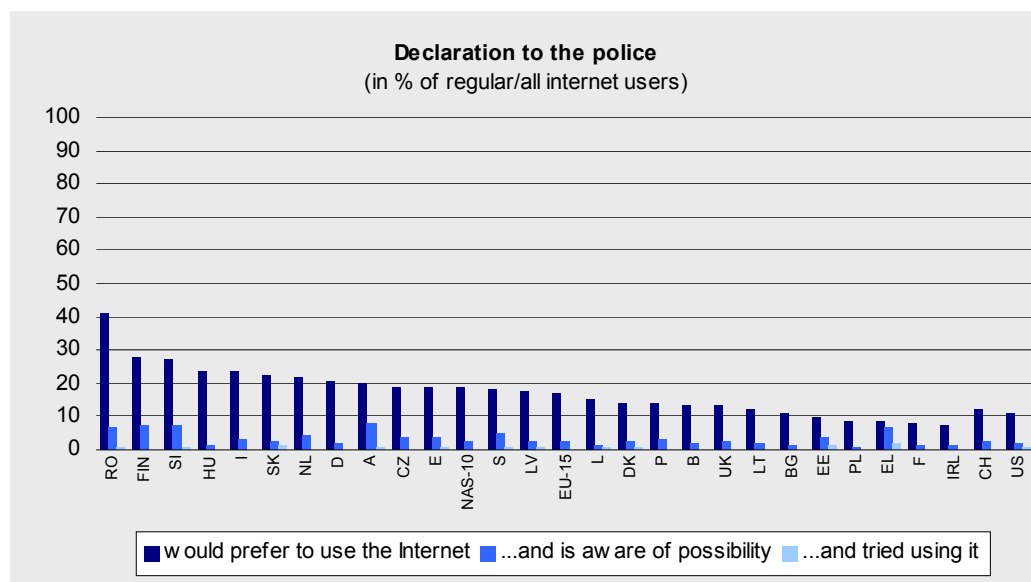
Declaration to the police
(in % of regular/all internet users)

Table 26 Declaration to the police
Bases: EU-15 countries: regular Internet users, NAS-10 countries: all Internet users, weighted column percentages
Question: K1e
Sources: SIBIS 2002, GPS, SIBIS 2003, GPS-NAS

Declaration to the police is the next service towards which Bulgarians do not show great interest, although they prefer using it than Estonians, Greeks, Polish, Irish and Finnish Finland.

Searches for books in public libraries
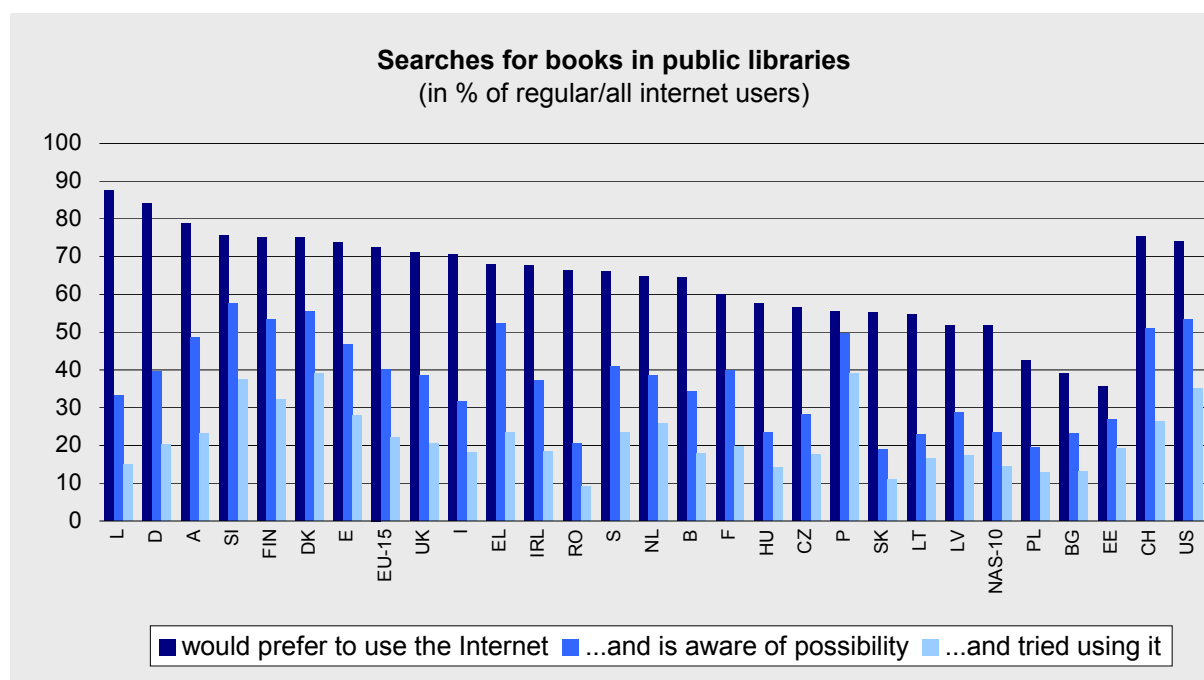(in % of regular/all internet users)

Table 27 Searches for books in public libraries
Bases: EU-15 countries: regular Internet users, NAS-10 countries: all Internet users, weighted column percentages
Question: K1f
Sources: SIBIS 2002, GPS, SIBIS 2003, GPS-NAS

This service shows a very high preference for on-line use and a considerable number of citizens who have the possibility to use this service on-line have tried to use it. Bulgaria is positioned on the lower position with regard to the interest, in awareness of this service, as well as in actual usage High interest and awareness (possibility) of the service most likely provides high usage, while the existence of the service alone does not provide the actual usage.

Announcement of change of address
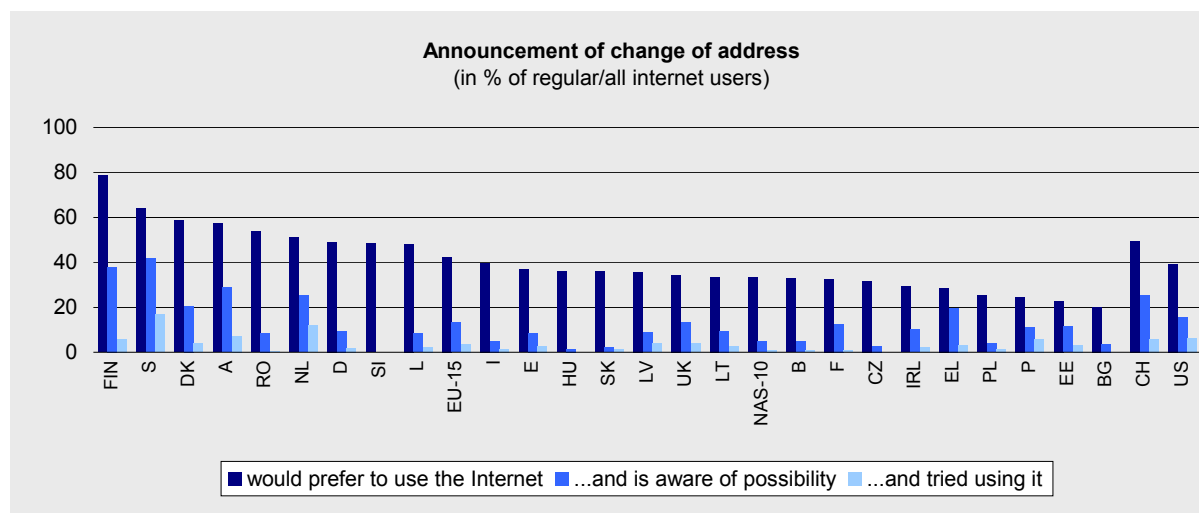(in % of regular/all internet users)

Table 28 Announcement of change of address
Bases: EU-15 countries: regular Internet users, NAS-10 countries: all Internet users, weighted column percentages
Question: K1g
Sources: SIBIS 2002, GPS, SIBIS 2003, GPS-NAS

For the announcement of the change of address via Internet Bulgarian Internet users are also not very much interested in comparison to the EU population. The usage of this on-line service is rather low in general, either because people are not aware that this service is available on-line or because it is not available yet.
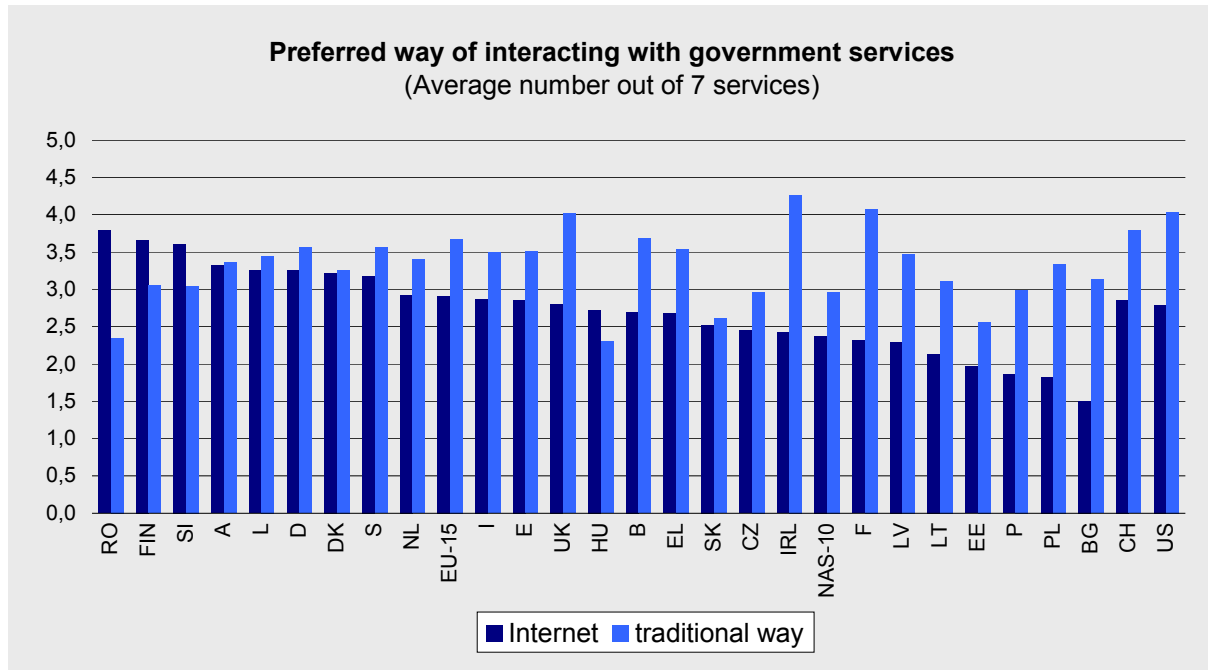
Preferred way of interacting with government services
(Average number out of 7 services)

Table 29 Preferred way of interacting with government services
Bases: regular Internet users, average number of services
Question: K1
Sources: SIBIS 2002, GPS, SIBIS 2003, GPS-NAS

Many externalities that vary from one EU Member State to the next may influence the preference of respondents for e-government so differences in the preferred way of interacting with government that are seen across the EU cannot be analysed immediately. Generally, respondents from the northern countries of Europe show a greater preference for interacting with government using Internet than the EU as a whole. Together with Finland, Slovenia is the only European country with sizeable Internet penetration where the interest of on line communication with the government surpasses the classical options of communication.

10. Conclusions

The SIBIS + GPS (January 2003) confirmed a general lag in Information society development in Bulgaria, and helped to identify some potentials for catching-up in the future.

The low level of PC penetrations is among the major constraints to faster Internet growth. New computers cannot compensate the depreciation of older machines. Computer access is concentrated in bigger cities and mainly in Sofia. Bulgarian Internet users typically access the virtual space for three main purposes: as a source of information, for entertainment purposes, and for business and education purposes. Financial transaction operations and on-line shopping are still used rarely. The main reasons for this are the reliability of the connection, the low level of awareness of these technologies and the low level of trust in electronic banking (only three of commercial banks – United Bulgarian Bank, First Investment Bank, and Union bank – provide e-services).

Internet users in Bulgaria are 267 out of 1000, which number is higher than in Hungary, Poland, and Romania. But the level of Internet usage in Bulgaria is lower than the best-performed NAS countries such as Estonia (591.23 – w.), or Slovenia. In % the Internet users are 26.7% of the population in Bulgaria in January 2003. This level is more then twice higher then a year ago. If the present tendency is preserved, the number of PC users is expected to grow substantially over the next few years due to the wider Internet penetration among young people.

The low level of PC penetrations is among the major constraints to faster Internet growth in Bulgaria. New computers cannot compensate the depreciation of older machines. When looking at the GPS survey results in more detail it becomes apparent that the high-bandwidth, multi platform ideal access environment is still very far away in Bulgaria. Information and communication technologies uptake is still unevenly distributed across various subgroups of population. This statement is supported by the results from the GPS and previous surveys in Bulgaria, which concern the same topic.

The well-developed fixed network and high rate of mobile subscribers are a solid precondition for the development of Internet services and wireless applications. According to the GPS results the basic access to telecommunication networks is well performed in Bulgaria in fixed telephones and faxes. But the level of access and usage of mobile phones is approximately low comparatively to the levels of NAS-10.

The citizens' inclusion into IS development (access to and use of Internet) is the main social policy concern of e-society development. Advantage of the country in this respect is the long – term traditions in hi-quality education in ICT, which are a good precondition for developing needed knowledge for citizen's inclusion into IS. There are 47 Universities in Bulgaria, located in 26 cities and towns. Around 50% of them have computer specialties. Over 6,000 Bulgarian students are currently majoring in Computer Science; another 5,000 have chosen electric engineering, mathematics, physics and biotechnology.

Nevertheless in January 2003 the level of participation in lifelong learning in % of labour force is 5.06%, which is higher than Romania only (3.51%). In comparison the leaders (Finland and the US) have levels of over 37%. The participation in any learning during the four weeks previous to the survey, in % of labour force is the lowest in Europe – 7.56%, and far away from the leader – Finland with 59.86%. The level of self-directed learning in % of labour force in the lowest among countries – 5.51%, which is about 8-9 times less then leaders such as Germany - 51.73%, Austria – 47.6%, and Finland – 44.45%. The total (online and offline) usage of e-Learning as a percentage of labour force is lowest among countries – 3.17%, included in SIBIS+ General Population Survey. But the level of on-line usage of e-learning in Bulgaria is higher then in Greece and Poland. This picture is

corresponding to the level of penetration of computers at schools and training provided by companies in Bulgaria. A lack of necessary financial resources is the main reason not to be launched plans for education according to 45.7% of managers in the companies.

This is the reason for the level of e-economy and e-commerce implementation in Bulgaria, in spite of the situation has sharply changed for the last year (2002). According to the Information Society Index, which rates 55 countries, comprising 96% of World GDP and 99% of World's expenditure, Bulgaria falls in the Sprinter Group (where investments surge and retreat on the whims of social, political, and economic change), together with countries like the Czech Republic, Poland and Hungary. However, Bulgaria has the advantage of established traditions and experience in the IT sector and well-structured private companies, which cover almost the whole spectrum of IT applications. According to research of the IDG group, the **yearly growth of the IT sector in Bulgaria is about 35%.** IT spending for 2001 is about USD 188.4 million and estimated total revenues will be around USD 270 million. There are **more than one thousand** IT small and medium sized enterprises in Bulgaria now .The software companies cover almost the whole spectrum of software applications from Enterprise Resource Planning to CAD/CAM/CAE. The constant and stable penetration of PCs and especially of mobile telephones (around 1,5M subscribers of the existing three mobile operators in 2001) in Bulgaria is a huge stimulating factor for such development.

The fast growing e-economy and e-commerce and recent use of ICT leads to possibilities for 'multi-locational eWork' – that is, working from more then one location while staying connected to the company and work colleagues. In January 2003 the interest in telework – current teleworkers in % of employed population is high in Bulgaria. It is higher than EU-15 average and NAS-10 average. This interest could be explained with relatively high share of ICT specialists and traditions in good quality of ICT education in higher schools in the country.[40] The higher interest in telework in Bulgaria is not directly connected with the ICT skills requirements for jobs in national companies. The feasibility of teleworking is estimated as less than 10%. In comparison with other countries – the feasibility of teleworking in NAS – 10 is almost 15% and for EU-15 – more than 30%.

Another characteristic of IS is e-Government development. According to 'Global e-Government survey 2001', World Market Research Centre, Bulgaria occupies 40th position in 169 countries. This is a good staring position for implementation of e-government strategy in the country as an integrated part of e-Europe 2005. According to the action plan proposed more than ½ of the population 18+ to use e-government services in 5 years period. Several times the costs and the time needed for e-government services have to be reduced.
The main success in e-government introduction in Bulgaria is Government to Citizen (GtC) and Government to Business (GtB).[41] Over 90% of central government agencies and public institutions have websites. The number of websites is of about 150 in 2002. In the beginning of 2002 on average[42] 20% of computers in public administration have access to the Internet. There is a differentiation in levels of access to computers with Internet connection between central and local Government administration bodies. More concretely 80-100% of computers in regional administrations, 70-80% of ministries, and less then 20% of local administrations are connected to the Internet. Most government websites are not yet interactive and do not allow for e-payments or electronic submissions of forms.

Nevertheless the GPS results has said low level of preference, availability, and usage of e-government in the country. More concretely this conclusion concern tax declaration, requests for personal documents, car registration, declaration to the police, search for books in public libraries, and announcement of the change of address. In general, citizens are not very willing to use Internet, but for those citizens who prefer to use the Internet the awareness of

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[40]DG Enterprise. Innovation policy profile. Bulgaria. March, 2003, www.cordis.lu
[41] Information society, 2002, ½, p. 03
[42] See: Bulgaria. E-Readiness Assessment 2001, www.arc.online.bg

availability and usage of the on-line services is relatively high. Only job search service is rather popular for on-line usage.

The SWOT of Information society performance in Bulgaria:

The country strengths for Information society development:
- Traditionally high interest for ICT services and developments
- Level of supply of educated and skilled personnel
- Developed competencies of small and medium sized IT companies covering almost the whole spectrum of software applications from Enterprise resource Planning to CAD/CAM/CAE

The country weaknesses for Information society development:
- The low level of PC penetrations
- Low level of on-line preference of interacting with government services
- Low level of e-learning
- Low level of searching of heath-related information online
- Disintegrated governmental web presence
- Limited offer of G2C services
- Low level of mobile phone penetration

The opportunities for Information society development:
- Integration into EU structures
- National strategy for IS development
- Institutional and human potential
- 35% yearly growth of IT sector in the country
- Pace of the ICT penetration, and more specifically – Internet one among young people
- Ability of the business sector to develop not only design work, but also maintenance and testing fully integrated systems and solutions.

The threats for Information society development:
- Insufficient demand for ICT sector products and services (in comparison with their supply).

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14.   www.arc.online.bg

15.   www.minedu.government.bg

16.   www.ict.bg

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21.   SIBIS WP5, Topic report No.3 "Security and Trust", RAND Europe, (www.sibis-eu.org)

22.   SIBIS WP5, Topic report No.4 "Education", Danish technological Institute, (www.sibis-eu.org).

23.   SIBIS WP5, Topic report No.5 "Work, employment and skills", empirica, Germany, (www.sibis-eu.org).

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26.   SIBIS WP5, Topic report No.8 "e-Government", RAND Europe, (www.sibis-eu.org)

Abbreviations

A – Austria
ADSL – Asymmetric Digital Subscriber Line
ARNES - Academic and Research Network of Slovenia
B – Belgium
BG – Bulgaria
CMI – Centre for Methodology and Statistics
CZ – Czech Republic
D – Germany
DG INFSO – Information Society Directorate-General
DIDIX – Digital Divide Index
DK – Denmark
DMS – Decision Maker Survey
DURS – Tax Office of Republic of Slovenia
E – Spain
EE – Estonia
EL - Greece
EU – European Union
EU-15 – average of all 15 European countries
Eurostat – European Statistical Office
F – France
FIN – Finland
FSS-UL – Faculty of Social Sciences at University of Ljubljana
G2C – government to citizen
GDP – Gross Domestic Product
GPS – General Population Survey
HU – Hungary
I - Italy
ICT – Information and Communication Technology
IPMIT - The Institute for Project Management and Information Technologies
IRL – Ireland
IS – Information Society
ISDN – Integrated Services Digital Network
ISP – Internet Service Provider
IST – Information Society Technologies
L – Luxemburg
LT – Lithuania
LV – Latvia
NAS – Newly Associated States
NAS countries - Estonia, Lithuania, Latvia, Bulgaria, Check Republic, Poland, Romania, Hungary, Slovakia and Slovenia
NAS-10 - average of all 10 NAS countries
NL – Nederland
NSI – National Statistical Institute
OECD – Organisation for Economic Co-Operation and Development
P – Portugal
PC – personal computer
PL – Poland
R&D – research and development
RIS – Research on Internet in Slovenia
RO - Romania
S – Sweden
SI – Slovenia
SIBIS – Statistical Indicators Benchmarking the Information Society

SIBIS+ - geographically expansion of the SIBIS activities from the EU Member States to the Newly Associated States
SK – Slovakia
SOHO – small office, home office
SORS - Statistical Office of Republic of Slovenia
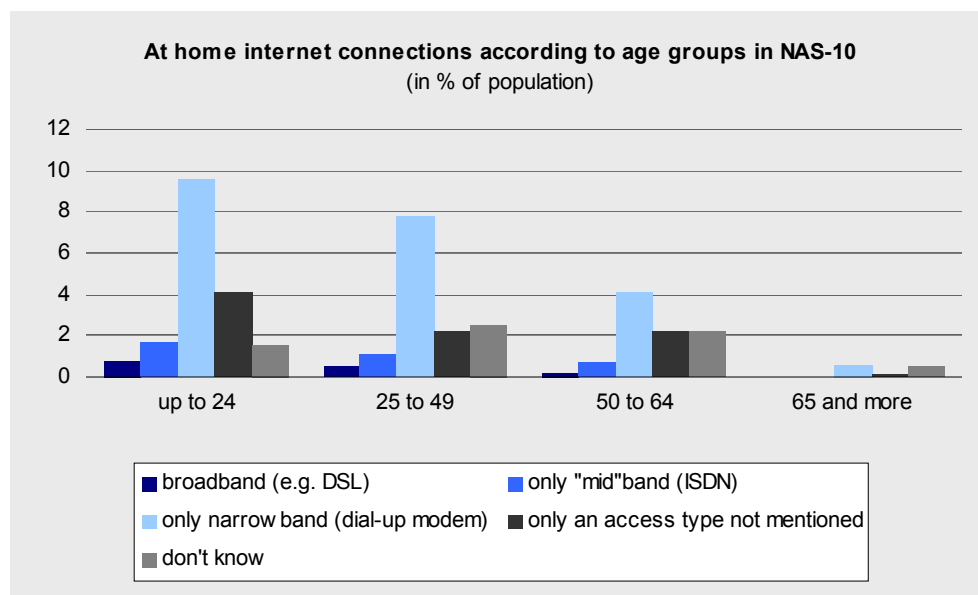T&A – telecommunication and access
UK – United Kingdom
WP – work package; relates to the work package of the SIBIS project
xDSL – any Digital Subscriber Line
SMS – short massage service

ANNEX 1 Additional tables/graphs with data (analysing data)
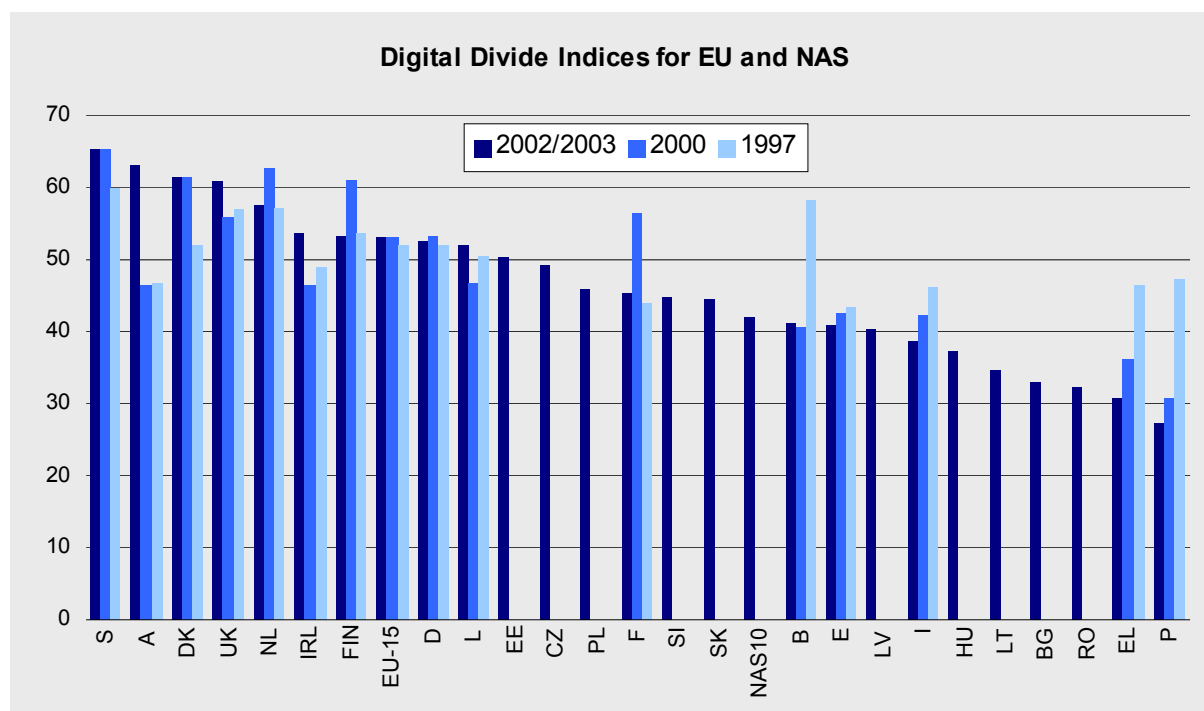
Telecommunication and Access

At home internet connections according to age groups in NAS-10
(in % of population)

Base: all respondents, weighted column percentages
Question: A11b
Source: SIBIS 2003, GPS-NAS

e-Society and Social inclusion

Digital Divide Indices for EU and NAS
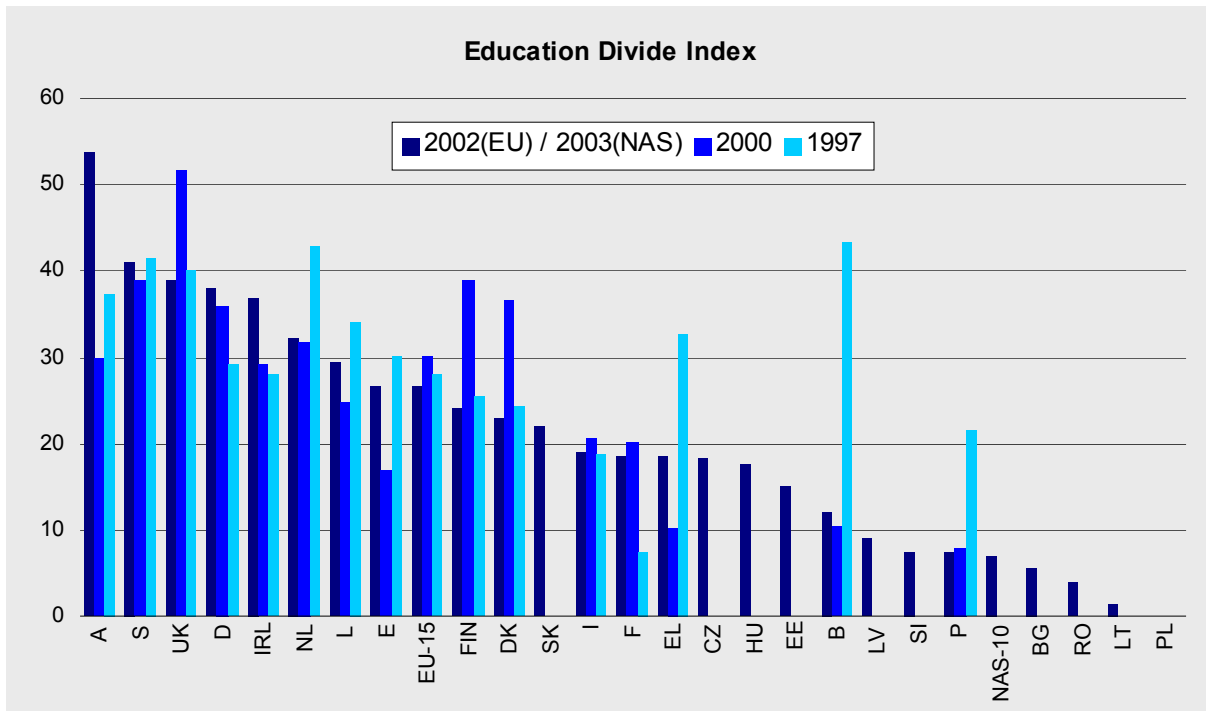

Base: 1997, 2000: N=15,900, weighted by standard Eurobarometer country and EU-15 weights; 2002, 2003: all respondents, weighted percentages
Questions: 2002, 2003: IN1, IN3, Z19, Z21
Sources: 1997: Eurobarometer 47.0, Jan-Feb 1997; 2000: Eurobarometer 54, Oct-Nov 2000; 2002: SIBIS 2002, GPS; 2003: SIBIS 2003, GPS – NAS
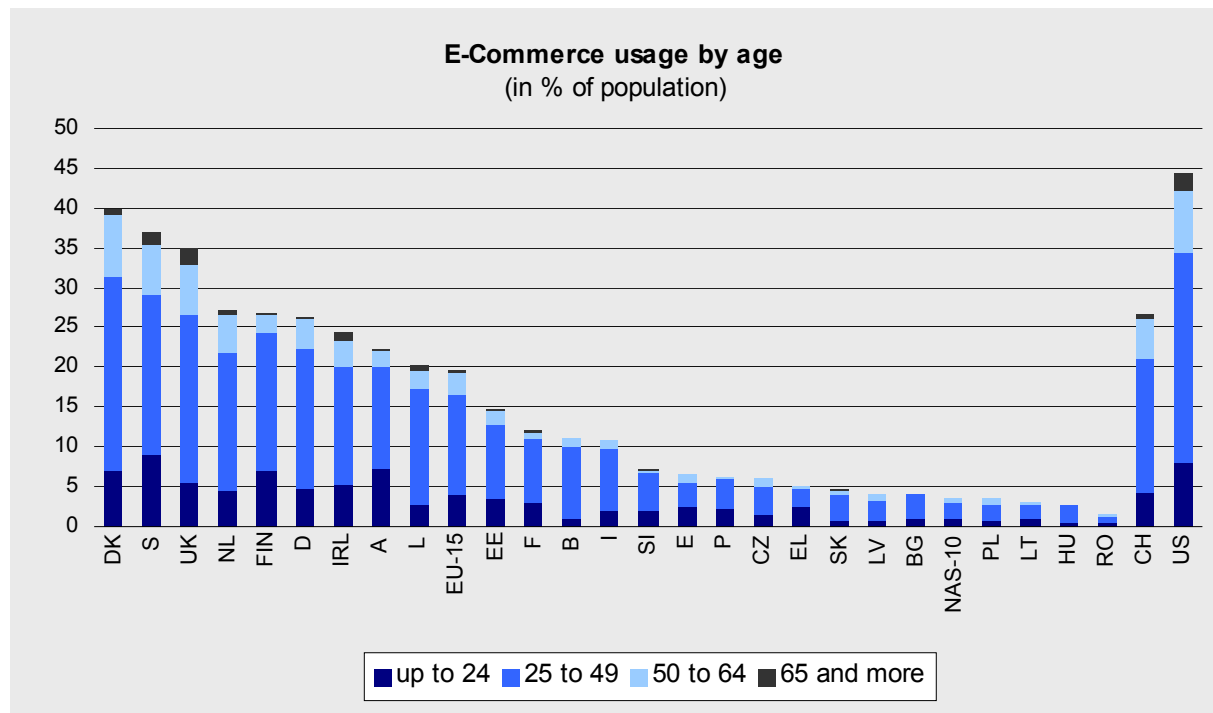
Education Divide Index

Base: 1997, 2000: N=15,900, weighted by standard Eurobarometer country and EU-15 weights; 2002, 2003: all respondents, weighted percentages
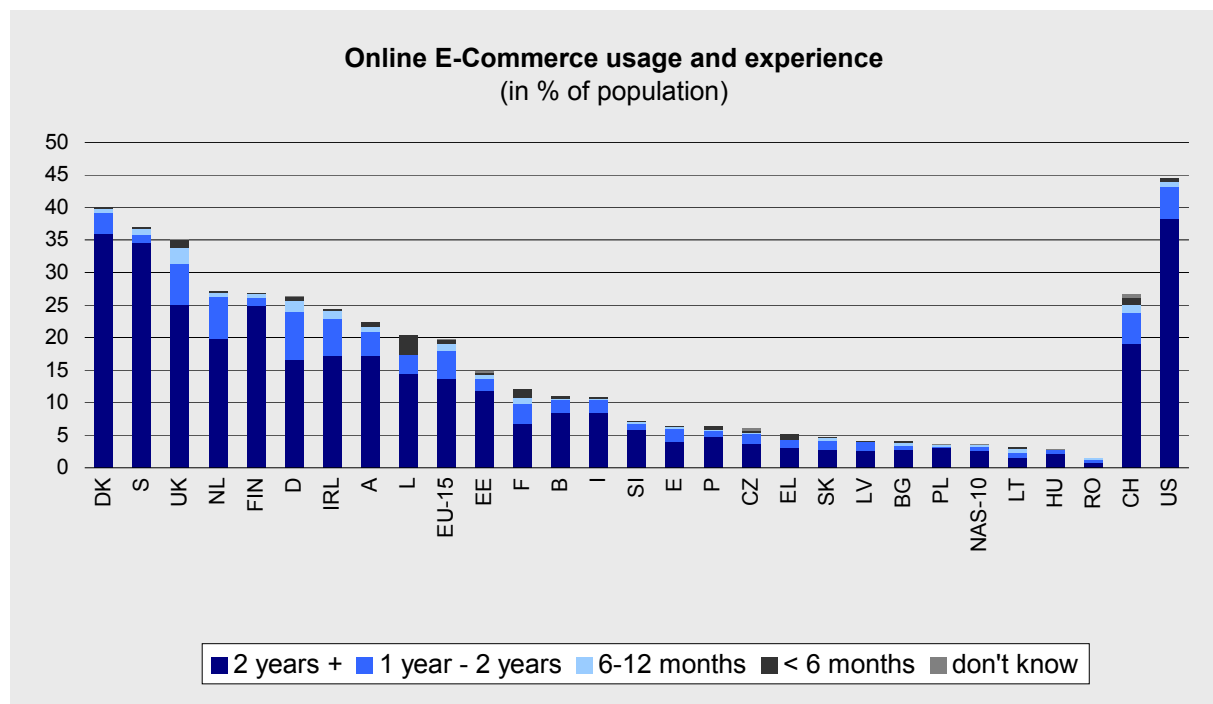*Questions: 2002, 2003: IN1, IN3, Z19, Z21*
Sources: 1997: Eurobarometer 47.0, Jan-Feb 1997; 2000: Eurobarometer 54, Oct-Nov 2000; 2002: SIBIS 2002, GPS; 2003: SIBIS 2003, GPS – NAS
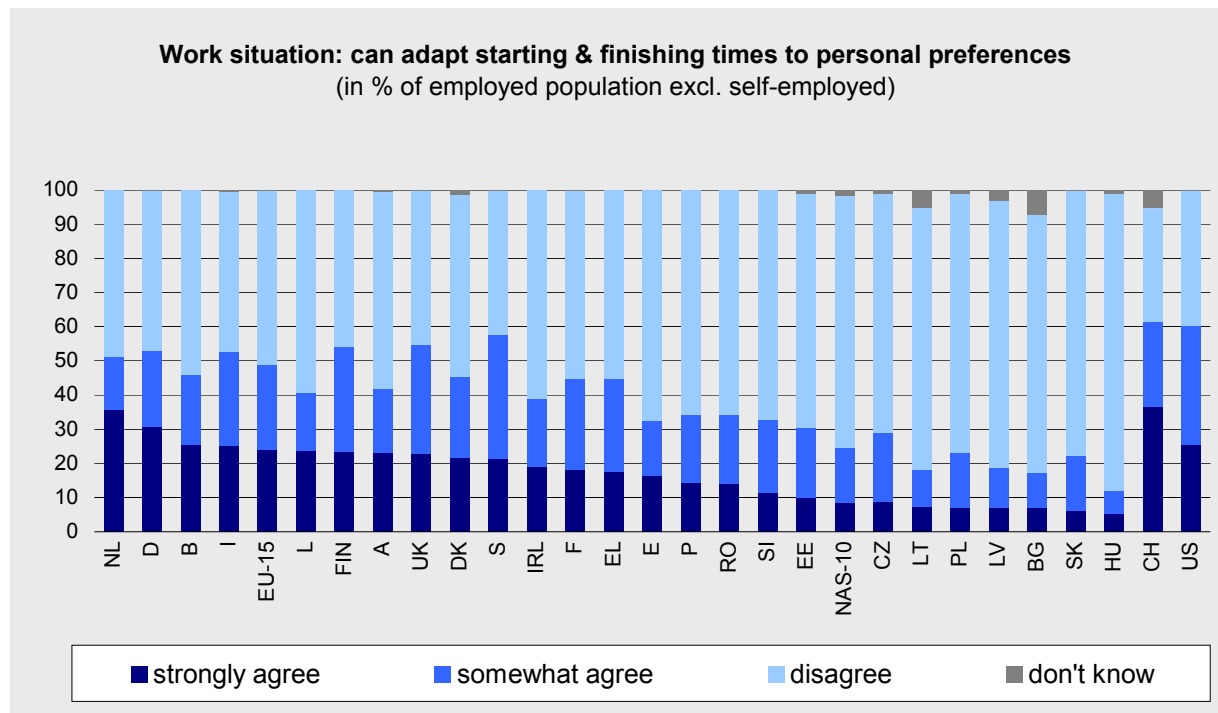
E-Economy and e-commerce

E-Commerce usage by age
(in % of population)

Bases: all respondents, weighted column percentages
Questions: B1, IN1
Sources: SIBIS 2002, GPS, SIBIS 2003, GPS-NAS

Online E-Commerce usage and experience
(in % of population)

Bases: all respondents, weighted column percentages
Questions: B1, A10
Sources: SIBIS 2002, GPS, SIBIS 2003, GPS-NAS

e-Work

Work situation: can adapt starting & finishing times to personal preferences
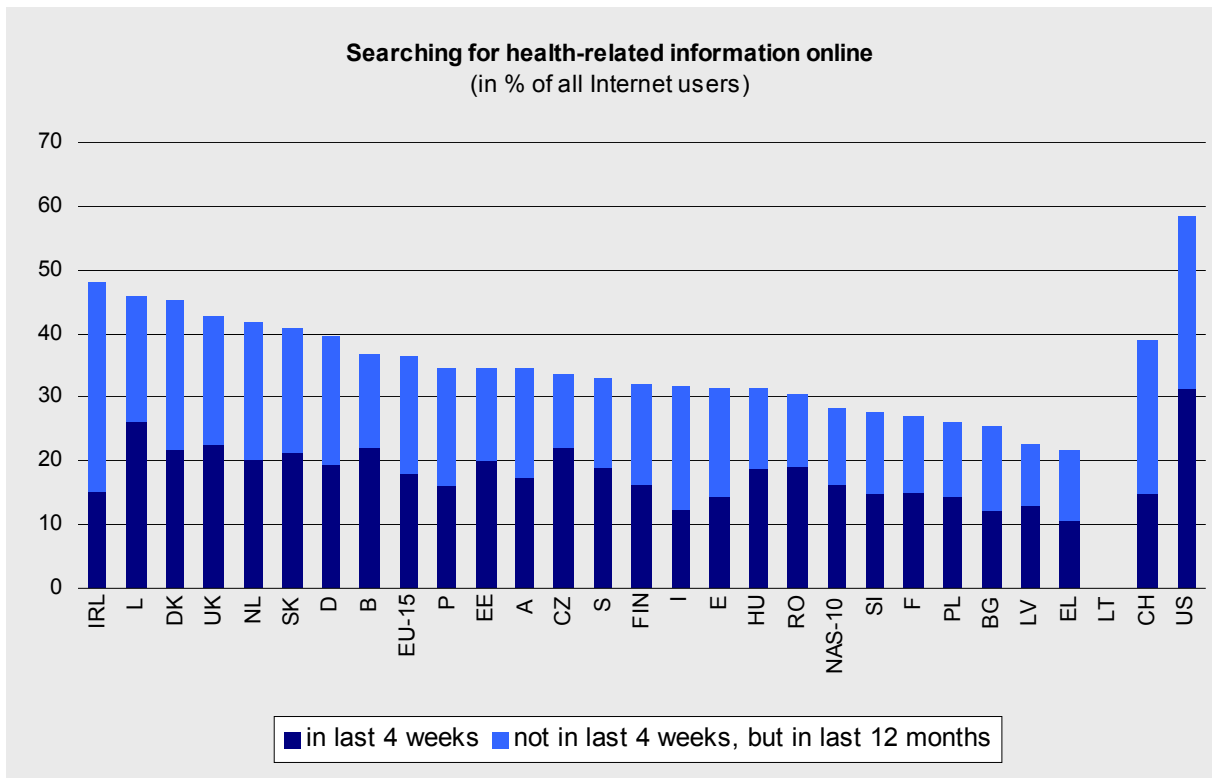(in % of employed population excl. self-employed)

Bases: all persons employed excluding self-employed, weighted column percentages
Questions: H2e
Sources: SIBIS 2002, GPS, SIBIS 2003, GPS-NAS

e-Health

Searching for health-related information online
(in % of all Internet users)

Legend: ■ in last 4 weeks ■ not in last 4 weeks, but in last 12 months

Bases: all Internet users, weighted column percentages
Questions A18f
Sources: SIBIS 2002, GPS, SIBIS 2003, GPS-NAS

ANNEX 2 Methodology

Methodology of the GPS 2002 survey

The survey was conducted in April-May 2002 (interviews were carried out between 4th April and 18th May) in all 15 EU Member States plus Switzerland and the US, using computer-aided telephone interviews. The survey was co-ordinated and executed by INRA Deutschland GmbH, Mölln. The population for this study is all persons aged 15 and over living in private households in the respective countries and speaking the respective national language(s). 11,832 interviews were successfully completed. The average interview length per country varied between 10 (Greece) and 20 minutes (Sweden).

Sampling: Target households were selected at random in all countries, either by random dialling techniques such as permutation of final digits or by drawing a random sample from official sources. Mostly a geographical stratification was implemented beforehand. For the selection of the target person common random keys were applied in all countries except for the UK where quota was used. In two cases (Spain, the US), screening had to be directed towards male respondents towards the very end of the field in order to gain gender representativeness.
There were three adjustments necessary in order to provide reliable data:

Transformation from household sample to person sample. As only one person per household is interviewed, the described sample procedure provides a household sample, i.e. each household of the base population has the same likelihood of being in the sample but not each person. With the weighting stage of the transformation the equal likelihood of households is replaced mathematically by the equal likelihood of the individuals. To this end, each data set is multiplied by the amount of people in the household aged 15 or over. This number is subsequently divided by the average household size in order to obtain the actual case number.

Adjustment of unweighted sample structure to the official statistic. Because random samples are not evenly distributed across all population strata, the distribution of unweighted samples regularly and systematically deviate from the population distribution from official statistics. Through the mathematical weighting the sample distribution was adjusted to the official statistics. The national weighting factor, which results from the iterative weighting, was included in the data material.

Adjustment of weighted sample structure to the EU-15 Member States population. This weighting factor was necessary to calculate total figures according to the whole population of the European Union Member States. Furthermore it is useful to compare the EU with the US. Population sizes of each Member State are weighted to reduce the distortion based on the sample sizes in each country.

NOTE: The GPS 2002 questionnaire is available on-line and can be obtained from the SIBIS website: http://www.sibis-eu.org/sibis/statistics/questionnaires.htm.

Sample characteristics GPS 2002

	Total		**EU-15**	
	unweighted	weighted	unweighted	weighted
Total sample	**11832**	**11832**	**10306**	**10306**
Country				
B	585	585	-	-
DK	501	501	-	-
D	1001	1001	-	-
EL	505	505	-	-

E	1015	1015	-	-
F	1000	1000	-	-
IRL	500	500	-	-
I	1000	1000	-	-
L	500	500	-	-
NL	530	530	-	-
A	500	500	-	-
P	500	500	-	-
FIN	669	669	-	-
S	500	500	-	-
UK	1000	1000	-	-
EU-15	-	-	10306	10306
CH	522	522	-	-
US	1004	1004	-	-
Age groups				
Up to 24	1964	2019	1731	1651
25 to 49	5511	5309	4817	4593
50 to 64	2515	2495	2191	2209
65 and more	1833	2000	1558	1839
Don't know	9	9	9	14
Terminal education age				
Up to 13	695	717	693	728
14	715	742	701	881
15 to16	1794	1750	1641	1820
17 to 20	3587	3515	2997	2937
21 and more	3266	3275	2743	2495
Still studying	1687	1751	1463	1372
Don't know	88	81	77	73
Internet usage				
Total Internet use	6905	6908	5828	5610
Regular use (last 4 weeks)	5944	5948	4985	4781
Occasional use (last 12 months)	961	960	843	830
Non Internet use	5550	5643	4655	4548
Employment status				
Paid employment	4966	4853	4291	4133
Self-employed	935	941	809	799
Unemployed/ temporarily not working	701	683	621	631
In education	1687	1751	1463	1372
Retired or other not working	3441	3510	3034	3292
Don't know	102	94	88	80
Longstanding illness				
Existence of health limiting conditions	1898	1885	1645	1610
No existence of health limiting conditions	9868	9858	8607	8606
Don't know	66	90	54	90
Mobile phone usage				
Mobile phone owner	8202	8192	7301	7121
Teleworking				
Home based teleworkers	217	233	168	172
eHealth usage				
Searched for health-related info online	2712	2728	2149	2041
Searched and found health-related info online	2578	2592	2038	1916

Methodology of the GPS-NAS 2003 survey

The survey was conducted in January 2003 (interviews were carried out between 1st January and 31st January) in the 10 Newly Associated States Bulgaria, Czech Republic, Estonia, Hungary, Lithuania, Latvia, Poland, Romania, Slovenia and Slovakia, using personal aided personal interviews (PAPI). The survey was co-ordinated and executed by NFO AISA Czech Republic, Prague. The population for this study is all persons aged 15 and over living in private households in the respective countries and speaking the respective national language(s). 10,379 interviews were successfully completed. The average interview length per country varied between 20 (Romania) and 40 minutes (Lithuania).

Sampling: Target households were selected at random in all countries, either by multistage stratified random-route sampling or by drawing a random sample from official sources. Mostly a geographical stratification was implemented beforehand. For the selection of the target person common random keys were applied in all countries, i.e. the next birthday method and the Kish method, except for Bulgaria where quota was used.

There were three adjustments necessary in order to provide reliable data:

Transformation from household sample to person sample in Poland and Slovenia. As only one person per household is interviewed, the described sample procedure provides a household sample, i.e. each household of the base population has the same likelihood of being in the sample but not each person. With the weighting stage of the transformation the equal likelihood of households is replaced mathematically by the equal likelihood of the individuals. To this end, each data set is multiplied by the amount of people in the household aged 15 or over. This number is subsequently divided by the average household size in order to obtain the actual case number.

Adjustment of unweighted sample structure to the official statistic. Because random samples are not evenly distributed across all population strata, the distribution of unweighted samples regularly and systematically deviate from the population distribution from official statistics. Through the mathematical weighting the sample distribution was adjusted to the official statistics. The national weighting factor, which results from the iterative weighting, was included in the data material.

Adjustment of weighted sample structure to the NAS-10 countries population. This weighting factor was necessary to calculate total figures according to the whole population of the Newly Associated States. Furthermore it is useful to compare the NAS with the EU. Population sizes of each of the ten states are weighted to reduce the distortion based on the sample sizes in each country.

NOTE: The GPS-NAS 2003 questionnaire is available on-line and can be obtained from the SIBIS website: http://www.sibis-eu.org/sibis/statistics/questionnaires.htm.

Sample characteristics GPS-NAS 2003

	Total		NAS-10
	unweighted	weighted	weighted
Total sample	10379	10371	10379
Country			
BG	104	1008	-
CZ	1096	1096	-
EE	1001	1001	-
HU	1000	1000	-
LT	1017	1017	-
LV	1006	994	-
PL	1000	1000	-
RO	1054	1054	-
SI	102	1002	-
SK	1199	1199	-
NAS-10	-	-	10379-
Age groups			
Up to 24	2036	1825	1736
25 to 49	4473	4604	4593
50 to 64	2402	2202	2234
65 and more	1468	1740	1816
Long standing illness			
Existence of health limiting conditions	2272	2386	2555
No existence of health limiting conditions	7961	7836	7688
Don't know	146	149	137
Terminal education age			

Up to 13	374	433	575
14	658	682	855
15 to16	1099	1151	1099
17 to 20	4784	4816	4869
21 and more	1823	1833	1719
Still studying	1407	1213	1057
Never went to school	59	59	68
Don't know	175	184	138
Employment status			
Paid employment	4038	3999	3354
Self-employed	608	622	690
Unemployed/ temporarily not working	1272	1303	1506
In education	1407	1213	1057
Retired or other not working	3052	3231	3764
Don't know	2	3	9
Internet usage			
Never heard of the Internet (incl. don't know)	1349	1437	1506
Ever heard of the Internet	9030	8935	8773
Total Internet use	3700	3507	2773
Regular use (last 4 weeks)	3025	2852	2215
Occasional use (last 12 months)	675	655	559
Non Internet use	6679	6864	7606
Mobile phone usage			
Mobile phone owner	5763	5635	4534
Telework			
Home based teleworkers	162	162	120