Central and Eastern Europe Information Society Benchmarks

Summary Report

September 2004

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Foreword

Background

European leaders set, at the Lisbon Summit in 2000, the ambitious objective for Europe to "*become the most competitive and dynamic knowledge-based economy in the world capable of sustainable economic growth with more and better jobs and greater social cohesion by 2010*".

The EU's eEurope Action Plan launched in Feira on 19-20 June 2000 aimed at bringing Europe closer to meeting the Lisbon objectives. It provided for concrete actions and targets aimed at making Internet use cheaper and faster, providing modern public services online and progressing a dynamic, e-business environment to attain these goals. In order to meet this challenge and to help accelerate reform and modernisation of their economies, encourage capacity and institutional building, the then 13 Candidate Countries launched a collective action, mirroring this Action Plan, on the occasion of the Göteborg European Council in June 2001, known as the eEurope+ Action Plan.

A first picture of the status of implementation of the targets of the eEurope+ Action Plan was subsequently provided with the presentation of the first eEurope+ Progress Report, in June 2002, at the European Ministerial Conference: "Information Society - Connecting Europe" held in Ljubljana, Slovenia.

The presentation of the Final eEurope+ Progress Report in February 2004 coincided with the biggest enlargement ever undertaken by the European Union, both in terms of scope and diversity. Ten countries - Cyprus, the Czech Republic, Estonia, Hungary, Latvia, Lithuania, Malta, Poland, the Slovak Republic, and Slovenia were set to join the Union on 1st May 2004.

The Final eEurope+ Progress Report was based upon statistical information obtained from Surveys carried out within 10 of the 13 candidate countries during 2003: Bulgaria, the Czech Republic, Estonia, Hungary, Latvia, Lithuania, Poland, Romania, the Slovak Republic, and Slovenia – referred to in this report as the Central and Eastern European Countries (the CEE 10).

Summary Report

This Summary Report of the eEurope+ Benchmarking and Monitoring Project presents the main findings and conclusions resulting from analysis of the results of the Surveys. The Introduction briefly describes the background and circumstances in which the CEE 10 are progressing towards the establishment of their Information Societies. This is followed by a review of the current national landscapes pertinent to telecommunications and their associated infrastructures. Aspects of Internet access are considered before an examination of the current status of ICT within the sphere of education, There is particular focus on Tertiary Education, expected to provide a highly skilled ICT workforce for the future. ICT in the workplace examines the levels of ICT skills within the context of e-Learning followed by a snapshot of the current status of e-commerce/e-business in the CEE 10 countries. With e-Health expected to offer so many opportunities for cost savings and efficiency increases, there is a review of the use of the Internet by General Health Practitioners. Security issues are examined relative to individual Internet use and that of enterprises. Throughout analysis of the data, digital divides have been defined and the factors influencing them are assessed and discussed.

A simple benchmarking exercise identifies leaders and trailers amongst the CEE 10 as well as those indicators for which some CEE 10 countries have made particular progress during 2003. Policy recommendations are included throughout wherever data results suggest that further policy action is needed.

A summary of the methodology used in the Surveys is included in the Annexes.

eEurope

Further information on eEurope can be found at:

http://europa.eu.int/information_society/eeurope/2005/index_en.htm

This report and other related documents can be downloaded from:

http://europa.eu.int/information_society/eeurope/2005/all_about/benchmarking/index_en.htm

Contents

Introduction

This Report presents a summary of the main findings of the surveys carried out by the eEurope+ Benchmarking and Monitoring Project during 2003. The surveys took place within the context of the eEurope+ Action Plan, which paralleled the eEurope Action Plan until enlargement in May 2004. The methodology of the surveys is described in the Annex. Conclusions are drawn from the findings and policy recommendations suggested throughout where appropriate. This Summary Report commences with a brief description of the socio-economic background of the CEE 10 countries and establishes the context within which they are developing their Information Societies in order to satisfy the challenges of the Lisbon Strategy[1].

A wide range of factors is influencing the development of the pathways of the CEE 10[2] countries towards their Information Societies, many of which are defined by their performance relative to the eEurope+ indicators as described in detail in this report, but one of the most important is their overall lack of wealth. There is considerable variation in GDP per capita from 76% of the average EU 15[3] GDP per capita in Slovenia to less than 30% in Bulgaria and Romania.

A significant percentage of the population, about one-third overall, live in rural areas with declining, ageing populations and a lower quality provision of services. During their transition from centralised economies, the CEE 10 have inherited many legacies, including the task of modernising neglected ICT infrastructures, within the context of overburdened policy agenda relating to transition in all spheres of society and economy, alongside an economic recession.

For many CEE 10, there are difficult decisions to be made regarding the balance between short term, more immediate needs of their societies, and longer-term strategies regarding the development of effective Information Societies. Such long term strategies should, according to the Lisbon Strategy, lead to further economic development, but real benefits may not be visible for some time; this dilemma has been described as the 'bread or broadband issue'[4].

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1 Part of the strategy set out at the Lisbon European Council 2000 to make the European Union the most competitive and dynamic knowledge based economy with improved employment and social cohesion by 2010

http://ue.eu.int/ueDocs/cms_Data/docs/pressData/en/ec/00100-r1.en0.htm

2 The ten Central and Eastern European Countries covered by this report. These are: Bulgaria, Czech Republic, Estonia, Hungary, Latvia, Lithuania, Poland, Romania, Slovak Republic, and Slovenia.

3 EU 15 refers to the fifteen EU member states before enlargement

4 IPTS, 2003. Building the Information Society in Candidate Countries, Joint Research Centre EC

Telecommunications Infrastructure

All CEE 10 are faced with the task of modernising telecommunications infrastructures where disparities in the availability of reliable fixed telephone lines, their affordability, and subsequent uptake of telecommunications services remain considerable. Progress towards the full implementation of internal markets in telecommunications (liberalisation), has been highly variable amongst CEE 10. *Stagnation and decline is apparent in fixed line infrastructures* where average household fixed line penetration levels are lower than in the EU 15 (82%)[5] and on average are at 65% in the CEE 10, although these vary from 46% in Lithuania to 85% in Slovenia. Attracting commercially viable investment for the further development of fixed line infrastructures has not been easy due to the high levels of investment required.

Household mobile penetration levels are variable, ranging from less than 35% in Romania and Bulgaria to over 75% and over in the Czech Republic and Slovenia, at EU 15 levels. Mobile phone ownership is more important in rural areas in Bulgaria, Estonia, Latvia, and Lithuania where fixed line penetration is low, and take up of mobile is increasing faster than fixed line take up. In some countries, mobile telephony is supplanting fixed line and the number of fixed lines in service is reducing. Mobile penetration levels are closely related to the GDP per capita in each country, with higher mobile penetration levels found in the wealthier countries. High growth rates in mobile penetration are driven by competition between the providers and the payment packages available, as in the Czech Republic. Estonia is a global leader for mobile value-added services such as m-parking, m-transport ticketing, m-positioning and m-commerce.

The roll out of broadband is still at an early stage in most CEE 10 and the variability of access reflects national telecommunications policies. In the light of current EU policies, the widespread availability of broadband at competitive prices is defined as one of two enablers for the implementation of the eEurope 2005 Actions re future development and delivery of services and applications in e-Health, e-Business and e-Government. The other is the existence of a secure information infrastructure[6]. Within the EU 15, the rate of broadband connections doubled in 2003 and the EC has recently established eEurope broadband targets to be reached by 2005[7].

Estonia is clearly the leader among the CEE 10 for household broadband penetration using both xDSL (7%) and cable (11%), compared to an EU 15 average of 9%. Cable modem is more important in Estonian urban/metropolitan areas where infrastructure is easier to establish and in urban areas, cable is cheaper than xDSL. It is also noteworthy that among CEE 10, Estonia is the leader for e-Government where the ability to upload and download forms is dependent on good bandwidth.

Enterprises with broadband access far outnumber the numbers of individuals with household broadband access. Regarding percentages of enterprises with broadband access, four of the CEE 10 are outperforming the others i.e. Estonia (69%), Latvia (57%), Lithuania (40%), and Slovenia (40%).

Policy implication:

As regards rural areas, it could be expected that the CEE 10 will be able to use Structural Funds for extending wireless broadband penetration and demand aggregation where it is not commercially viable for Telecommunications operators to develop services.

A reluctance of dominant national telecommunications suppliers to open their technical infrastructure to other suppliers is a barrier to the introduction of effective competition, meaning that legislation concerning facility sharing should be implemented and regulated effectively

5 IPSOS 2004, EU Telecoms Services Indicators, data for Dec 2003 and Jan 2004

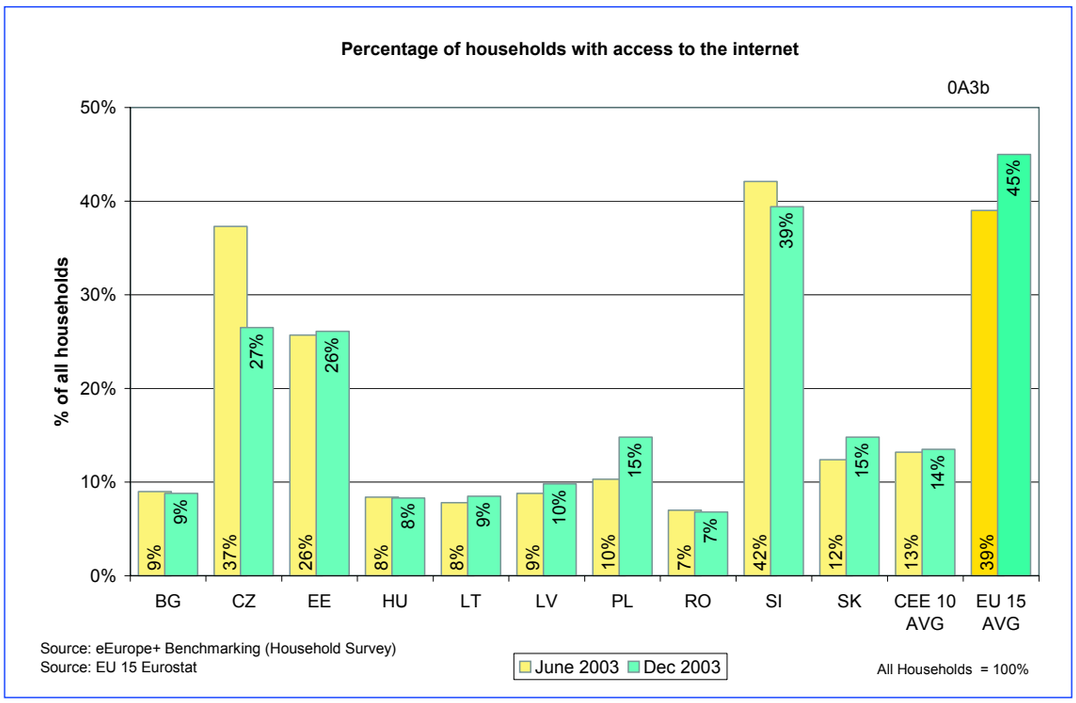
6 eEurope 2005 An information society for all, Seville, May 2002

7 eEurope 2005 Mid term Review February 2004: half of all Internet connections to be broadband, all public administrations must have broadband connections, all new member states to adopt broadband strategies

Internet

Access and usage

Only three countries have more than 15% of households with Internet access. With Slovenia having a household Internet access level of 39% followed by the Czech Republic (27%) and Estonia (26%), all other countries have household Internet access levels at 15% or less. It is notable that Bulgaria, Hungary, Lithuania, Latvia, and Romania all report household Internet access levels at 10% or lower. Slovenia lies just behind the average value for the EU 15 household Internet access levels (45%), for 2003[8]. Seven of the CEE 10 trail behind EU 15 countries regarding household Internet access. *Levels of household Internet access are currently stagnating.*



One third of households with computers do not have an Internet connection.

Internet access at home is predominantly by use of a PC or laptop.

With the higher penetration levels and high growth rates of mobile telephony; mobile Internet access could offer a cheaper and easier means of accessing the Internet in the future as mobile operators expand their range of offerings. This is a challenge and an opportunity for them, although accessing the Internet by mobile is currently at very low levels. Romania already has a 3G mobile network covering the whole country. In the short term, the low levels of fixed telephone line penetration along with their frequent poor quality is a cause for concern regarding the potential to increase household Internet access in the near future, as is the limited provision of mobile Internet services. For most of the CEE 10, because of the low levels of fixed line penetration, multi channel access i.e. the use of mobile, television, and cable could be highly relevant for increasing Internet access levels at home.

8 Eurostat 2003

Cost and affordability

For some CEE 10, the cost of a PC is a major inhibitor for household Internet access. The cost of a PC is twice or more than twice the average monthly salary in Bulgaria, Lithuania, Latvia, and Romania. These countries, where a PC is relatively expensive, are amongst those with the lowest Internet penetration levels.

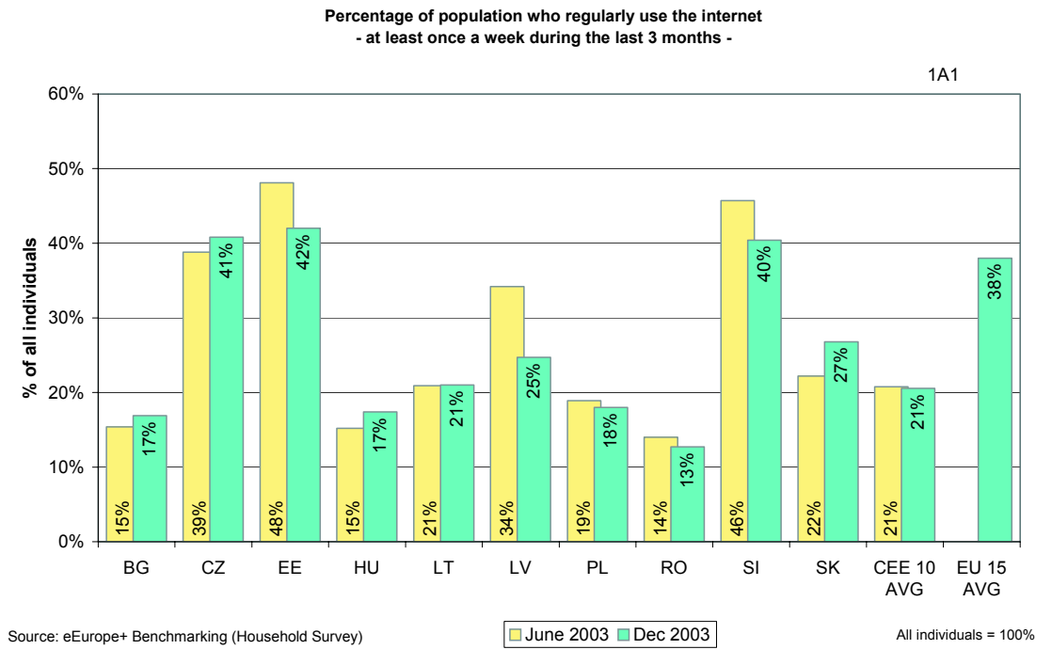
Internet access costs vary considerably. Due to the increasing complexity of the telecommunications sector, the wide variety of packages available, dynamic pricing policies and commercial sensitivity, it is becoming increasingly challenging to measure the cost of Internet access.

Policy implication:

Given that affordable access in the CEE 10 is a much more topical issue compared to many EU 15 countries, and the lower purchasing power in the former, the wide range of Internet access costs suggests that in some of the CEE 10, Internet access costs could be lower

Additionally, schemes could be considered (as in Denmark), where an employee may acquire a PC and Internet connection financed through the company by regular monthly instalments together with an element of tax deduction and subsidy. This would also have the effect of increasing demand and competition for broadband thus driving prices down.

Usage by individuals



With *over 40% or more of their population accessing the Internet once a week in the Czech Republic, Estonia and Slovenia*, the other CEE 10 are lagging at levels of 27% or less, aligning them with the regular Internet user levels of Italy, Ireland, Greece and Portugal. The CEE 10 average of 21% regular Internet usage compares to an average of 38%[9] in the EU 15.

Policy implication:

Given the limited investment capital and declining household fixed line penetration ratios in many of the CEE 10, the possibility of leapfrogging should be considered looking particularly at wireless solutions. A multi-channel access policy with respect to Internet usage could be pursued, with particular reference to cable TV networks.

Multi-channel access policies would be especially important in reducing the rural –urban divide with respect to Internet usage that exists in all of the CEE 10.

[9] ibid

Inhibitors to individual Internet use

The four most important reasons for not using the Internet found by the surveys are:

- "I don't want the Internet"
- "I don't know how to use a computer"
- "…no access device at home"
- "computers are too expensive"

Whilst a lack of skills and affordable access are resolvable issues with time and resources available, a choice of not wanting to use the Internet relates more closely to a lack of appealing content and personal need/desire. For those who are not using the Internet, no matter now advanced the country's Internet penetration levels are, the same four inhibitors listed above are relevant.

There is stagnation in levels of regular Internet use, as in household Internet access levels, suggesting the need for wider ranging triggers to deepen and extend penetration levels among populations, for example, by developing desirable content, promoting skills enhancement, and working towards the availability of cheaper and more convenient access.

Policy implication:

A re-emphasis of the importance of e-Government driven content in health, education and other public sectors to act as a catalyst for driving the creation of relevant content and raising Internet awareness levels is made..

It is important that the implementation and 'driving through' of policies relating to ICT are maintained, despite changes in national political landscapes that will inevitably take place before 2010.

Places where the Internet is used

Home is the most popular place for Internet access in the Czech Republic, Estonia, Hungary, Poland, and Slovenia, as it is for individuals in the EU 15. In Bulgaria and Romania, where there are low levels of household Internet access, Internet cafés are increasingly popular (an increase of 15% to 41% usage in the second half of 2003 in Romania by those users that had used the Internet during the last three months) and used by nearly half of all regular Romania Internet users; private initiatives are taking advantage of the demand for Internet use.

Access at the workplace is most important in Latvia, Lithuania, and Slovakia. Despite many of the CEE 10 establishing Public Internet Access Points (PIAPs), they do not rank as one of the most important places of access, being used by less than 1% of the population apart from in Estonia, where they are used by 5%. There has been an increase in the use of 'places of education' as a site of Internet access in several of the CEE 10 during the last six months, so the *development of schools as citizen centric places of access would seem to be effective.*

Policy implication:

More PIAPs are needed, especially developed in schools/after hours, but more data regarding PIAPs are needed i.e. numbers of computers, other services offered, amount of usage, socio-economic breakdown of users etc. in order to assess their effectiveness. PIAPs will be needed until household access levels have increased and/or as a means of training users.

The quality of training of the trainers is critical in order to match demand for skills in the workplace.

It would be interesting to know the extent to which employers in CEE 10 allow employees access to the Internet for personal reasons. Enlightened employers in the Scandinavian countries have had successful liberal policies in this area, with a view to expanding the Internet experience of their workers.

PIAPs will need to increase their range of functions to allow for teleworking and e-Learning as long as home Internet access remains at low levels.

Personal use of the Internet

Internet users in the Czech Republic, Estonia, and Slovenia, the countries with the highest levels of Internet access penetration, are taking advantage of a wider range of possible uses of the Internet than users in other CEE 10.

- *E-mailing, general information searches, playing games and music are currently the most important personal uses of the Internet*, with the reading of online newspapers and downloading games and music increasingly popular in Bulgaria, Estonia, Hungary, and Latvia. E-mailing in Czech Republic, Estonia, and Slovenia is at EU 15 average levels i.e. 42%[10].

- *Individual searching for information about goods and services is popular but levels of online ordering are low.* Less than 4% of the total population, apart from in Czech Republic (12%), Estonia (8%) and Slovenia (10%) are ordering online. As e-commerce also depends on consumer protection law, the quality of logistical networks, secure mail systems, customs clearance etc, deficiencies in these areas will be deterrents for the development of B2C commerce. In Estonia, 36% of the total population are searching for information about goods and services but only 8% are ordering; some web influenced off line purchasing may be taking place. It has been suggested that in small countries like Estonia, markets are geographically convenient; hence, the lack of need for e-commerce by individuals, but the UK (with 24% of the population having ordered online in 2003[11]) leads for B2C for EU 25 and is also a country with dense networks of traditional retail outlets.

- *Internet banking/financial services are important in Estonia, used by 43% of the population;* the influence of neighbouring Baltic countries can be seen here. Internet banking is taking place at levels of 16% in Slovenia and 10% in Latvia, compared to 19% EU 15[12] (9% CEE 10 average). However, the personal use of Internet banking is not acting as a stimulus for personal e-commerce.

- *The online travel and tourism sectors are showing some signs of growth.* These sectors have been very effective in marketing and selling their services online for some time in North America and the EU. However due to the more limited opportunities for business travel and tourism in CEE 10, they could be expected to be not so important at this stage but nevertheless are currently accessed by 19% of the Czech Internet population, 15% of Estonian population and 16% of the Slovenian population.

Policy implications:

Strengthen consumer protection legislation to support online commerce. This means that administrative capacity for the effective implementation of legislation must be present.

Given the success of Internet Banking in Estonia, this should be emulated across other CEE 10.

10 Eurostat 2003

11 ibid

12 ibid

Education

The ability to access and use computers and the Internet is seen as a most important enabler in the development of a digitally literate population. With all countries currently having initiatives in place to informatise their schools and universities, a combination of public and privately funded schemes is often used. Privately funded initiatives can be more unreliable and sometimes have undesirable 'strings' attached, but are an important means of funding some computer and Internet provision in education for some countries. In Bulgaria and Romania, 'academies' have been established by global ICT companies with the aim of offering ICT training. However, evidence suggests that they actually promote the movement of young people away from the countries in search of jobs elsewhere, thus contributing to a Brain Drain. Local fundraising for computers and Internet connections is often encouraged where public budgets are restricted but this means that penetration levels are more difficult to control and monitor within an overall policy, leading to an uneven and possibly inappropriate distribution of resources.

The future ICT workforce is currently being created in schools and policy implementation now will have an impact before 2010. With this in mind, the importance of developing ICT in secondary schools and tertiary education is particularly relevant. Effective teacher training is a critical factor in ensuring that the potential of ICT resources is realised, once adequate access levels are achieved. This has been shown in Estonia where the Ministry of Education and Research, because of their State Audit Office proposals, found that the education system was failing to exploit the full potential of their ICT resources for changing learning processes within the Tiger Leap Plus Programme[13].

With some CEE 10 unable to collect the relevant data, the benchmarking of computer, Internet penetration, and usage levels at primary, secondary, and tertiary educational stages is not yet completely possible.

Computer and Internet penetration in CEE 10 schools is generally lagging behind EU 15 2001 levels, but is improving.

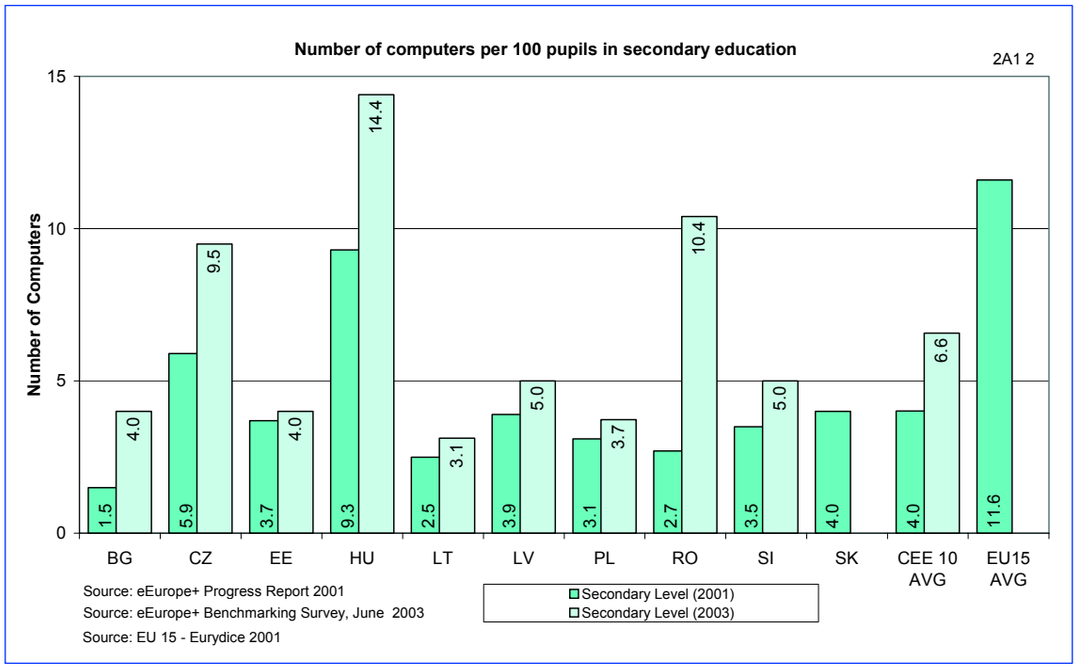
Primary education

The Czech Republic has the highest computer and Internet penetration levels in primary schools. The Czech Republic leads with 8.9 computers per 100 pupils compared to the CEE 10 average of 4.3 (EU 15 (2001), 7.7). It also leads for computers connected to the Internet at 6.4 per 100 pupils followed by Estonia (4.0) and Slovenia (3.5) compared to the CEE 10 average of 2.8 (EU 15 (2001), 3.0).

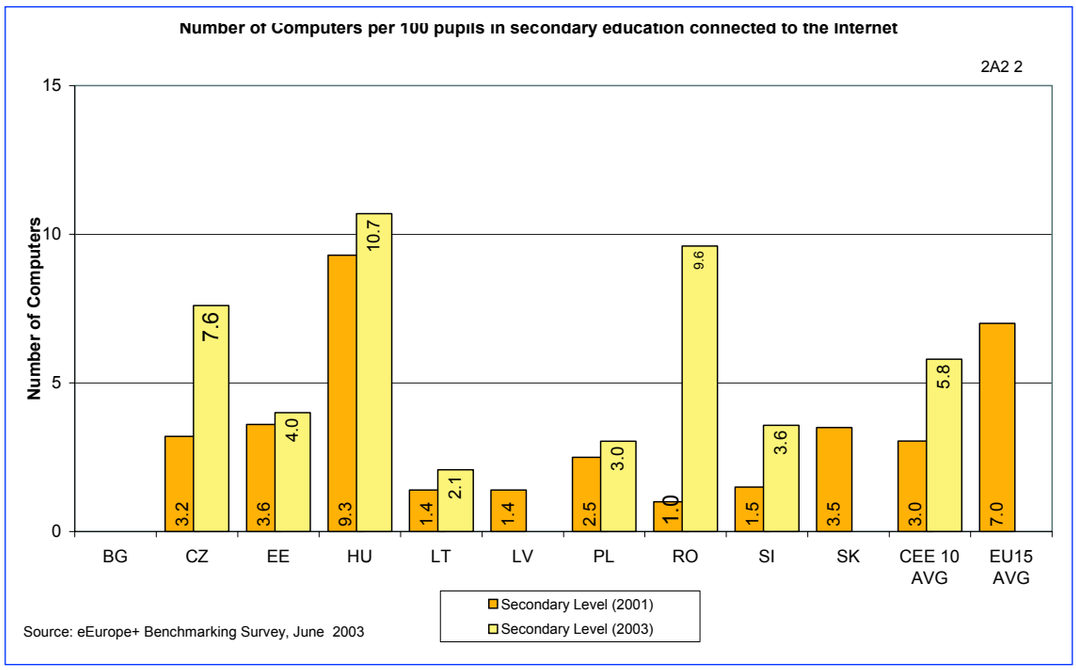
Secondary education

The Czech Republic, Hungary, and Romania are making the most progress regarding computer and Internet penetration in secondary schools.

[13] Tiger Leap Plus www.riigikontroll.ee/audit_en.php?lang=en&audit=312



Hungarian schools have 14.4 computers per 100 pupils compared to the CEE 10 average of 6.6 (EU 15 (2001), 11.6), but Czech Republic, Hungary and Romania (from 2.7 in 2001 to 10.4 in 2003) also show the most improvement.



The Czech Republic, Hungary and Romania also lead for computers connected to the Internet: Hungary (10.7), Romania (9.6) and Czech Republic (7.6), compared to the CEE 10 average of (5.8) (EU 15 2001, 7.0). Romania has almost all computers in their secondary schools connected to the Internet. Most of the computers in secondary schools in Czech Republic, Estonia, Hungary, and Latvia also have high-speed connections, which enhances the ability to access teaching and learning material. Lithuania reports 2.1 computers per 100 pupils with Internet connection in secondary schools.

Policy implication:

It is vitally important to monitor penetration levels, types and amounts of usage in education and to measure the outcomes of initiatives. The roles of technicians and well-trained teachers should not be underestimated in realising the potential of ICT.

Tertiary education,

If the CEE 10 countries are to contribute to Lisbon 2010, they must adopt the new ICT and train a new workforce to make such a contribution possible. Technological development and a growing skills demand has led to shortages of ICT professionals in CEE 10. There are overall shortages at all levels with a specific demand for technical programming skills. A critical mass for an ICT skilled labour force is absent, partly attributable to a Brain Drain, as students and academics seek jobs elsewhere that are more relevant and better paid[14]. With a current mismatch or bottleneck between demand and supply for ICT skills, there is a shortfall in industry and a shortage of high-level ICT skills in central and local government administrative functions, which could lead to *an inability to drive forward ICT development and policy and implementation*[15]. However, with traditionally high standards of education in maths and science in schools and in engineering and computer science in universities, CEE 10 has some strength here.

With EU targets of increasing total numbers of gradates and increasing numbers of female graduates to 40% of the total by 2010[16], other sources indicate that the Czech Republic, Lithuania and Slovakia have above EU 15 averages of science and engineering graduates and that all CEE 10 have higher than average numbers of female graduates in science and engineering. This is highly relevant since not all graduate ICT workers actually study ICT related subjects at university. Incomplete data sets in the eEurope+ Surveys has made analysis of critical indicators relating to numbers of ICT students and graduates unsatisfactory but show that the Czech Republic and Hungary have more than one tenth of their tertiary levels students following ICT related courses, higher than EU 15 averages. Four of the CEE 10 report very large gender gaps within their ICT graduate population; one in three third level ICT students are female in Estonia, one in five in Hungary, one in six in the Czech Republic, one in seven in Poland and one in ten in Slovakia.

Policy implications:

There are currently incomplete data sets in the CEE 10 for these indicators and a great need for NSOs to be able to collect this information. This is a critical tool for national and strategic planning re future demands for ICT skills, the ability to develop national Information Societies and to contribute to the Lisbon Strategy for 2010.

Females represent an untapped source of ability and initiatives should be developed to encourage greater participation in ICT Third Level Courses. A context is needed that encourages brain circulation rather than brain drain possibly by creating incentives for specialists to remain or return to their own country, e.g. tax incentives and governments to encourage inward investment and attracting outsourcing from multinationals that are looking for cheaper skilled labour. CEE have several advantages for this with their high English literacy levels, good traditions of ICT skills, smaller time differences relative to Western Europe and North America and lower labour costs.

The recent World Bank Conference, "Improving Competitiveness in the Knowledge Economy"[17] referred to universities in the CEE 10 facing difficulties due to a Brain Drain, ageing lecturers, insufficient PhD students, and effects of recent political change.

Policy implication:

There is a need for diversity in the higher educational experience through courses more relevant to demand and broader participation in a wider range of courses. Wider participation would relate more closely to the needs of future national economies, the personal needs of individuals and would represent investment in human capital for the future benefit of these societies.

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14 IPTS., (2003), Building the Information Society in Candidate Countries, EC Joint Research Centre

15 Gourova, E., (2003), ICT Skills and education in an enlarged Europe, IPTS, www.jrc.es

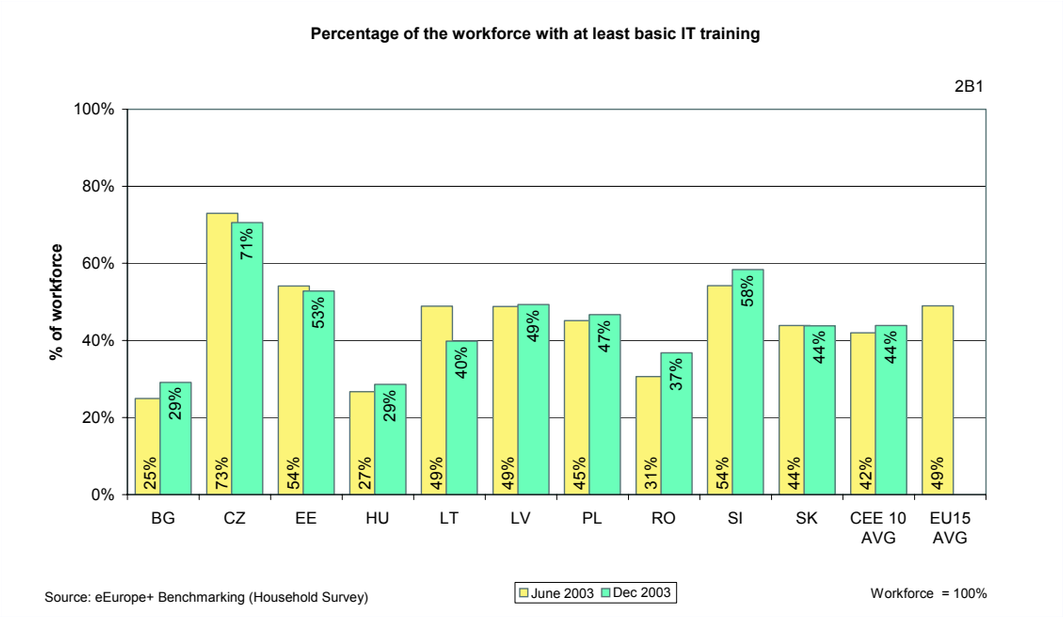
16 Eurostat: Statistics in Focus, Theme 9, 9/2003, Catching up with the EU? Their definition of science includes life sciences, physical sciences, mathematics and statistics, computing.

17 Budapest March 2004

The Workplace

ICT skills in the workplace

ICT skills are recognised as an enabler needed by all citizens in order to satisfy future employment requirements as well as their active participation in a knowledge society and e-citizenship.



Only the Czech Republic, Estonia and Slovenia have more than 50% of their workforce with basic ICT skills. Bulgaria and Hungary have 29% of their workforce with basic ICT skills. Males with basic ICT skills predominate over females in all CEE 10 apart from Bulgaria, Hungary, and Romania where there is a small predominance of females over males.

Word processing software is the most frequently used application (used by four out of ten employees), followed by use of spreadsheets (used by three out of ten employees) and finally, presentation software (used by one out of ten employees) in CEE 10.

The Czech Republic, Estonia, and Slovenia have about 60% of their employees able to use the Internet but Bulgaria, Hungary, Poland, and Romania have 30% or fewer of their employees able to use the Internet.

Against a CEE 10 average of 48%, the Czech Republic (56%) and Poland (57%) have the highest percentage of employees using computers in their normal work routines. Levels of Internet use at work are lower, with a CEE 10 average of 34% (compared to 86% EU 15 2003), with the exception of Estonia where almost all computer users at work (33%), are also Internet users (31%). 44% of Polish employees use the Internet at work.

Policy implication:

Enterprises should be targeted for skills training as their computer and Internet penetration levels increase. Appropriate facilities and training sessions could be organised locally e.g. by Chambers of Commerce or their equivalents who are familiar organisations and trusted by the local business communities.

Some countries e.g. Romania, are effectively promoting the ECDL[18] as a qualification for ICT users and this could be further promoted as a useful means of increasing digital literacy amongst the workforce.

[18] European Computer Driving Licence

e-Learning

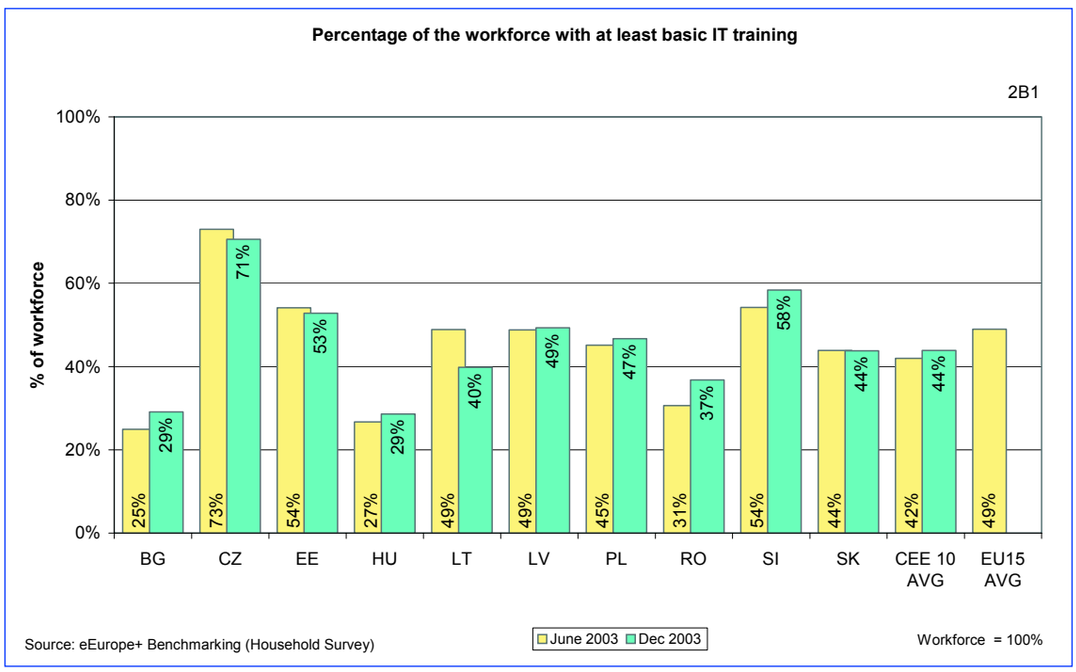
Amongst their population, the Czech Republic (6%), and Hungary (5%), report the highest levels of activity. E-Learning[19] is intrinsically linked to Information Societies and closely allied to the concept of Lifelong Learning[20] . By 2010, the EU average level of participation in Lifelong Learning, should be at least 15% of the adult working age population in the 25-64 age group, and should not be lower than 10% in any country[21]. As e-Learning is one of the most effective ways of allowing access to flexible, personal programmes of tuition, measurement of participation is indicative of the extent that individuals in a population are engaged in Lifelong Learning.

The percentage of enterprises using applications for training and education of employees lies at low levels, with a CEE average of (1%). *Individuals in Slovenia and Hungary are the keenest online learners overall* and well positioned amongst other EU countries with EU 15 averages of 10%. Participation in online lectures in the most popular form of online learning amongst individuals with Slovenia leading at 12%, followed by Hungary and Estonia at 7%, whilst participation in other online courses is popular in Slovenia (8%) and Hungary (7%). In many countries, the critical levels of Internet penetration do not yet exist and therefore the demand for e-Learning is low.

Policy implication:

Education and training organisations should be preparing e-Learning material, anticipating the demand in these countries where traditionally, education has a high profile among the population.

Enterprises: e-commerce and e-business



The Czech Republic, Estonia, Poland, Slovenia, and Slovakia have 80% or more enterprises with at least one point of Internet access. Overall, in the CEE 10, online enterprises are twice as likely to be online as individuals are. Bulgaria and Romania are lagging with fewer than 50% of enterprises online. It should be remembered that

19 '…e-Learning is the use of new multimedia technologies and the Internet to improve the quality of learning by facilitating access to resources and services as well as remote exchanges and collaboration', The e-Learning Action Plan: Designing tomorrow's education, 2001

20 …skills, knowledge and competencies need to be continuously updated, ibid

21 EC, Education Council, Brussels May 2003

the workplace is the second most frequently used place of access for individuals, particularly in Lithuania, Latvia, and Slovakia, and many individuals are gaining Internet experience in their workplaces.

Amongst all enterprises, the Czech Republic is the leader for online purchasing at 30% and Poland for online selling, at 20%. All other CEE 10 enterprises are carrying out online purchasing at levels of 20% or less and for Bulgaria, Lithuania and Romania, 7% and less. Levels of online selling are lower, as would be expected, following global trends, with Poland leading at 20%, followed by the Czech Republic (16%) and Slovakia (15%). All other countries trail at levels of less than 10% and as low as 2%, 3% and 4% in Lithuania, Bulgaria and Romania. The relative importance of e-commerce amongst enterprises in the Czech Republic, Poland, and Slovakia is almost certainly due to the role of multinationals operating in these countries and the amount of inward investment that has been available for companies in the manufacturing sector. Multi-nationals are pushing their CEE 10 partners along the e-commerce/e-business route.

Online payment is not a popular method of payment for enterprises but use of online banking and financial services are more popular. With an average usage level for online payment of less than 5% in the CEE 10 reflecting national variation in the availability of online banking facilities, confidence in the use of credit cards online, as well as confidence in online security, the strongest countries are the Czech Republic (5%), Estonia (7%), Latvia (3%) and Poland (6%). They do not mirror the trends in individual use of Internet banking. Use of the Internet for banking and financial services is more popular, with more than 45% of enterprises using these online services in all countries, apart from in Bulgaria and Romania where there are major issues relating to trust impacting on commercial activities.

Only the Czech Republic, Poland, and Slovakia have more than 50% of enterprises with websites. Since the survey samples contain many micro enterprises (reflecting the enterprise structure within the CEE 10), the creation and maintenance of a website requires money and skills, which may not be available, hence, the low results compared to EU 15 enterprises where 56% of SMEs and 87% of large enterprises have websites[22]. Only 17% of enterprises in Bulgaria and Romania have websites.

Slovenia is the outstanding leader for enterprises with LANs. With 57% of Slovenian enterprises using LANs[23], all other countries lie at levels below 24%. A notable increase in enterprises using Intranets in all countries is recorded, particularly in the Czech Republic (32%) and Latvia (34%), with an increase in the use of Extranets recorded in Czech Republic, Lithuania, Latvia, Romania, Slovenia and Slovakia. The suggestion is that *informatisation is gaining pace in the CEE 10*, reflecting the increases in e-business activity seen elsewhere in Europe[24] at the expense of Internet based e-commerce.

Policy implications:

With large numbers of micro-enterprises and small companies, 'drop-in' centres where mentors can informally assist businesses with their development needs, could also provide full support for ICT.

Some enterprises could be identified as those most likely to benefit from intervention regarding take up of ICT and then used as exemplars; some SMEs are less likely to benefit from a deepening of ICT usage.

22 Eurostat 2003 available data unpublished at time of writing

SME: Small and Medium sized Enterprises, small (10-250 employees), large enterprises (more than 250 employees)

23 LAN: local area computer network

24 European eBusiness Watch report 2003

Teleworking

More than one tenth of employees in Slovenia and nearly a tenth in Estonia is teleworking a minimum of half a day per week. Teleworking[25] is another socio-economic activity particularly typical of an Information Society, requiring remote access to an enterprise's computer network. The amount of teleworking in Slovenia mirrors the higher levels of informatisation that have been recorded along with high Internet penetration in enterprises, high personal use of the Internet and high home Internet access levels.

Conversely, levels of teleworking in Bulgaria, Hungary, Latvia, and Romania are at levels of less than 3% of employees, reflecting low levels of household and enterprise Internet access. It is reasonable to assume that PIAPs (which are important places of Internet access in Bulgaria and Romania), are not appropriate for teleworking (which may require the downloading and uploading of documents and e-mailing confidential information), with their lack of privacy. Levels of teleworking will increase with the increasing informatisation of the CEE 10 and increases in household Internet penetration levels.

25 those employed working part of their time, a minimum of half a day a week on average away from work, away from enterprise premises and accessing the enterprises' IT systems remotely

Health

e-Health

With health sectors regarded as 'the most information dependent businesses of all'[26], ICT, including the Internet, offer some opportunities to meet the needs of the sector and introduce efficiencies. With so many organisations involved in personal health care, secure access to patient health records underpins any development of 'seamless care'. Little of this is yet possible within Europe mainly due to a lack of interoperability between health care systems along with important issues of security and confidentiality. Moreover, use of the Internet as a means of communication with the Health Sector may be more restricted due to the new EU Personal Protection Legislation. However, it is possible to establish smaller scale local/regional initiatives between local medical practitioners, pharmacies, and health insurers and this has already been demonstrated to work effectively in two CEE 10, Estonia, and Slovenia[27].

Bulgaria, the Czech Republic, Estonia, Hungary, and Slovenia have very high computer penetration at saturation levels but Lithuania and Latvia are trailing at levels of 22% or less. The high penetration levels relate to pre-accession administrative practices but represent an opportunity for increasing the Internet penetration, which lie at much lower levels of 20% or below, apart from in Estonia (92%), the Czech Republic (57%) and Slovenia (48%). Of course, it is possible that computers and Internet connections are to be found elsewhere in a health centre and shared among many health care professionals, but this would not allow the potential for high intensity usage to be achieved by individual practitioners. With an EU 15 average at 78% (2002)[28] General Practitioners with Internet access in their consulting rooms, Estonia is surpassing many European countries.

Information searches and communication are the most widely used categories of Internet use by General Practitioners, with Estonia reporting a decrease in the use of the Internet for exchange of patient records due to recent changes in Data Protection Laws. With none of the CEE 10 reporting the use of the Internet for exchange of patient records at levels of more than 15%, these low levels relate to security issues required for the exchange of such personal and confidential information along with patient consent. Additionally, there may not yet be critical mass to allow effective exchange of patient records. However, the use of electronic patient records is taking place more frequently: Hungary (99%), Estonia (89%), Slovakia (86%), Lithuania (79%), and Slovenia (76%). The exchange of electronic patient records has been a well-established practice in many of the CEE 10 for time due to their centralised health care systems so is a legacy healthcare practice. This compares to 27% General Practitioners in EU 15 exchanging patient records electronically in 2002[29].

- One in five doctors in Estonia, one in three in Slovenia and one in five in the Czech Republic are using the Internet to communicate with other doctors/staff
    - Four out of five doctors in Estonia, one out of three in Slovenia, one in five in Poland, one in ten in the Czech Republic and Lithuania are using the Internet to communicate with Health Insurers
    - One in three doctors in Estonia, one in ten in the Czech Republic, Lithuania, Poland and Slovenia are using the Internet to communicate with specialists
    - One in three doctors in Estonia, one in ten in the Czech Republic and one in twenty in Slovenia, are using the Internet to communicate with Pharmacies

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26 EC High Level Committee on Health, Delphi, April 8/9, 2003, http://europa.eu.int/comm/health/ph_overview/Documents/hlch_health_telematics_final_report_en.pdf

27 Mid term revision of the eEurope 2005 Action Plan requires member states to develop a national/regional road map for e-Health, focussing on deployment, setting targets for interoperability, use of e-Health records and payment

28 Flash Eurobarometer 126, data for 2002

29 ibid

The percentages of individuals using the Internet to seek health care information lies at low levels with Slovenia leading at 15%, the Czech Republic and Estonia at 10%. This low level of activity reflects the lack of appropriate content online and low household Internet penetration levels, as this is a highly personal activity requiring privacy.

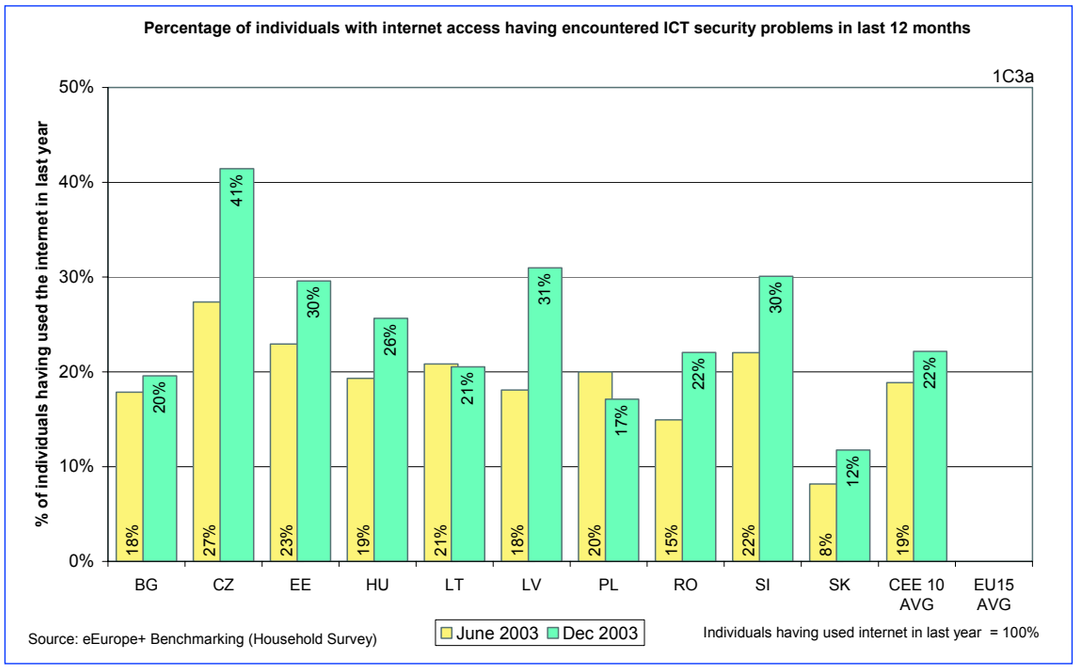
Policy implication:

With all health care systems everywhere facing major challenges, there are significant opportunities to improve the quality of services using ICT. CEE 10, with their background and culture of use of electronic health care systems, already have high computer penetration levels and should take advantage of best practices to leapfrog in this sector.

Security

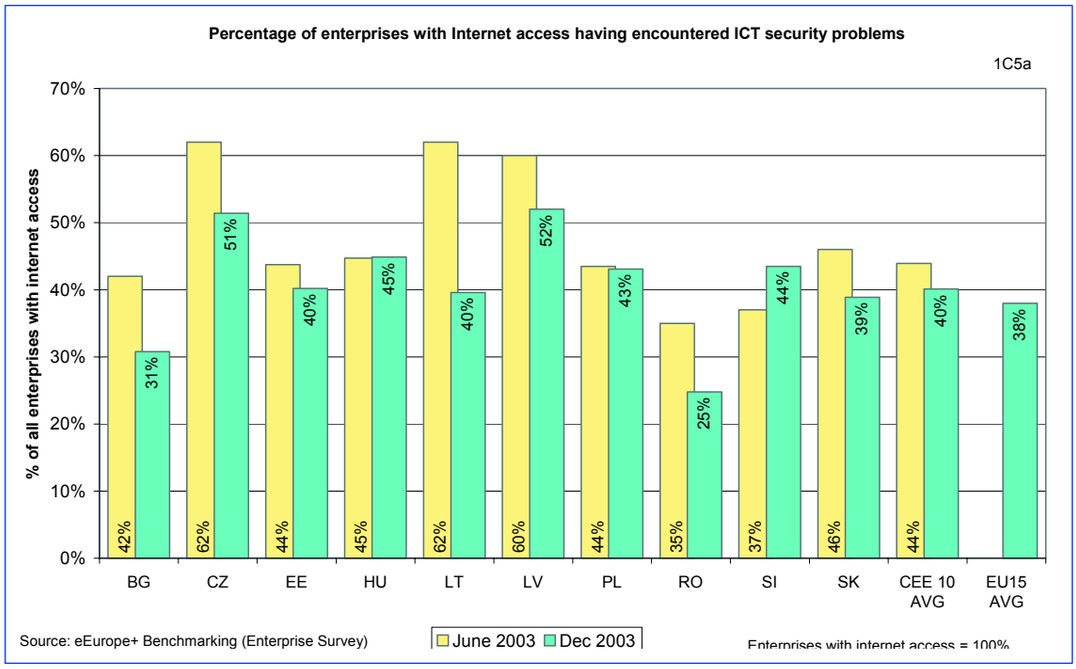
The existence of a secure information infrastructure is the second key enabler defined by eEurope 2005 to support the delivery of services and applications in e-Health, e-Business, and e-Government[30]. A lack of confidence in security is a key inhibitor. Security is a general issue for all Internet users rather than a national one. *Considerable variation can be seen amongst CEE 10 regarding exposure to online risk and the extent to which individuals, enterprises and organisations are protecting themselves.*

- 22% of individuals with Internet access have experienced ICT security problems during the last twelve months compared to 40% of enterprises with Internet access during the last twelve months.
- 56% of individuals with Internet access have taken ICT security precautions compared to 68% enterprises with Internet access during the last twelve months.



Individual experience of security problems varies within the CEE 10. During 2003, More than 17% of individual Internet users in Poland, Bulgaria, Lithuania, and Romania experienced Internet security problems compared to more than 41% of individual Internet users in the Czech Republic. Many of the CEE 10 encountered increased exposure to security problems between June and December indicating that the number of security risks had proliferated during this time. Problems relating to computer viruses were the most frequently experienced security problem, affecting more than 75% of those individuals reporting having experienced security issues. Problems relating to abuse of personal information are reported at much lower levels with a CEE 10 average of 10%. The number of individuals who reported taking ICT security precautions has substantially increased between June and December 2003, at least doubling in Bulgaria, Hungary, Lithuania, Latvia, Poland, Romania, and Slovakia. The Czech Republic, Estonia, and Slovenia previously showed higher levels of adoption. Seven countries now report 60% or more individuals having taken security precautions. It should be remembered that many individuals might be using older computers where to install and update virus protection software requires money and skills, which may not be available to all new Internet users.

30 eEurope 2005 An information society for all, Seville



Enterprises are encountering more security problems overall than individuals. They could be experiencing even more and unwilling to report them, as compromises to their data could be negative for their image, resulting in adverse publicity especially for large enterprises.

Experience of computer viruses are again the commonest threat, experienced by enterprises in the CEE 10 with a range between 25% (Romania) and more than 50% (Czech Republic and Latvia), substantially lower levels than for individuals. Unauthorised access is a minor problem and blackmail threats are not reported to be a problem at all for CEE 10 enterprises.

However, only about 50% of enterprises in Bulgaria and Romania report having taken security precautions whereas more than 85% or more enterprises in the Czech Republic, Poland, Slovenia, and Slovakia are taking precautions. Not surprisingly, these are the countries most active in e-commerce and e-business.

The most frequently used security precautions are virus protection software, firewalls and authentication mechanisms, relating to the increased use of Intranets and Extranets reported amongst CEE 10. Slovenia is the most advanced in the frequency of use of security precautions and the leader in the use of firewalls (37% of all enterprises), encryption (12% of all enterprises), and document authentication (23% of all enterprises), whilst Slovakia is the leader for offsite data backup (31% of all enterprises).

Policy implications:

The public sector should lead the way regarding security issues, promoting a 'culture of security' with the development of e-government services requiring secure transactions and authentication. In this way, the public sector would act as a provider of exemplars regarding the establishment of standards for online security.

Digital divides

In Romania, Bulgaria, Lithuania, and Latvia there are pronounced rural--urban divides with respect to fixed line penetration. In all CEE 10, except Slovenia and Latvia, there is a rural-urban divide with respect to regular Internet usage (at least once a week). Generally, rural-urban divides are much larger for Internet usage and computer penetration than for fixed telephony penetration.

There is a close correlation between regular Internet usage and educational attainment. In most countries, except the Czech Republic, the largest divide lies between those with tertiary education and the rest. This is partly due to the higher income levels of this group and possibly due to their ability to perceive the benefits of Internet access.

In most of the CEE 10 there is a gender divide regarding ICT skills, which increases with the complexity of the application, except in Romania, Hungary, and Bulgaria. In Bulgaria, the percentages for females and males are the same. The gender gap is especially large among students doing ICT related studies where very few females choose to study ICT related subjects.

In all of the CEE 10, young people 16-20 years old are using the Internet more frequently than the rest of the population. Whilst the differences are small in Romania and the Czech Republic, they are particularly large in Bulgaria, Estonia, Lithuania, Poland, and Slovenia.

The results of the digital divides mean that many Internet users in the CEE 10 are typically young, educated, and living in urban and metropolitan areas, which is also the profile in most countries globally.

With National Statistical Offices (NSOs) unable to provide data about the distribution of households according to rural, urban, and metropolitan areas, data from the eEurope+ Household surveys has been disaggregated for penetration levels according to estimates provided by TNS.

Policy Implication:

NSOs need to be able to break down their data according to type of region, whilst acknowledging that it is problematic, depending on current national variance of definitions and variance in definitions according to requirements of administrators.

Use of open source agreements could be very effective in allowing the widest access to the tools and techniques of the knowledge economy to be available to the general public and in reducing digital divides.

Continued implementation of initiatives aimed at increasing rural Internet penetration levels should be maintained, with reference to broadband issues, rural PIAPs, and ICT training centres.

Leaders and Trailers

A simple benchmarking exercise was subsequently carried out in order to identify 'Leaders and Trailers' amongst the CEE 10, as well as those indicators for which some CEE 10 countries have made particular progress during 2003. Forty eEurope+ indicators were selected by virtue of their relevance and reliability. The three best performing and three less well performing of the CEE 10 recorded for each indicator, along with the CEE 10 averages. Comparisons were also made, where possible, with equivalent averages for the EU 15.

Three of the CEE 10 appeared the most frequently in the best three performing positions, with the Czech Republic appearing the most often, followed by Estonia and then Slovenia, thus identifying these three as the overall leaders amongst the CEE 10, with respect to their Information Societies. When the top performer was identified for each indicator, Slovenia appeared the most frequently, followed by Estonia and then the Czech Republic. This confirms that the Czech Republic is performing well all round but is not always the leader. These three countries sometimes have levels of ICT activity above the equivalent EU 15 average and sometimes just behind the EU 15 leaders for particular indicators.

Each of the three leading countries is leading with particular respect to certain groups of indicators.

- Slovenia leads for infrastructure and access among individuals and enterprises, e-learning and informatisation within enterprises (comprising a wide range of indicators), i.e. focus on wide ranging use of ICT among individuals and enterprises
- Estonia leads for broadband access among individuals and enterprises, regular individual Internet use, use of security precautions among individuals, online financial activities, e-health and e-government, i.e. focus on ICT for individuals and public sectors in society
- Czech Republic leads for digital literacy in the workplace, individual e-commerce and e-commerce among enterprises and security among enterprises i.e. focus on ICT in enterprises

However, most countries are amongst the top performers for some aspects of their Information Society e.g. computer and Internet penetration in schools and health clinics in Hungary, Internet penetration in secondary schools in Romania, Poland for some aspects of e-commerce, Slovakia for aspects of ICT in enterprises and Bulgaria, Latvia and Lithuania for broadband access. Conversely, Bulgaria and Romania consistently appear among the less well performing CEE 10 and are trailing with respect to most indicators, due to their low Internet penetration levels.

Annexes

Annex 1 — Leaders and Trailers

Annex 2 — Information Society Development Paths

Annex 3 — Benchmarking Survey Methodology

Annex 4 — Error Margins

Annex 5 — Bibliography

Annex 1 — Leaders and Trailers

Introduction

For relative benchmarking purposes, forty eEurope+ indicators were selected by virtue of their relevance and reliability and the three best performing and three less well performing CEE 10 logged for each indicator, along with the CEE 10 weighted averages. Comparisons were also made where possible with equivalent averages for EU 15. This enables the 'leaders' and the 'trailers' to be identified in a relatively simple, crude manner, albeit unsophisticated, and not requiring the calculation of complex indices at this stage.

It will be noticed that countries often cluster or lie very closely together meaning that sometimes, a country may lie just outside a lead position, or conversely, considerable gaps sometime occur between one country and another regarding percentage levels of frequencies for particular indicators meaning that three countries could be grouped together yet with widely different activity levels. Additionally, there are many indicators relating to e-commerce, which possible over balance the final view. Further statistical work could further refine the identification of CEE 10 leaders.

Outcomes

Three CEE 10 countries appear the most frequently in the best three performing positions, with the *Czech Republic appearing the most often, followed by Estonia and then Slovenia*, thus identifying these three as the overall leaders amongst the CEE 10, with respect to their Information Societies. When the top performer was identified for each indicator, Slovenia appeared the most frequently, followed by Estonia and then the Czech Republic. This confirms that the Czech Republic is performing well all round but not always the leader. These three countries sometimes have levels of ICT activity above the equivalent EU 15 average and sometimes just behind the former EU 15 leaders. For example, for household broadband access, percentage of enterprises with employees using telework, individual online purchasing, individual use of security precautions, enterprises receiving online orders, enterprises making online purchases, enterprises with access to the Internet, enterprises with broadband access, enterprises using Intranet, enterprises having experienced ICT security problems, enterprises using Internet for banking and financial services (Estonia and Slovenia), and sometimes just behind the EU 15 leaders for other indicators.

Each of the three foremost countries is leading with particular respect to certain groups of indicators, suggesting different pathways of Information Society evolution, reflecting their particular strengths:

- Slovenia leads for infrastructure and access among individuals and enterprises, e-learning and informatisation within enterprises (comprising a wide range of indicators), i.e. wide ranging use of ICT among individuals and enterprises.
- Estonia leads for broadband access among individuals and enterprises, regular individual Internet use, use of security precautions among individuals, online financial activities, e-health, and e-government, i.e. *focus on ICT for individuals and public sectors in society.*
- The Czech Republic leads for digital literacy in the workplace, individual e-commerce, and e-commerce among enterprises and security among enterprises i.e. focus on ICT in enterprises and the workplace.

However, most countries are amongst the top performers for some aspects of their Information Society, for example: computer and Internet penetration in schools and health clinics in Hungary, Internet penetration in secondary schools in Romania, for some aspects of e-commerce in Poland, for aspects of ICT in enterprises in Slovakia and for broadband access in Bulgaria, Latvia, and Lithuania. Conversely, Bulgaria and Romania consistently appear among the less well performing CEE 10 countries and are trailing with respect to most indicators, due to their low Internet penetration levels. Also noteworthy is the modest improvement shown by Hungary, Bulgaria, Latvia, and Estonia during the six months between June and December for many indicators.

Positive changes in Hungary have been corroborated by TNS Hungary who informally commented, "… the Hungarian Government have started the public program Sulinet Express aiming to support and increase Internet usage, meaning that those who purchase a PC and another tool receive a tax allowance. In parallel, an ATL communication campaign was launched in August 2003 relating to the Internet and promotions of wholesale chains such as ….. offered Internet configurations at a reasonable price….*and according to (their) monitoring data and that of competitors, Internet penetration is increasing*".

Three groups of CEE 10 countries can be identified because of the stage of their progress regarding uptake and usage of ICT. Three countries are CEE leaders and sometimes aligned behind (former) EU 15 leaders; these are Estonia, the Czech Republic, and Slovenia who have established appropriate infrastructure and access mechanisms and are starting to be interested in measuring impacts of their ICT provision. A second group of countries are making steady progress although at much lower levels of achievement. Hungary, Latvia, Lithuania, Poland, and Slovakia are making progress with infrastructure and access but with some way to go. Finally, Bulgaria and Romania are trailing with considerable challenges ahead, but poised to benefit from leapfrogging, as they introduce wide-ranging changes into the organisation of their public sectors.

Alignment of new member states within the EU 25 countries for the purposes of benchmarking Information Societies is now increasingly feasible due to the range of data, relating to data reference year 2003 which is now available, along with an ever increasing degree of harmonisation of indicators used, allowing valid comparisons to be made.

CEE 10 Information Society Leaders and Trailers, December 2003

Table 1, below, identifies the three best performing CEE 10 (leaders) and the less well performing three CEE 10s for 40 indicators selected because of their relevance and reliability. EU 15 averages have been included when possible using Eurostat data for 2003. Eurostat data for enterprises includes data for enterprises with more than 10 employees for NACE sectors DFGHIKO whilst the CEE 10 data is for all enterprises in NACE sectors DFGHIK. Data sets are sometimes incomplete and country specific data included in footnote where no EU 15 2003 average exists. The E-commerce and the Internet in European Businesses Report (2002) covers NACE sectors D, G 55.1, 55.2, I, and K and Enterprises with 10-49 employees (small), 50-249 employees (medium), and more than 250 employees (large).

Table 1: Best performing and less well performing CEE 10, December 2003

Indicator No	Indicator descriptor	EU 15[31] average	CEE 10[32] average		Best performing CEE 10				Less well performing CEE 10		
	Infrastructure and access										
OA1	Percentage of households with fixed telephone lines	82%[33]	65%		SI (85%)	BG (75%)	PL (74%)		SK (60%)	RO (54%)	LT (46%)
0A2a	Percentage of households that have telecommunications capable of providing access to Internet	-	82%		SI (95%)	EE (92%)	CZ SK (91%)		BG (82%)	LT (70%)	RO (65%)
0A31	Percentage of households with computer and broadband Internet access at home	12%[34]	11%		EE (21%)	LV (11%)	LT (10%)		SI (5%)	CZ (2%)	BG SK (1%)
0A3b	Percentage of households with access to Internet	45%	14%		SI (39%)	CZ (27%)	EE (26%)		BG LT (9%)	HU (8%)	RO (7%)
2C1	Number of Public Internet Access Points per 1,000 inhabitants	-	-		EE (0.756)	CZ (0.319)	RO (0.231)		PL (0.024)	SK (0.015)	BG (0.013)

31 Weighted average

32 Weighted average

33 IPSOS Telecoms Services Indicators Dec 2003/Jan 2004

34 ibid

Table 1: Best performing and less well performing CEE 10, December 2003											
Indicator No	Indicator descriptor	EU 15[31] average	CEE 10[32] average		Best performing CEE 10				Less well performing CEE 10		
2C3	Percentage of libraries offering Internet Access to public[35] (incomplete data set)	-	17%		SI (100%)	EE (86%)	LV (28%)		-	-	-
	Capabilities and skills[36]										
2A1	Numbers of computers per 100 pupils in secondary education	14.3[37]	6.6		HU (14.4)	RO (10.4)	CZ (9.5)		BG EE (4.0)	PL (3.7)	LT (3.1)
2A2	Numbers of computers connected to Internet per 100 pupils secondary schools[38]	10.0[39]	5.8		HU (10.7)	RO (9.6)	CZ (7.6)		SI (3.6)	PL (3.0)	LT (2.1)
2A32	Numbers of computers with high speed connection to Internet per 100 pupils in secondary schools (incomplete data set)	-	-		HU (7.87)	CZ (7)	EE (4)		-	-	-
1A4	Percentage of individuals who have participated in formal education using Internet	11%	2%		SI (6%)	EE (4%)	CZ (3%)		BG (1%)	LT (1%)	PL RO (1%)
1A4	Percentage of individuals who have participated in educational courses related to employment	10%	1%		CZ (3%)	EE (3%)	SI LV (2%)		[40]		
2B9	Percentage of enterprises using e-learning for training and education of employees	-	1.4%		CZ (6.4%)	HU (4.8%)	EE (4.3%)		SI (1.8%)	BG (1.7%)	PL (0.4%)
2B1	Percentage of workforce with at least basic IT training	49%[41]	44%		CZ (71%)	SI (58%)	EE (53%)		LT (40%)	RO (37%)	BG HU (29%)

35 Data missing for BG HU RO

36 Many incomplete data sets for these indicators

37 Flash Eurobarometer 118, 2002

38 Data missing for LV BG

39 Flash Eurobarometer 118, 2002

40 All other CEE 10 at 1% or less

41 Eurobarometer 58, Sept/ Oct 2002, Proportion of active population using computer for professional purposes that had active computer training at workplace.

Table 1: Best performing and less well performing CEE 10, December 2003											
Indicator No	Indicator descriptor	EU 15[31] average	CEE 10[32] average		Best performing CEE 10				Less well performing CEE 10		
	Stimulating usage										
1A1	Percentage of population who regularly use Internet (at least once a week during last 3 months)	41%	21%		EE (42%)	CZ (41%)	SI (40%)		PL (18%)	BG HU (17%)	RO (13%)
2B7	Percentage of employees using computers in their normal work routine – at least once a week	39%	35%		SI (58%)	CZ (55%)	EE (47%)		LT (33%)	PL (31%)	HU (24%)
2B8	Number of employees having used Internet at workplace (at any time)	86%	44%		CZ (75%)	LT (72%)	PL (59%)		SK (29%)	LV (28%)	HU RO (14%)
2B5	Percentage of enterprises with persons using telework	16%	8%		SI (25%)	CZ (23%)	EE (19%)		LT SK (11%)	BG PL (6%)	RO (4%)
3A2	Percentage of individuals who have used Internet during last three months having bought goods or services for private use over the Internet in the last three months.	14%	11%		CZ (26%)	SI (21%)	EE (16%)		BG (7%)	LV RO (5%)	LT (3%)
1C7a	Percentage of individuals who have taken ICT precautions on their PC and updated them within the last three months: installation of virus checking programme	14%	35%		EE (45%)	PL RO (37%)	SI (36%)		BG (31%)	LT (25%)	LV (24%)

Table 1: Best performing and less well performing CEE 10, December 2003												
Indicator No	Indicator descriptor	EU 15[31] average	CEE 10[32] average		Best performing CEE 10				Less well performing CEE 10			
	Accelerating e-commerce											
3A1a	Percentage of enterprises with 1-20% of their turnover from e-commerce	-	11%		PL (16%)	CZ (12%)	LV (11%)		HU (8%)	RO (2%)	BG LT (1%)	
3A1b	Percentage of enterprises (10 or more employees) with 1-20% of their turnover from e-commerce	83%[12]	10%		PL (22%)	CZ (20%)	EE LV (15%)		RO (6%)	SI (4%)	BG LT (1%)	
3A3	Percentage of enterprises having received online orders via Internet	10%	14%		PL (20%)	CZ (16%)	SK (15%)		RO (4%)	BG (3%)	LT (2%)	
3A4	Percentage of enterprises having received online payments for Internet sales	1%	4.7%		EE (7.2%)	PL (6.4%)	CZ (5.4%)		SI (1.0%)	LT (0.3%)	HU (0.2%)	
3A5	Percentage of enterprises having purchased online	14%	17%		CZ (30%)	SI (22%)	PL (21%)		LT (7%)	RO (5%)	BG (4%)	
3A6	Percentage of enterprises having access to the Internet	86%	74%		SI (94%)	CZ (93%)	SK (85%)		LT (62%)	BG (47%)	RO (41%)	
3A7	Percentage of enterprises with broadband access	39%	21%		EE (69%)	LV (57%)	LT SI (40%)		PL (20%)	SK (16%)	RO (10%)	
3A8	Percentage of enterprises with website/homepage	57%	44%		CZ (59%)	PL (56%)	SK (51%)		HU (28%)	LT (21%)	RO BG (17%)	
3A9	Percentage of enterprises with LAN	-	11%		SI (57%)	EE (24%)	LT (18%)		RO (9%)	SK (8%)	BG (7%)	
3A10	Percentage of enterprises using Intranet	27%	18%		LV (34%)	CZ (32%)	SI SK 23%		HU 16%	EE RO (15%)	BG (12%)	
3A11	Percentage of enterprises using Extranet	12%	3%		LV (13%)	SI SK (9%)	LT (8%)		EE HU (4%)	BG (3%)	PL (2%)	
1C5a	Percentage of enterprises with Internet access having encountered ICT security problems during last three months[13]	38%	40%		LV (52%)	CZ (51%)	HU (45%)		SK (39%)	BG (31%)	RO (25%)	

Table 1: Best performing and less well performing CEE 10, December 2003												
Indicator No	Indicator descriptor	EU 15[31] average	CEE 10[32] average		Best performing CEE 10				Less well performing CEE 10			
1C6	Percentage of enterprises using security precautions during last twelve months	70%	69%		CZ SI (86%)	SK (85%)	PL (76%)		LT (54%)	BG (44%)	RO (43%)	
1C7	Percentage of enterprises having updated security precautions during last three months	60%	67%		EE (45%)	PL RO (37%)	SI (36%)		BG (31%)	LT (25%)	LV (24%)	
3A13	Percentage of enterprises whose IT systems for managing order or purchases are linked automatically with other internal IT systems	26% (online orders [14]	9%		SI (17%)	CZ PL (10%)	RO (9%)		LT SK (6%)	HU (5%)	LV (4%)	
3A14	Percentage of enterprises whose systems are linked automatically to IT systems of suppliers or customers outside their enterprise group by Internet	26%[15] (online orders)	8.9%		PL (10.9%)	EE (9.4%)	RO (7.1%)		SI (6.0%)	LV SK (5.7%)	HU (2.0%)	
3A15a	Percentage of enterprises using the Internet for banking or financial services	65%[16]	38%		EE (78%)	SI (76%)	CZ (60%)		HU PL (47%)	LT (45%)	RO BG (5%)	

42 Eurostat Survey on ICT Usage in Enterprises 2002, enterprises more than 10 employees, NACE - D, G, 55.1, 55.2, I, K, Enterprises having sold 1% or more than total sales online,

43 Leaders should have experienced the fewest security problems not the most

44 European E-business Report, 2003: unable to retrieve appropriate value

45 European E-business Report, 2003: and 23% small enterprises (0-49 employees) and 17% medium enterprises (50-249 employees), integrated IT with suppliers

Table 1: Best performing and less well performing CEE 10, December 2003												
Indicator No	Indicator descriptor	EU 15[31] average	CEE 10[32] average		Best performing CEE 10				Less well performing CEE 10			
	Health Online											
3C4b	Percentage of general practitioners using computers in their consulting rooms	-	57%		HU (99%)	CZ EE (93%)	SK (87%)		PL (30%)	LV (22%)	LT (19%)	
3C1	Percentage of general practitioners with Internet access in the consulting room	-	24%		EE (92%)	CZ (57%)	SI (48%)		LT (15%)	BG (14%)	LV (12%)	
3C5	Percentage of population who have used Internet to seek Health information for themselves or others	[17]-	4%		SI (15%)	CZ (11%)	EE (9%)		BG (4%)	PL (3%)	HU RO (2%)	
2B2a	Percentage of individuals using the Internet for interacting with public authorities broken down by purpose – obtain information from Public Authority	21%	23%		EE (61%)	LV (47%)	CZ (38%)		PL (18%)	RO (16%)	LT (13%)	

46 EC E-commerce and the Internet in European businesses (2002)

47 Eurostat Survey 2002 on ICT usage in households, having used Internet in last three months, using health related services: DK 37%, DE 10%, EL 10%, ES 9%, LU 30%, AT 8%, FI 25%, SE 20%

Annex 2 — Information Society Development Paths

Foreword

The aim of this Annex is to put the results of the eEurope+ Information Society Benchmarking survey of February 2004 (with reference date December 31st, 2003) in a comparative perspective and characterise the Information Society development paths in ten of the Central and Eastern European countries[1]. Lessons will be drawn from the variety of experiences of the countries that participated in the survey on their way to the Information Society.

In defining Information Society pathways some major performance and impact indicators (IS infrastructure, general Internet usage, Internet usage in doctor's consulting rooms, online interaction of citizens with government, e-commerce and barriers to Internet usage) will be examined.

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Factors influencing Information Society Development Paths

Many factors influence the development path of countries moving towards the Information Society. Some factors have relatively superficial coverage or are taken for granted. Do countries where the population has advanced skills in English generally have higher levels of Internet usage? Does geographical latitude matter? For obvious reasons, there is often a positive correlation between wealth in terms of GDP per capita and Information Society development. Smaller countries often succeed better in developing the Information Society than larger countries.

A major inhibiting factor for the CEE 10 countries is the fact that average income is very low compared to the EU 15 average. In 2002, the average GDP per capita of the Central European countries plus Turkey, Malta and Cyprus in purchasing power parity terms was 34 per cent of the EU 15 level (see table 1). The GDP per capita of the 10 new EU Member States (2004) is 47 per cent of the EU 15 level (2002). Economic structures that are usually very different from the average EU 15 country are hidden behind these figures. For example, a significant part of the population in many CEE 10 countries still lives in the countryside, sometimes deprived of basic services[2]. In addition, service industries are usually less developed.

By comparing GDP per capita in 1989 and 2002 the uneven impact of the transitional recession upon various CEE 10 countries is shown (table 1). The GDP per capita varies widely (table 1).

Table 1 Central and Eastern European (10) countries, GDP per capita (PPS, 2003, EU 15=100), GDP in 2002 as percentage of GDP in 1989 and population (2004)

	Country code	GDP per capita PPS EU 15=100, 2003	GDP in 2002 as a % of GDP in 1989	Population, millions (1.1.2004)
Slovenia	SI	76	117	2.0
Czech Republic	CZ	61	105	10.2
Hungary	HU	59	118	10.1
Slovakia	SK	49	109	5.4
Estonia	EE	44	95	1.4
Lithuania	LT	41	78	3.5
Poland	PL	40	130	38.2
Latvia	LV	38	81	2.3
Bulgaria	BG	26	83	7.8
Romania	RO	26	88	21.7
13 EU accession countries and new EU member states		34 (2002)		173.3
10 new EU member states (2004)		47 (2002)		74.2
10 Central and Eastern European countries (new EU member states in CE plus Bulgaria and Romania)	CEE 10			102.6

Source: GDP per capita and population: Eurostat: IBM (2003); GDP 2002/1989: Economic Commission for Europe, UN.

ICT infrastructure

In 1989-91, the CEE 10 countries were faced with a legacy that included a much neglected ICT infrastructure. Moreover, during the 1990s they were faced with an economic recession that put heavy strains on the public purse (see table 1). During 1994-1999 the Czech Republic spent on average $95.21 per year on public telecommunications investment per capita, Hungary $73.70, Poland $29.85, Slovakia $81.69 and Romania $12.26 (ITU, OECD). For comparison, Germany spent $146.97, the UK $131.02 and France $106.18 per capita during the same period.

Moreover, these transition countries were faced with systemic change that comprised all aspects of society and economy. In the sphere of ICT infrastructure, it meant liberalisation and new ownership structures. In some CEE 10 countries the State kept a majority stake in the incumbent telecommunications operator (Czech Republic, Latvia, Slovenia) while the Bulgarian telecommunications operator remained fully state owned (June 2003, IBM 2003B, p. 19). Despite liberalisation, little competition emerged in the fixed line market (see also BuddeComm, 2003). The result of liberalisation was, initially, usually a surge in telecommunication tariffs, partly related to the fact that telephone tariffs were very low before liberalisation (ITU).

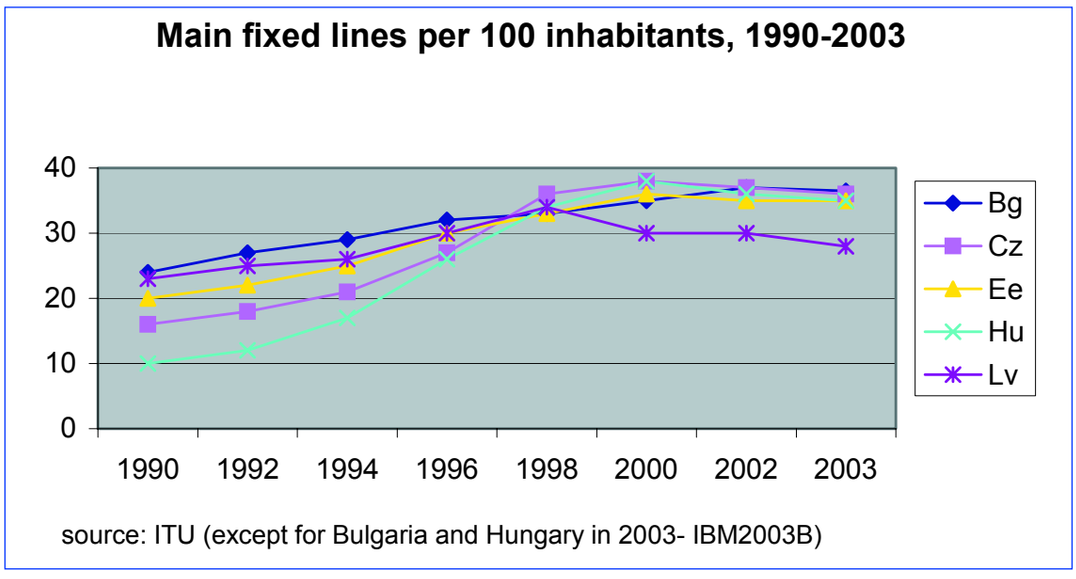
Graphs 1 and 2 show the big progress made in the CEE 10 with respect to fixed line penetration, despite limited investment capital. It was also uneven progress. Some countries, like Hungary, made faster progress during the nineties, while others, like Romania, were slower, at least in fixed line penetration ratios.

The rural areas in the CEE 10 are especially faced with low telephone penetration. In rural areas, there are often analogue exchanges and lack of bandwidth that drastically reduces the quality of Internet dial up connections.

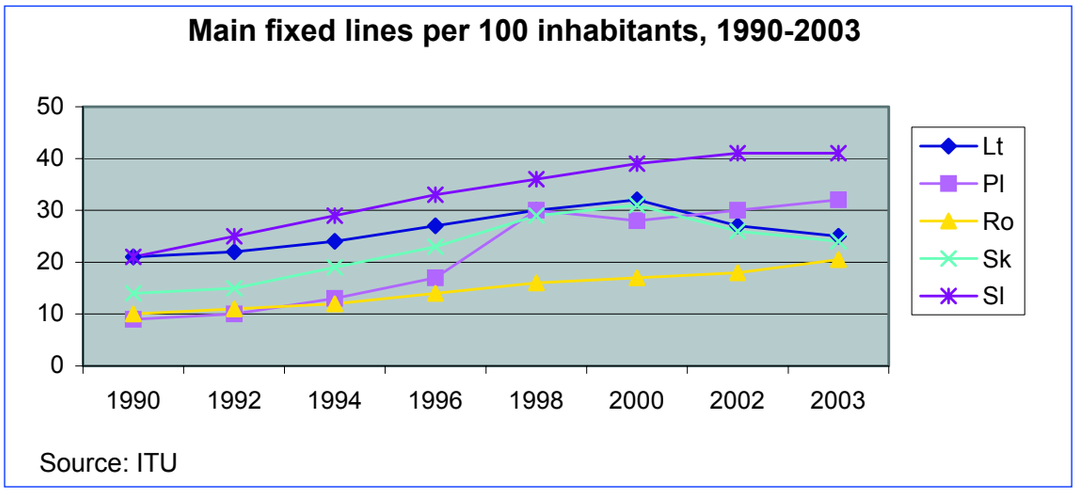
On average, EU 15 countries have many more main telephone lines per 100 inhabitants than the CEE 10 countries (2002: Germany 65; France 57; UK 59; Italy 49; Spain 46; Ireland 50; Greece 53; Portugal 42) and trends are different. In those few EU 15 countries where fixed line penetration has stagnated recently, like in Greece, France, and Portugal, it is on a much higher level.

The provision of broadband services (xDSL) over telephone lines is still in its early development phase and only Estonia has more than 2.5 per cent (i.e. 7.4 per cent) of individuals that access Internet from home using xDSL (December 2003, eEurope+).

Graph 1 Main fixed lines per 100 inhabitants, 1990-2003



Graph 2 Main fixed lines per 100 inhabitants, 1990-2003



Households fixed line penetration rates give a better picture of the share of the population that has access to fixed telephony. Table 2 shows a trend over the past few years of decreasing fixed telephone household penetration ratios in many CEE 10 countries (Romania, Slovakia and Poland are exceptions – compare also with graphs 1 and 2). This trend is accompanied by an explosive growth in mobile telephony[50].

Table 2 Fixed lines per 100 households in CEE 10, 2001-2003

	BG	CZ	EE	HU	LT	LV	PL	RO	SI	SK
eEurope+, HS survey December 2003 (% of respondents with fixed telephone line	75	62	62	63	45	60	74	54	85	60
eEurope+, NSO survey, June 2003	83.6	74.1	61.4	58.1	51.3	63.4	75.1	44.6	95.0	45.0
IBM June 2003	82.7	66.5	62.9	72.9	50.2	68.4	72.4	52.7	96.2	58.2
IBM Dec 2002	79.3	65.4	68.2	73.4	59.7	71.8	62.1	51.5	95.6	60.9
IBM Dec 2001	83.0	71.0	68.2	80.4	72.8	77.6	65.6	49.9	85.3	69.5

Source: IBM and eEurope+

Therefore, penetration ratios for telephony, including mobile telephony, are increasing across the CEE 10. However, the percentage of the population that have telecommunications capable of providing access to the Internet is stagnating or declining, taking into account that mobile Internet provision is hardly developed and that a significant number of fixed telephone lines are not fit for high quality Internet provision.

For example, in Lithuania, the fixed line household penetration rate decreased from 72.8 in December 2001 to 45 in December 2003, which means a decline of 32 per cent. According to the eEurope+ Household Survey (December 2004), 55 per cent of respondents did not have a fixed telephone line at home. This puts a brake on future Internet usage expansion.

[50] The eEurope+ household surveys found a decrease in mobile penetration ratios from 54 per cent in June 2003 to 48 per cent in December 2003, indicating that the end of the boom in mobile telephony has been attained. In Poland the penetration ratios declined from 60 per cent in June 2003 to 43 per cent in December 2003.

The situation may change drastically if Internet provision through cable TV networks and mobile telephony is expanded. Table 3 shows that a significant number of households access the Internet through cable modem in Bulgaria, Slovenia, Poland and the Baltic republics. Recently, in Estonia, there has been a fast increase in cable modem users. Sixty per cent of Czech homes are passed by cable TV, 56 per cent of Hungarian homes, 30 per cent in Poland, and 35 per cent in Slovakia (OECD, 2003, p. 37). 48 per cent of Bulgarian households have cable TV (national regulatory authorities). The mobile connection is only used by a small number of households.

Table 3 Households that have access to the Internet at home through mobile connection and cable modem, as a percentage of all households with a computer at home, June 2003 and December 2003

		BG	CZ	EE	HU	LT	LV	PL	RO	SI	SK
Mobile connection	06/2003	2.3	1.8	0.1	1.8	1.8	0.6		1.9	0.1	0.8
	12/2003	1.8	5.1	0.3	1.9	0.6	3.7	1.8	4.9	0.7	2.7
Cable modem	06/2003	17.6	3.3	17.4	3.2	11.3	7.5	3.9	4.5	6.1	1.1
	12/2003	20.1	4.7	30.8	3.2	12.0	12.0	7.3	2.6	8.1	1.4
Do not have Internet connection at home	06/2003	31.7	27.6	22.8	41.6	51.2	58.5	58.9	58.6	23.7	58.

Source: eEurope+

For comparison: in the EU 15, Finland and Denmark had the highest share of households using a mobile phone to access Internet (UMTS) with 2 and 1 per cent respectively (April 2004) while Denmark and Portugal had the highest scores for households with access to Internet with cable modem (8 and 6 per cent respectively, April 2004) (Eurostat).

The situation in Romania can be taken as an illustration. Here telecommunications operators and regulatory authorities reckon with a rapid expansion of broadband Internet provision through the cable network to which 55 per cent (2003) of the population is connected. It also seems to be the case that telecommunications operators are not investing very much in the telecommunication backbone infrastructure in the expectation that wireless solutions may be cost saving and will provide broadband access. It means that there is the option of leapfrogging with the help of new technologies. Remarkable is the 5 per cent of households with computer in Romania that access the Internet through a mobile phone (table 3). It is probably related to the 3G mobile services that are now covering the whole of the territory of Romania.

The ICT infrastructure in most CEE 10 countries is less developed compared to the EU 15. Moreover, ICT expenditures per capita are far less compared to Western Europe.

Telecommunications investment differs very much across the region. While investment ratios, as a percentage of GDP, are high in Slovakia, Latvia, Hungary, Bulgaria, the Czech Republic, and Estonia, they are very low in Romania (ITU, 2003). Poland is lagging behind other Central European OECD countries.

A similar pattern emerges if we compare ICT spending as a percentage of GDP over a longer period. During 1993-2001, the Czech Republic spent 6.8 per cent of GDP, Hungary 6.2 per cent, Slovakia 5.5 per cent, Poland 3.7 per cent, Slovenia 3.7 per cent, and Romania 1.5 per cent. For comparison: the UK spent 8.0 per cent, Belgium 6.5 per cent, The Netherlands 7.5 per cent, and the USA 7.8 per cent (UNCTAD, 2003, p. 68).

Because of relatively low spending on ICT, we cannot expect a substantial improvement of the telecommunications infrastructure in the near future. Broadband expansion will be limited. While Western Europe had 15.9 million ADSL lines in 2003, Central and Eastern Europe had only 128,000.

The great divide between the EU 15 and the CEE 10 countries is above all in the quality of service indicators. Wanting a fixed telephone line and having the money to afford one does not always mean that a line is immediately available. Although in all CEE 10 countries waiting lists for initial connection decreased drastically since the early 1990s, they are still long in Poland (2.5 months waiting) and Bulgaria (2 months, 4 days) (30 June 2003; IBM 2003B, p. 29).

Sometimes, the telephone network is in a bad condition. The fault rate per access line was 0.4416 in Bulgaria while in Latvia 0.2306, in Romania 0.149, in Slovenia 0.225 and in Poland 0.166 (30 June 2003, IBM 2003B, p. 29). For example, in 2003, 47 per cent of all calls in Bulgaria failed; 9.8 per cent of all calls in Romania and 8.6 per cent in Slovenia (IBM, 2003B, p. 29).

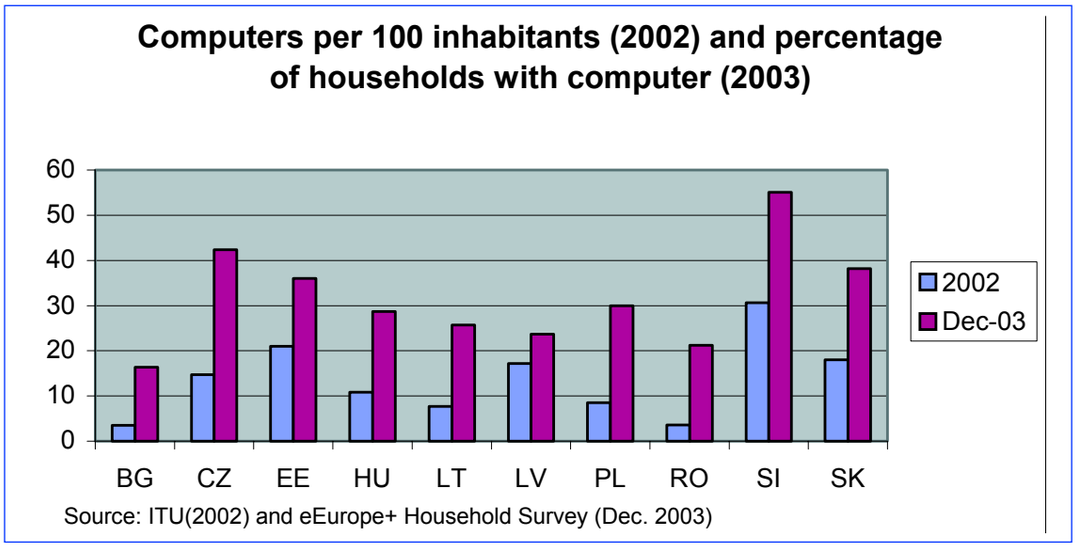
With respect to digital mainlines, Bulgaria stands out with 22 per cent of digital lines (June 2003, IBM-2003B, p. 17). Romania has 73 per cent digital lines (2003) while the third lowest in CEE 10 is Estonia with 82 per cent. Estonia had in 2002 51.8 digital lines per 100 households. It should be noticed here that the Baltic States have made significant progress during the period 1990-2003 (Estonia from 38 per cent to 82 per cent digital lines, Lithuania from 17 to 90 per cent and Latvia from 26 to 84 per cent). Bulgaria (from 4 to 22 - in terms of percentages it is a big step forward), Romania (from 31 to 73), and the Czech Republic (from 55 to 100 per cent) made big advances (ITU; IBM, 2003B, p. 17).

Another barrier for delivering Internet services is the existence of party lines (i.e. group lines where one local loop serves two subscribers or more). In Bulgaria 46.6 per cent of all lines were party lines in December 2002 and 4.1 per cent in Romania (IBM, 2003A).

Computer penetration

Graph 3 shows the level of penetration of computers into households. Although the two data series about computer penetration represent different indicators, the figures show a large leap ahead in the Czech Republic, Hungary, Poland, Bulgaria, Romania, and Lithuania with respect to computer ownership.

Graph 3 Computers per 100 inhabitants (2002) and percentage of households with computer (2003)



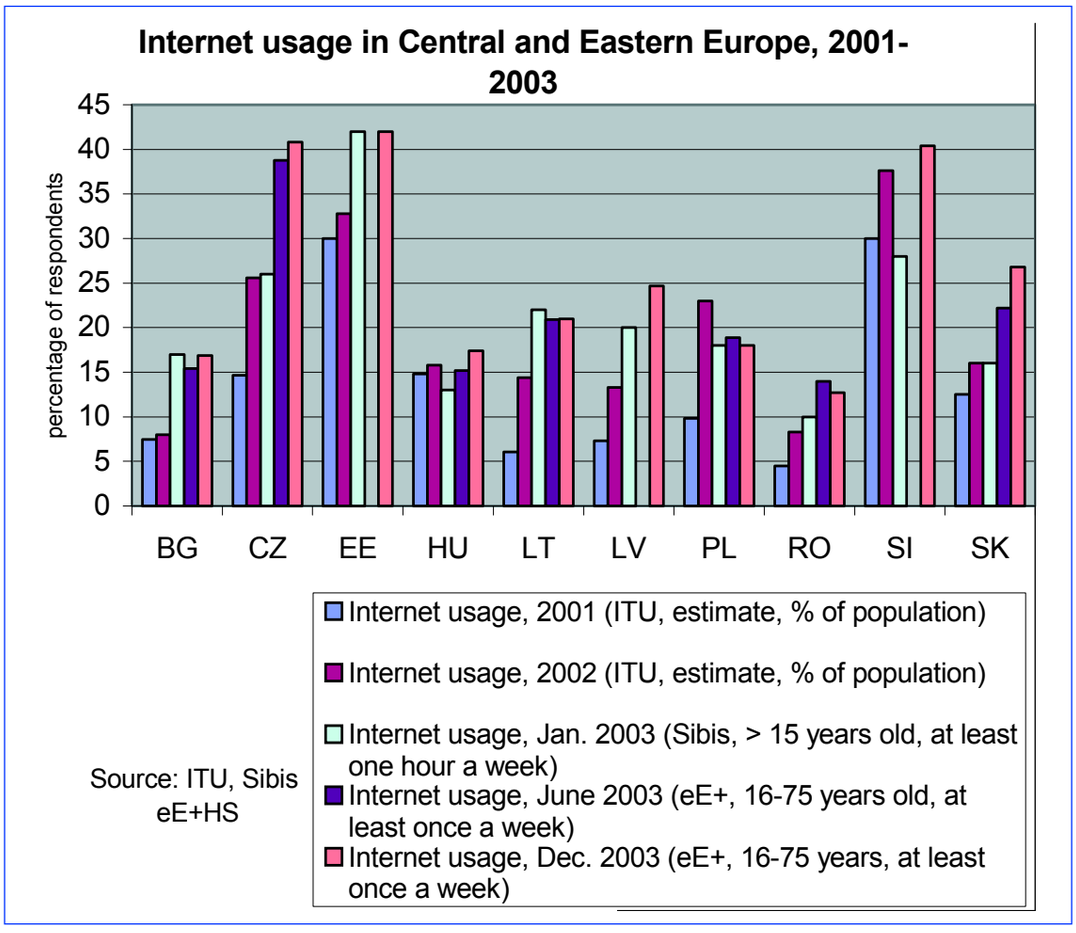
However, on average 35 per cent of households with computers in the CEE 10 do not have an Internet connection (56 per cent in Latvia, 39 per cent in Poland, 50 per cent in Slovakia, 65 per cent in Romania and 23 and 24 per cent in respectively Estonia and Slovenia) (December 2003, eEurope+, household survey).

Internet usage

With a regular Internet usage (at least once a week) of 20 per cent of the population in CEE 10 the divide with the EU 15 (46 per cent regular Internet usage, last 4 weeks, according to SIBIS, January 2003; 45.3 per cent average Internet usage according to Eurostat in November 2003; 44.2 per cent for EU 15 according to Interworldstats, May 2004) is very big. Only Estonia, the Czech Republic, and Slovenia are close to the EU 15 average.

Graph 4 shows large leaps ahead in Internet usage since 2001 in the Baltic states, the Czech Republic and to a lesser extent in Romania and Bulgaria while slow progress, or even stagnation can be observed since 2001 in Hungary, which is worrisome given the low Internet penetration in that country. As the legend shows, indicators are not exactly the same in different surveys and should therefore be interpreted with due caution.

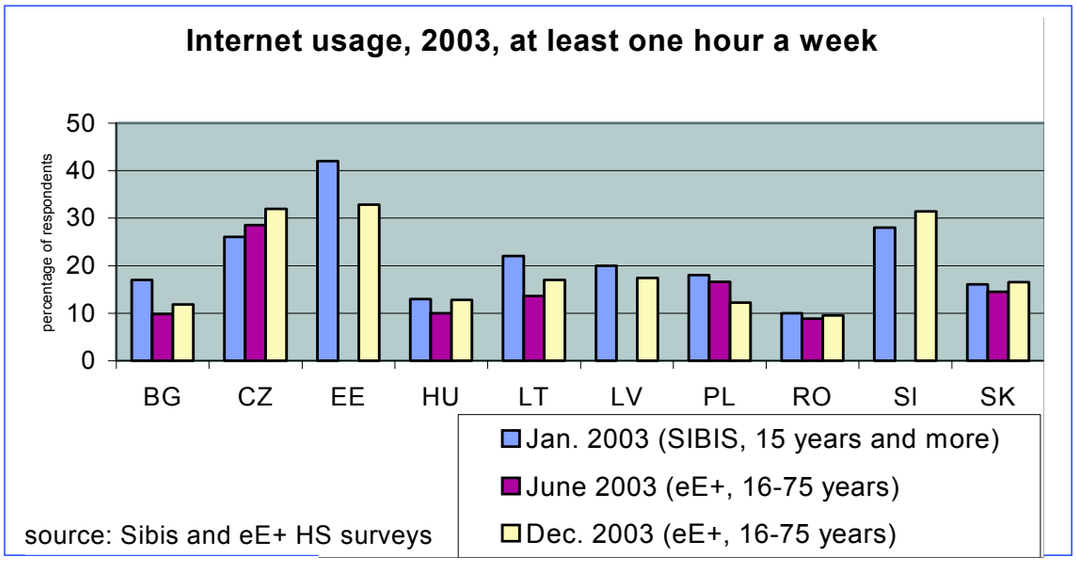
Graph 4 Internet usage in Central and Eastern Europe, 2001-2003



For Estonia, Latvia and Slovenia no data are given in graph 4 for June 2003. This is related to the fact that in June 2003 Computer Aided Telephone Interviews were held, excluding those without a fixed telephone line. But if we look at regular Internet usage amongst those with a fixed telephone it decreased significantly between June 2003 and December 2003 in Estonia, Latvia and Slovenia. Regular Internet usage in Latvia amongst respondents with fixed telephone lines was 34.2 in June 2003, but 25.5 per cent in December 2003. Percentages are for Estonia respectively 48 and 39.8 and for Slovenia 45.7 and 42.6.

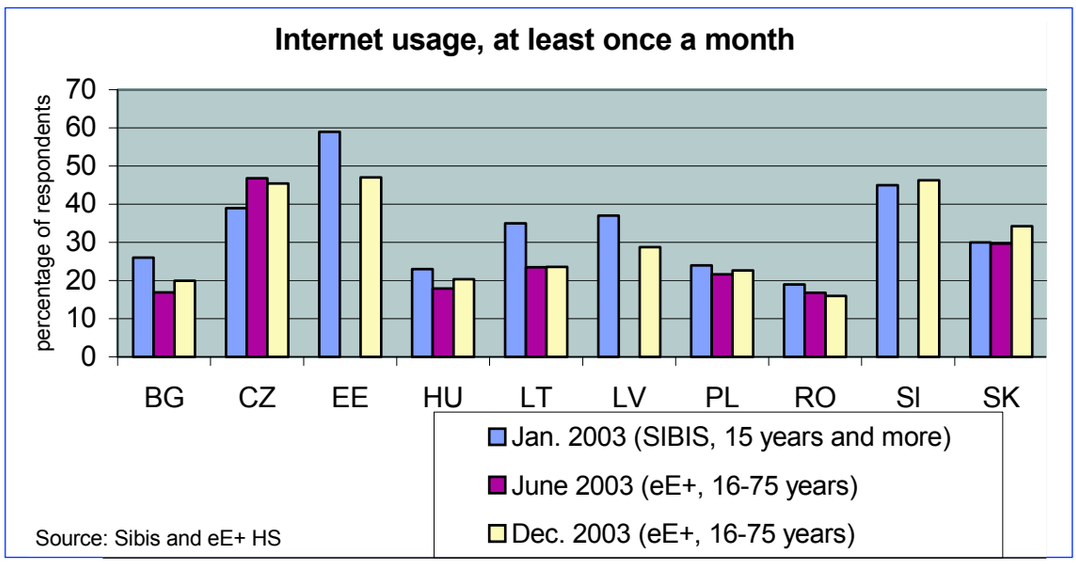
For five out of ten Central European countries, there is evidence of stagnation in regular Internet usage during 2003 while for Slovenia differences are too small to draft firm conclusions[51]. The problem with the SIBIS figures in graph 4 are that they measure Internet usage for at *least one hour a week* while eEurope+ figures measure Internet usage at *least once a week*. We must be careful, therefore, when comparing indicators with the same basic description to ensure that the underlying questions are the same. Graph 5 shows the Internet usage figures for at least one hour a week.

Graph 5 Internet usage, 2003, at least one hour a week



Graph 5 shows that the January 2003 scores are higher for six countries than both the June and December 2003 scores while for Slovakia the January score is almost the same as in December 2003. It points to stagnation in seven countries (Bulgaria, Estonia, Hungary, Lithuania, Poland, Romania, and Slovakia). In the cases of Estonia and Poland, we see continuous decline while for the Czech Republic persistent progress. Slovakia and Romania remain on almost the same level.

Graph 6 Internet usage, at least once a month



[51] According to a survey by TNS Emor, Internet usage increased during 2003 in all three Baltic republics, the most in Lithuania 'where the Internet user base reached 28 per cent of the population'. 'The development of Internet usage has been the slowest in Latvia where 24 per cent of 15-75 year old inhabitants use the Internet' (19 May 2004, www.emore.ee).

With respect to Internet usage at least once a month, we see similar patterns: January 2003 scores are higher for seven countries (Bulgaria, Estonia, Hungary, Lithuania, Latvia, Poland, and Romania) than for both the June and December 2003 scores. Of course, we should take into account a statistical error margin and the fact that the sample composition of the SIBIS survey might be somewhat different (the SIBIS sample size was approximately 1,000 for each country). However, three data series point at stagnation in eight out of ten countries.

Some other surveys show continued progress with Internet penetration during 2003 (for example in the Baltic republics and Hungary (see footnote 5, page 12). However, these surveys are not precise with respect to what kind of Internet usage they are measuring.

From January 2003 to December 2003 Internet usage from home is progressing in all CEE 10 countries as table 4 shows (for Estonia and Latvia there is an upward bias for June 2003 due to CATI surveys). Both Romania and the Czech Republic show regression during the second half of 2003

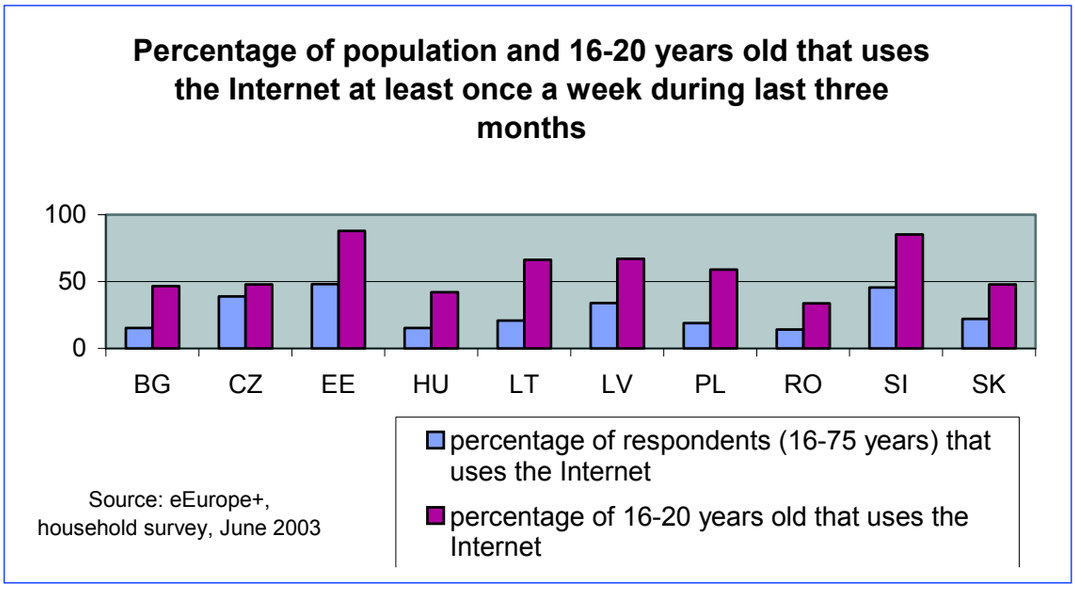
Table 4 Internet usage from home (2003) (percentage of total respondents)

	BG	CZ	EE	HU	LT	LV	PL	RO	SI	SK
January 2003 (SIBIS)	8	16	24	9	8	5	10	4	25	6
June 2003 (eEurope+)	8.1	31.8	31.9	8.2	8.5	11.4	14.5	8	39.1	12.7
December 2003 (eEurope+)	8.4	29.8	29.5	10.3	8.6	9.8	14.1	5.9	34.8	13.4

Source: eEurope+ and SIBIS; for Latvia, Estonia and Slovenia in June 2003 CATI survey

The question emerges as to what extent Internet access other than at home may have contributed to the expansion of Internet usage since 2001. In Bulgaria and Romania, 40 per cent of all Internet users used public Internet access points (SIBIS, 2003C, p. 15). In the EU 15, usage of Internet only at work and 'only somewhere else' comprised 11 per cent of the population against 'usage at home and at work' and 'usage only at home' 36 per cent. The respective percentages for the CEE 10 countries are 12 and 9 per cent (ibidem, January 2003). In Poland, 40 per cent of all Internet users used a place of education to access Internet and 29 per cent Internet cafes (eEurope+, Household Survey, December 2003).

Graph 7 Percentage of population and 16-20 years old that uses the Internet at least once a week during last three months



Comparing Internet usage (at least once a week) of the general population and youth (16-20 years old) reveals remarkable patterns. While Internet usage is low in Lithuania for the general population, it is high for youths in a CEE 10 perspective. On the other hand, in the Czech Republic Internet usage by youths is only slightly higher than for the general population. In Lithuania 40 per cent of all Internet users is in the age category 16-24 while in the Czech Republic only 24 per cent. It may point to a slow down in Internet usage in the near future for the general population in the Czech Republic and an acceleration of growth of Internet usage for the general population in Lithuania.

The question emerges how to explain the differences mentioned above. The question of statistical error margin should be looked at in detail, as the number of respondents in the age category 16-20 is relatively small. The February 2004 survey (reference date December 2003) indeed shows differences compared to the October 2003 survey. Whereas, in June 2003, 51 per cent of Czech 16-20 years old used the Internet regularly, it was 48 per cent in December 2003. Whereas, in June 2003, 60 per cent of Lithuanian 16-20 years old used the Internet regularly, it was 66 per cent in December 2003. Nevertheless, in both June 2003 and December 2003, the Czech Republic belonged to the Central European countries where the percentage of 16-20 years old that was using the Internet regularly was relatively low compared to that of the general population while it was relatively high in Lithuania.

If we look where youth accesses the Internet in the Czech Republic and Lithuania the following pattern emerges (table 5):

Table 5 Lithuania and Czech Republic: place from which Internet is accessed, as a share of all that accessed Internet, according to age

	From home	Place of education	Public libraries	Internet café	Public Internet Access Point	Work place	Neighbours, friends or relatives house
Czech Republic: 16-20 years old	57.5	65	10	11.2	O	8.7	21.2
Czech Republic: general population	63.4	20.5	7.2	9.8	2.7	54.9	18.1
Lithuania: 16-20 years old	21.4	82.1	12.5	17.8	0	1.8	32.1
Lithuania: General population	34.8	30.3	6.8	13.1	1.3	44.8	17.2

Source: eEurope+, June 2003

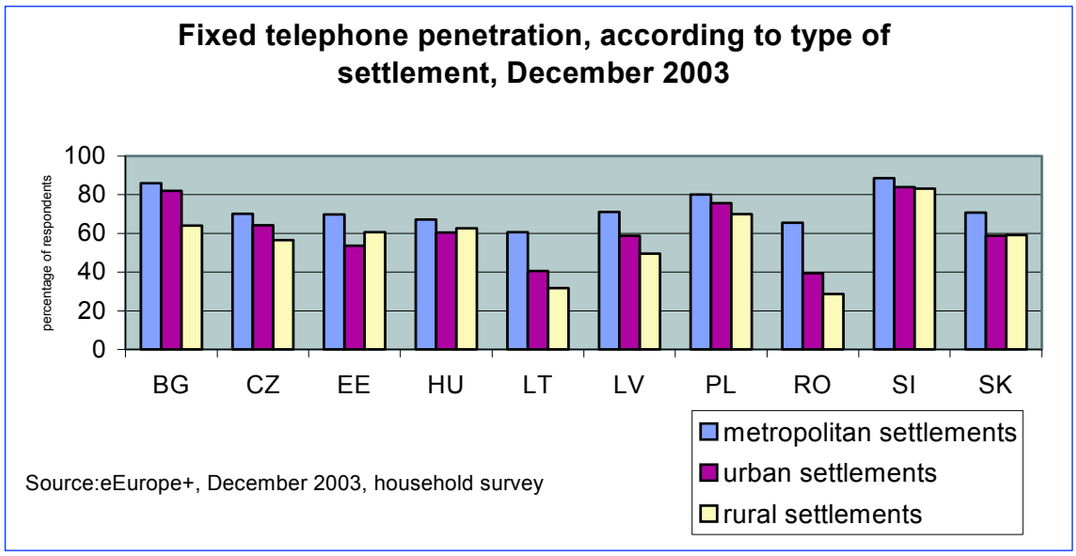
It appears that Lithuanian youth is accessing Internet much more in schools, with neighbours, friend or relative's house and Internet café than the Czech youth. Despite the fact that the Czech youth has more access to Internet at home, the Lithuanian youth uses Internet much more. Lithuanian youth is accessing Internet much more at school than the Czech youth despite the fact that Czech secondary schools have 7.7 computers with Internet access per 100 students while Lithuanian secondary schools 2.1 (eEurope+, June 2003).

Digital divides

Rural-urban divide

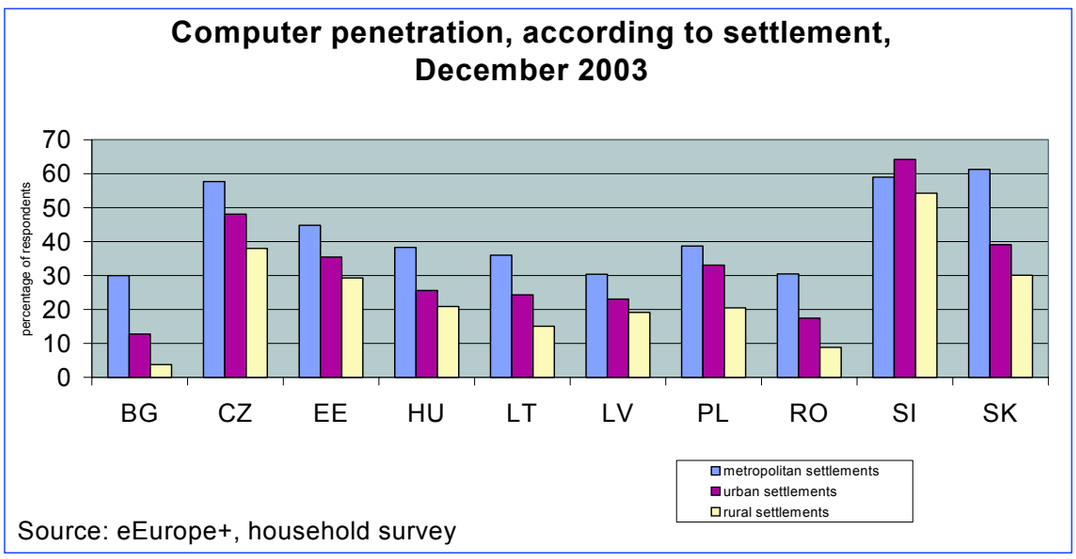
Only in Romania, Bulgaria, Lithuania, and Latvia is the urban-rural divide with respect to fixed line penetration pronounced. Graph 8 summarises the position at December 2003.

Graph 8 Fixed telephone penetration, according to type of settlement, December 2003



However, in Graph 9, we see that the number of computers per 100 households differs considerably according to place of residence (rural/urban/metropolitan) in the poorer CEE 10 countries (a rural settlement has less than 2000 inhabitants, an urban settlement between 2,000 and 100,000, and a metropolitan area more than 100,000 inhabitants). Graph 10 shows that only in Slovenia and Latvia the rural-urban divide with respect to regular Internet usage (at least once a week) is rather small. Notice that the rural-urban divide is much bigger for Internet usage and computer penetration than for fixed telephony penetration[52].

Graph 9 Computer penetration, according to settlement, December 2003



52 All data for graphs 8, 9 and 10 are based on the household surveys in which respondents were asked to answer the question 'where do you live? (metropolitan, urban or rural settlement).

Graph 10 Regular Internet usage, according to settlement, December 2003

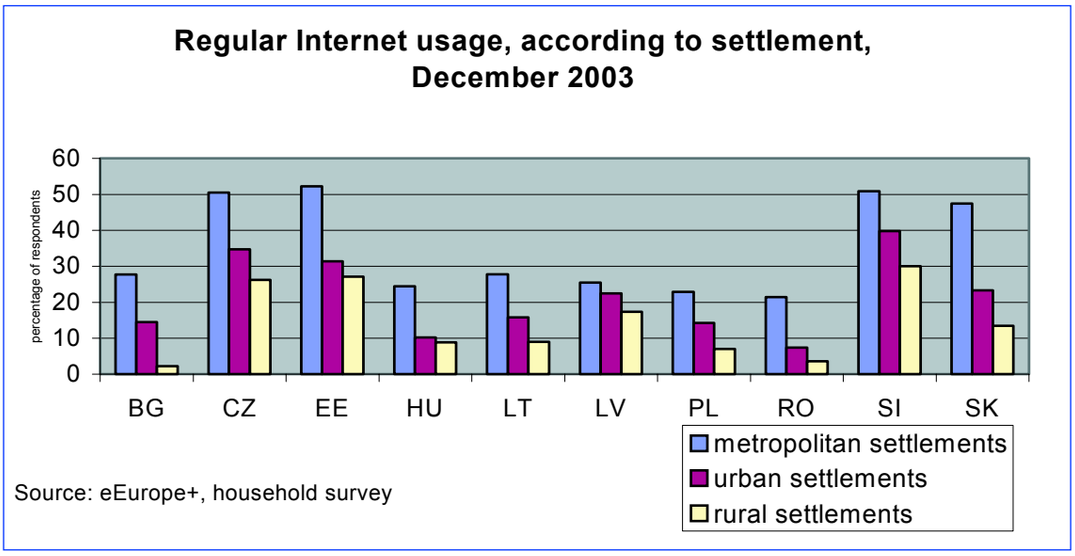


Table 6 shows a slight increase in metropolitan regular Internet usage (at least once a week) in only three countries during June 2003-December 2003 while four countries witnessed a growth of general regular Internet usage during June 2003- December 2003. In four countries, there is a significant decrease in regular Internet usage in metropolitan settlements. Of course, we have to take into account here the shift from CATI to CAPI interviews in Latvia, Estonia, and Slovenia. If looking at only those respondents with a fixed telephone, regular Internet usage in metropolitan areas in Slovenia, Estonia and Latvia decreased. It is remarkable that the decrease in regular Internet usage in metropolitan settlements is mainly in the better-connected countries.

Table 6 Regular Internet usage (at least once a week) in metropolitan settlements

	BG	CZ	EE	HU	LT	LV	PL	RO	SI	SK
Regular Inter usage in metropolitan areas June 2003	23.5	49.7	53.7	17.0	28.7	39.2	28.5	22.8	59.6	48
Regular Inter usage in metropolitan areas, December 2003	27.7	50.5	49.6	24.4	27.8	25.5	22.9	21.4	50.8	47.4
Regular Internet usage, June 2003	15	39	48	15	21	34	19	14	46	22
Regular Internet usage, December 2003	17	41	42	17	21	25	18	13	40	27

Source; eEurope+, household surveys

All this raises the question about the possible levelling off and even a possible decline of general Internet usage at a comparatively low level (compared with the EU 15 average).

Another remarkable development is the decrease of regular Internet usage in Romanian urban settlements (from 10.1 to 7.3 per cent; June-December 2003) and rural settlements (from 5.3 to 3.6 per cent; June-December 2003). It should be noticed here that the statistical error margin is small given the sample size of 1,655 respondents (although, and this is important to note, only 3 per cent of Romanian respondents live in rural settlements - smaller than 2,000 inhabitants - therefore only the urban decline is statistically significant). Regular Internet usage also decreased in Bulgarian rural settlements (from 3.3 to 2.7 per cent; June 2003-December 2003).

Education

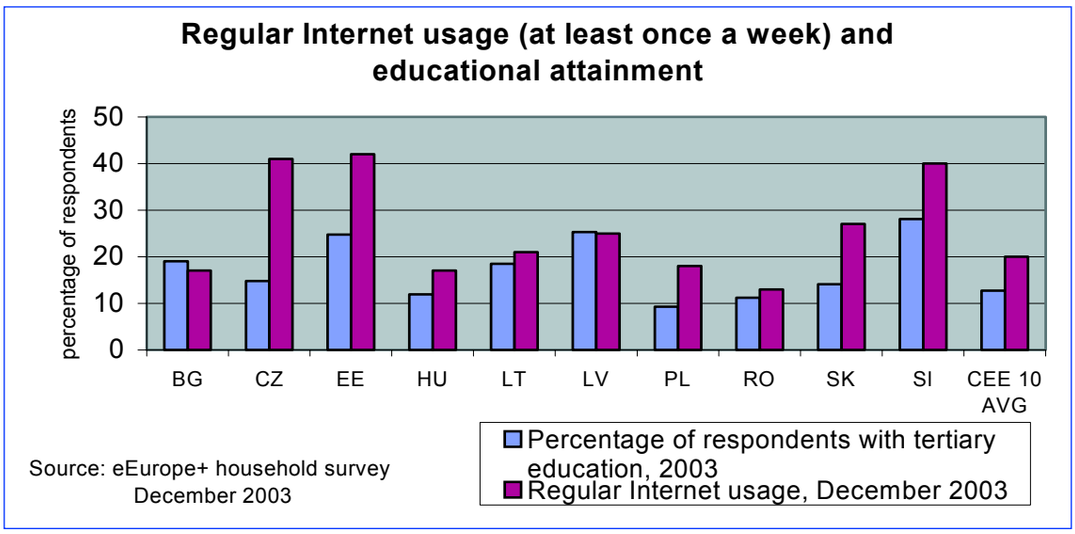
Digital literacy of the general population is at a rather low level. There is no correlation in the CEE 10 between the share of population with tertiary education and digital literacy (see also graph 11). The digital literacy index is 0.8 for the EU 15 and 0.3 for the CEE 10 countries (for the USA the index is as high as 1.5 on a scale of 3) (SIBIS, 2003A, p. 126).

The highest scores in the CEE 10 are Estonia and Slovenia with 0.7 points (the same level as Italy and Spain) while the Czech Republic scores 0.6, Latvia 0.5, Lithuania 0.4 and Bulgaria, Romania, Poland and Hungary 0.3 (January 2003, SIBIS, indicator 60, page 126). Compare this with Greece (0.5) and Portugal (0.4).

A similar picture emerges with respect to digital literacy among youths (January 2003, SIBIS, indicator 61, p.128). EU 15 scores 1.5 while the CEE 10 countries 0.9. Highest scorers are again Estonia and Slovenia (with 1.4) that is lower than Spain and Italy but higher than Belgium, Greece, France, and Portugal. Disparities with respect to digital literacy are less pronounced between the CEE 10 countries, EU 15 and the USA for youth than for the general population.

Graph 11 shows that there is a close correlation between educational attainment and regular Internet usage.

Graph 11 Regular Internet usage (at least once a week) and educational attainment



In most countries, except the Czech Republic, the big divide lies between those with tertiary education and the rest. Table 7 summarises the position.

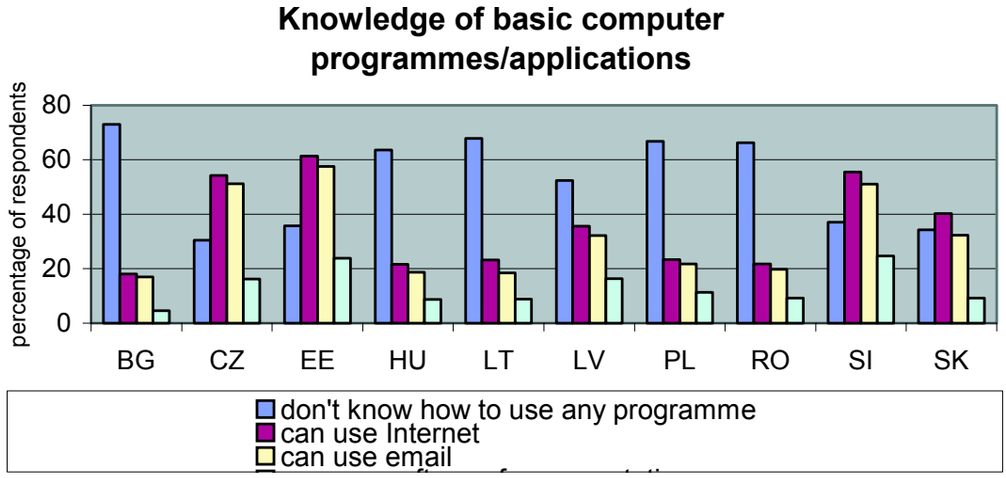
Table 7 Percentage of respondents that has never used the Internet, according to educational attainment (June 2003)

	BG	CZ	EE	HU	LT	LV	PL	RO	SI	SK
Primary and lower secondary education	82%	71%	50%	81%	81%	82%	91%	76%	76%	61%
Medium and upper secondary education	80%	30%	45%	67%	73%	67%	57%	77%	44%	51%
Tertiary education	43%	12%	18%	36%	41%	31%	29%	44%	13%	19%

Source: eEurope+, household survey

Graph 12 shows knowledge of basic computer programmes and application across the CEE 10.

Graph 12 Knowledge of basic computer programmes/applications



Source: eEurope+ household survey, June 2003

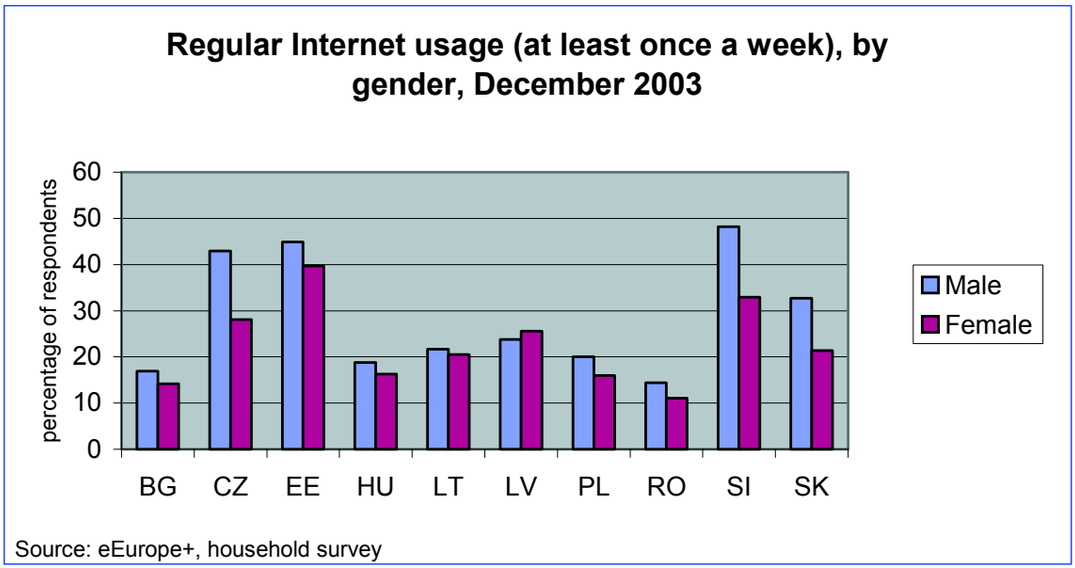
One would expect that if one adds up those who do not know how to use any programme or application and those who can use the simplest application (Internet), one would be close to 100. This is not the case in Slovakia where 25.5 per cent of respondents cannot use Internet but know some computer programme or application. In Slovakia, there are many respondents who can use a word processing programme (59 per cent) but who do not know how to use the Internet.

Gender

In most CEE 10 countries there are more women than men who do not know how to use any programme, except in Romania, Hungary, and Bulgaria (in Bulgaria, the percentages are the same for women and men). The more complicated programmes become, the more the gender divide widens. With respect to the use of presentation programmes, there is a big gender divide in most CEE 10 countries. Romania is an exception because 9.4 per cent of women can use a presentation programme against 9.2 per cent of all respondents (June 2003, eEurope+).

As in the EU, more men are accessing the Internet in the CEE 10 than women are.

Graph 13 Regular Internet usage (at least once a week), by gender, December 2003



Source: eEurope+, household survey

The big gender divides in Czech Republic, Slovakia, and Slovenia are remarkable. What is behind these discrepancies? In the section on educational divides, we have seen that educational attainment is an important factor in determining levels of Internet usage. How is this in the Czech Republic, Slovakia and Slovenia (see table 8)?

Table 8 Educational attainment of men and women, December 2003

% with tertiary education	BG	CZ	EE	HU	LT	LV	PL	RO	SI	SK
a) Men	14.1	18.1	15.5	9.4	11.2	10.8	8.3	14.4	18.5	10.6
b) Women	20.1	11.4	17.9	9.3	21.3	18.4	10.0	13.2	18.5	10.3
c) Difference a-b	-6	6.7	-2.2	0.1	-10.1	-7.6	-1.7	1.2	0	0.3

Source: eEurope +, household survey, December 2003

In the Czech Republic far fewer women have tertiary education than men do, but not in Slovenia and Slovakia. In Latvia, women are better educated than men are and regular Internet usage among women is higher than among men. However, we do not see a higher Internet usage among Lithuanian women although the share of women with tertiary education is there almost twice that of men.

Male dominance in 'Internet banking' and 'ordering or purchasing goods on the Internet' is very pronounced in most countries (table 9). However, in Lithuania and Hungary the roles are reversed.

Table 9 Internet usage: Internet banking and purchasing/ordering of goods through the Internet, according to gender, December 2003

	BG	CZ	EE	HU	LT	LV	PL	RO	SI	SK
Males: used the Internet for banking, December 2003, in % of all male respondents	0.30	11.4	11.9	1.7	2.0	7.7	2.7	1.2	16.3	8.5
Females: Used the Internet for banking, December 2003, in % of all female respondents	0.36	7.7	7.4	2.6	2.7	7.9	2.3	0.2	8.0	6.2

	BG	CZ	EE	HU	LT	LV	PL	RO	SI	SK
Males: used the Internet for purchasing or ordering goods, December 2003, in % of all male respondents	1.8	15.0	7.3	1.2	0.6	2.0	3.5	0.9	11.8	3.6
Females: used the Internet for purchasing or ordering goods, December 2003, in % of all female respondents	0.7	8.0	7.4	1.9	0.8	0.8	2.1	0.8	8.0	3.2

Source: eEurope+, December 2003

The gender gap is especially big among students doing ICT related studies. In the Czech Republic 9.3 per cent of male third level students are in ICT related studies but only 1.5 per cent of female students. For Hungary, the figures are respectively 10.7 and 2.1 per cent, for Estonia 5.0 and 1.5 per cent, for Poland 4.6 and 0.7 per cent and for Slovakia 5.8 and 0.6 per cent (eEurope+, ministries of education).

Inhibitors

Among the most important reasons not to use the Internet are, according to the eEurope+ survey, 'I do not want Internet' (35.3 per cent), 'I don't know how to use a computer' (33 per cent), 'I have no access device at home' (17.3 per cent), 'I do not know exactly what it is' (17.3 per cent), 'computers are too expensive' (18.2%) and 'The Internet connection is too expensive' (12.6 per cent) (December 2003).

Lack of knowledge can be addressed by pro-active government policies and furthering ICT usage in education. Given the lower income levels, affordability of Internet access is a much bigger barrier in the CEE 10 compared to the EU 15.

More than in EU 15 countries, telephone tariffs and Internet access costs constitute a barrier for the spread of Internet usage. The fixed line monthly rental for residential users (in €/PPP) in June 2003 was: in Hungary € 23.73, in Poland € 18.04, in Slovenia € 16.49, in Lithuania € 15.22, Czech Republic € 12.79, in Bulgaria € 12.58, in Estonia € 12.35, in Latvia € 12.15, in Romania € 9.73 and in Slovakia € 9.18 (IBM 2003B, p. 34).

IBM (2003B, p. 65) gives Internet access costs on 30 June 2003. PPP adjusted access costs in peak time (40 hours) vary widely. Far above the EU 15 maximum (Belgium with € 73) are Latvia (€ 166 plus € 74), Lithuania (€ 144), Slovakia (€ 116 plus € 13) and the Czech Republic (€ 109). All CEE 10 countries are above the EU 15 minimum tariff (Finland, € 5.9). Off peak time (20 hours, PPP; p. 66) gives a slightly different pattern. Apart from Latvia (€ 29), Lithuania (€ 25.5) also Poland (€ 25), Slovenia (€ 24) and Hungary (€ 19) are significantly above the EU=15 maximum (€ 17.7, Belgium). It means that on average, the CEE 10 countries give less discount on off-peak hours than the average EU country[6].

The eEurope+ survey (December 2003) gives the following pattern: the mean spending on Internet access per month in euro is in Hungary € 32, in Bulgaria € 14, in Slovenia € 21, in the Czech Republic € 19, in Latvia € 18, in Estonia € 16, in Slovakia € 15, in Lithuania € 14 and in Poland and Romania € 10.

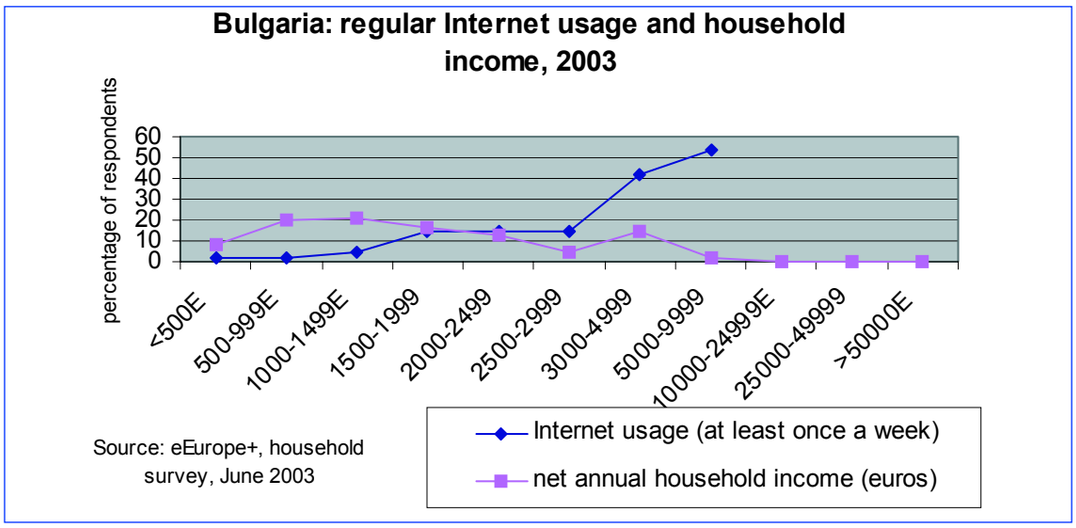
It generally appears that, on average, service provider charges are higher in the CEE 10 countries then in most OECD. In addition, interconnection charges of telecommunications operators are in the CEE 10 countries usually higher than in the EU 15.

The OECD gives figures about the share of consumption of ICT goods and services in total household consumption (1999). After Korea, Hungarian households spend among OECD countries most on ICT (about 5.7 per cent). The Czechs spend 3.7 per cent, the Poles 3 per cent and the Slovaks 2.9 per cent on ICT goods and services (OECD, 2002, Measuring the Information Economy, p. 13).

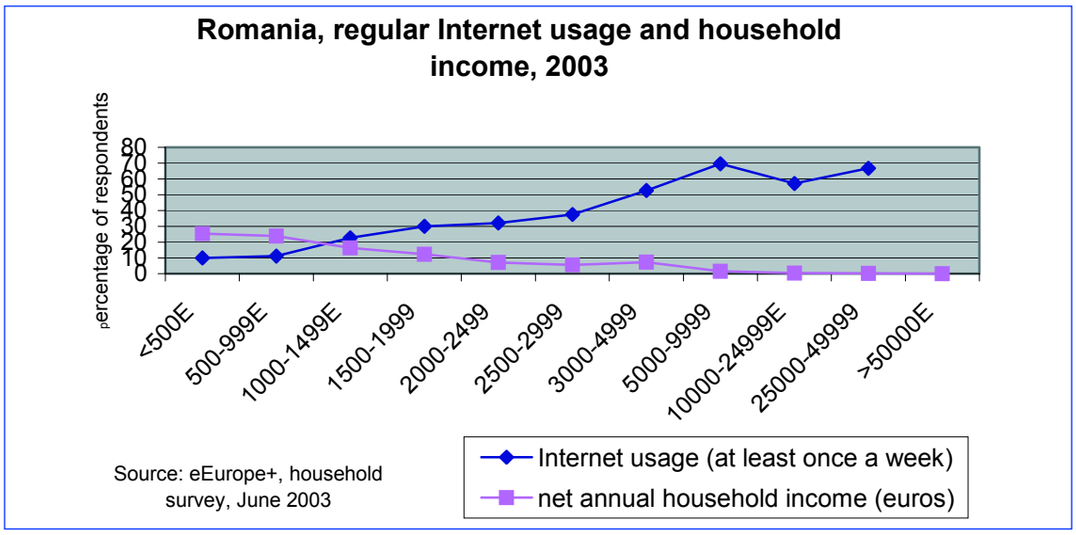
The purchase price of a computer is often an obstacle for accessing the Internet. In Bulgaria, Lithuania, Latvia, and Romania it is more than double the average monthly household income. In the Czech Republic, Estonia, Hungary, and Slovakia the price of a computer is more than the average monthly household income (eEurope+, December 2004).

53 The OECD gives purchasing power adjusted tariffs for Internet access (40 hours in office hours based on reduced tariffs, September 2002, OECD 2003b, p. 174). It appears that the most expensive OECD country is the Czech Republic followed by Belgium, Hungary, and Slovakia. However, Poland is less expensive than the OECD average.

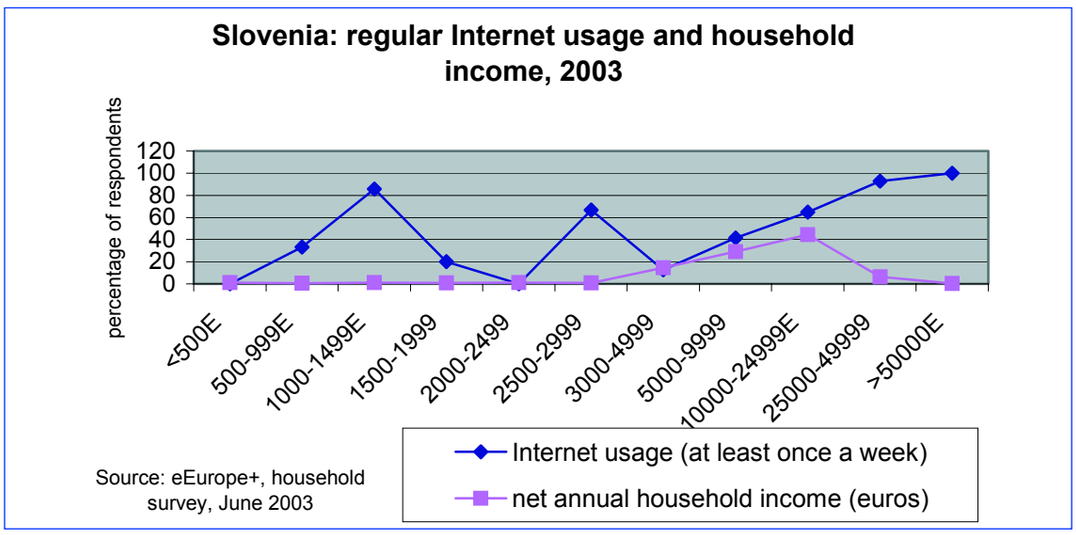
Graph 14 Bulgaria: regular Internet usage and household income, 2003



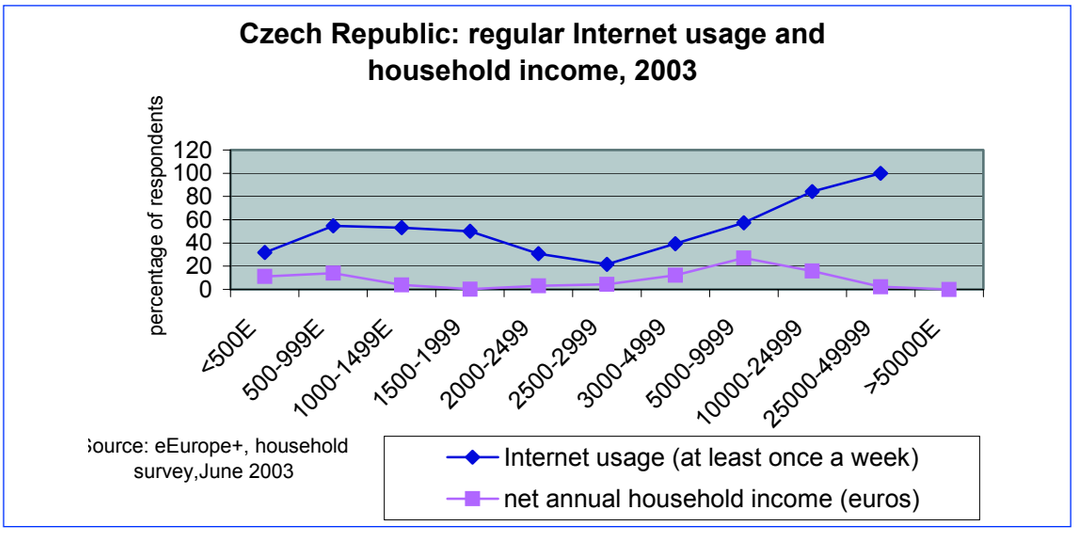
Graph 15 Romania, regular Internet usage and household income, 2003



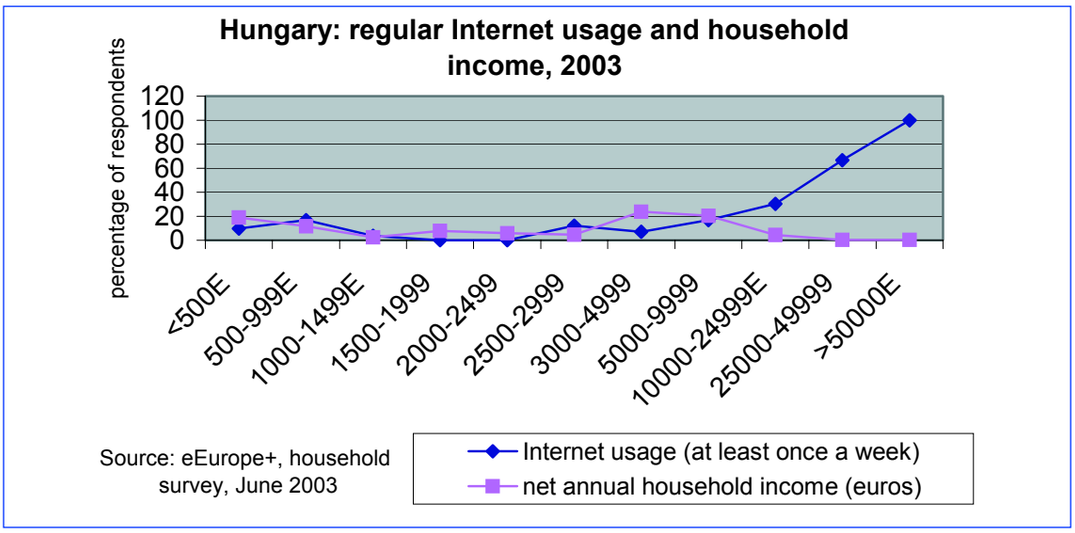
Graph 16 Slovenia: regular Internet usage and household income, 2003



Graph 17 Czech Republic: regular Internet usage and household income, 2003



Graph 18 Hungary: regular Internet usage and household income, 2003



The relationship between net annual household income and Internet usage is rather straightforward in the poorer CEE 10 countries such as the examples of Bulgaria and Romania (graphs 14 and 15) show. In the richer CEE 10 countries, such as the examples of Slovenia, the Czech Republic and Hungary (graphs 16-18) show, some of the poorest income groups are, on average, more frequent Internet users than some categories in the medium income groups. The results of graphs 16-18 should be interpreted with great caution because the number of respondents in some of the income groups is very small. However, the fact that the Slovenia, Hungary, and the Czech Republic show similar patterns is remarkable.

In the case of the Czech Republic, the Internet users from the net annual income category of 500-999 Euro are using the Internet less from home (56 against 63 per cent for all income categories) but also much less from work (45 per cent against the average of 54 per cent) and also less from the place of education (16 against 18 per cent) and far less from the Internet café (5.4 per cent against 9.4 per cent) compared to all income categories (June 2003). The income group 500-999 euro also possesses only slightly less computers (49 per cent) than all respondents (52.5 per cent).

If we compare the Czech Republic with Bulgaria, we might expect more one-person households in the lower income categories in the Czech Republic, assuming that in poorer countries people are less likely to live on their own. This might explain a higher household income per capita in the Czech households

that have a low total annual household income. Surprisingly, in the lowest annual household income category (less than 500 euro) there are more one-person households in Bulgaria (63 per cent) than in the Czech Republic (52 per cent) while the percentages for the household income category 500-999 euro are respectively 29 and 23 per cent. The big difference between the Czech Republic and Bulgaria lies in the possession of computers: in Bulgaria only 1 out of 121 respondents from the household income category up to 500 euro a year has a desktop computer and only 6 out of 334 respondents from the household income category 500-999 euro (eEurope+, June 2003).

Comparing Bulgaria and the Czech Republic with respect to educational attainment and income categories it appears that in Bulgaria there is a close positive correlation between income category and percentage of respondents with tertiary education: the higher the net household income category, the higher the percentage of respondents with tertiary education. This is not so in the case of the Czech Republic where, in the income categories 500-999 euro and 1000-1499 euro per year, the percentage of respondents with tertiary education is higher than the average for all respondents as is the case in the income categories higher than 5000 euro per year.[54] These results suggest that educational attainment could be even more important than income levels as a determinant for Internet usage.

Access from home is closely correlated with income and Internet access costs as table 10 shows:

Table 10 Internet access from home, Internet access costs and average monthly household income, December 2003

	BG	CZ	EE	HU	LT	LV	PL	RO	SI	SK
% of all respondents with Internet access from home	8.4	29.8	29.5	10.3	8.6	9.8	14.1	5.9	34.8	13.4
Mean costs for Internet access costs per month (euro)	14	19	16	32	14	18	10	10	21	15
Average monthly household income (euro)	211	550	383	491	317	324	444	167	1312	440

Source: eEurope+, household survey, NSO survey

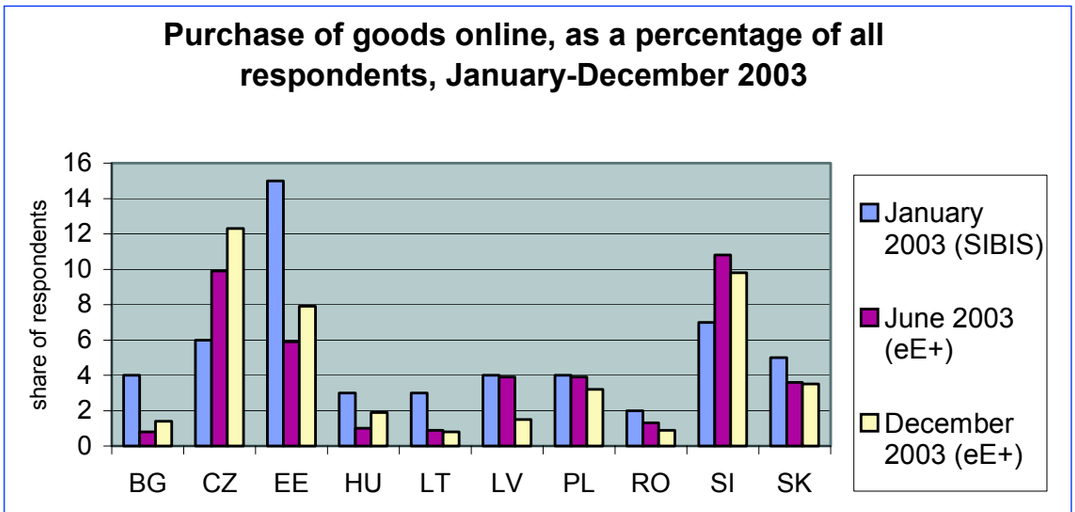
54 In the case of Hungary, this phenomenon is very pronounced. In the net annual household income category of 500-999 euro, 14.2 per cent have tertiary education while the average of all respondents is 10.2 per cent (eEurope+, June 2003). Only the income categories of 10,000 euro and more showed an above average of respondents with tertiary education. Of those respondents who gave net annual household income, 13.7 per cent were in the income category 500-999 euro, but 24.1 per cent of those respondents with tertiary education. It shows that a considerable proportion of highly educated Hungarians are impoverished.

E-commerce

Business to Consumer e-commerce is on a very low level. The CEE 10 average is 3.4 per cent of individuals having purchased on the Internet (December 2003) while the EU 15 average is 16 per cent (Eurobarometer survey 14 March 2004, survey date: autumn 2003). The EU 15 countries that scored lowest were Greece (3 per cent), Portugal (4 per cent), and Italy (7 per cent) while the highest scorers in the CEE 10 are Slovenia (10.8 per cent), Czech Republic (9.9 per cent), and Estonia (5.9 per cent).

Graph 19 shows evidence of large leaps ahead with respect to online shopping in the Czech Republic and progress in Slovenia but regression and stagnation in all other CEE 10 countries during 2003.

Graph 19 Purchase of goods online, as a percentage of all respondents, January-December 2003



Source: Sibis and eEurope+ household survey

E-banking in Estonia and Latvia made the change over from cash transactions to Internet banking, skipping the phase of cheque transactions. The banking system in Soviet times was underdeveloped and, during transition, the population was faced with very few banks and low service levels. E-banking was also furthered because it was free while desk transactions were charged. Moreover, several additional online services were offered by the banks.

Table 11 Usage of Internet for e-banking, as a percentage of all respondents, December 2003

BG	CZ	EE	HU	LT	LV	PL	RO	SI	SK
0.4	9.9	40.1	2.6	2.8	8.6	2.8	0.7	12.5	8.2

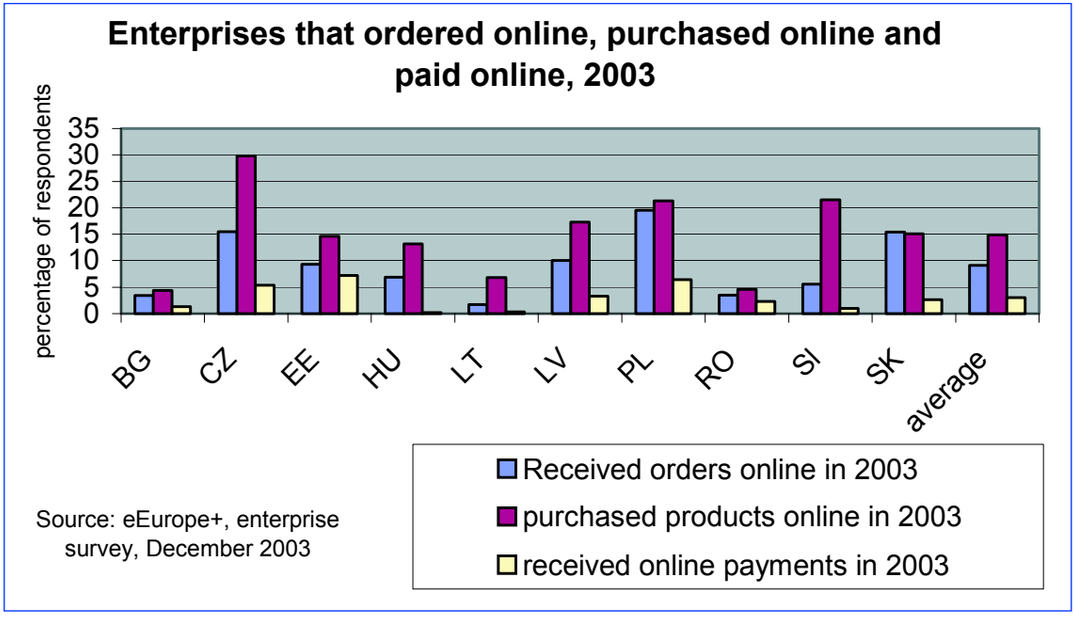
Source: eEurope+, household survey, December 2003

The Estonian and Latvian examples in e-banking have not been followed by other CEE 10 countries, even in those countries where foreign banks have a dominant position. The success of Baltic e-banking may be related to the experience of Swedish and Finnish banks, with developed e-banking services. Unlike the Baltic States, in most other CEE 10 countries financial card penetration is very low which further impedes the spread of e-commerce. Sirkka Hämäläinen of the European Central Bank remarked, April 28, 2003 in Warsaw that '*while in the existing EU countries each inhabitant has on average at least 1.5 bank accounts, in*

some acceding countries only a small share of the population is able to make payments from an account held with a bank. The fact that salaries, pensions, social benefits and payments to public utilities are still frequently paid in cash does not encourage efficiency in the economy.'

Although many enterprises use e-banking services, a small proportion of online orders are paid online (graph 20). The discrepancy between online orders and online payments is particularly wide in the cases of Hungary and Slovakia. With online orders, usually the order is done online but the payment made in the traditional way.

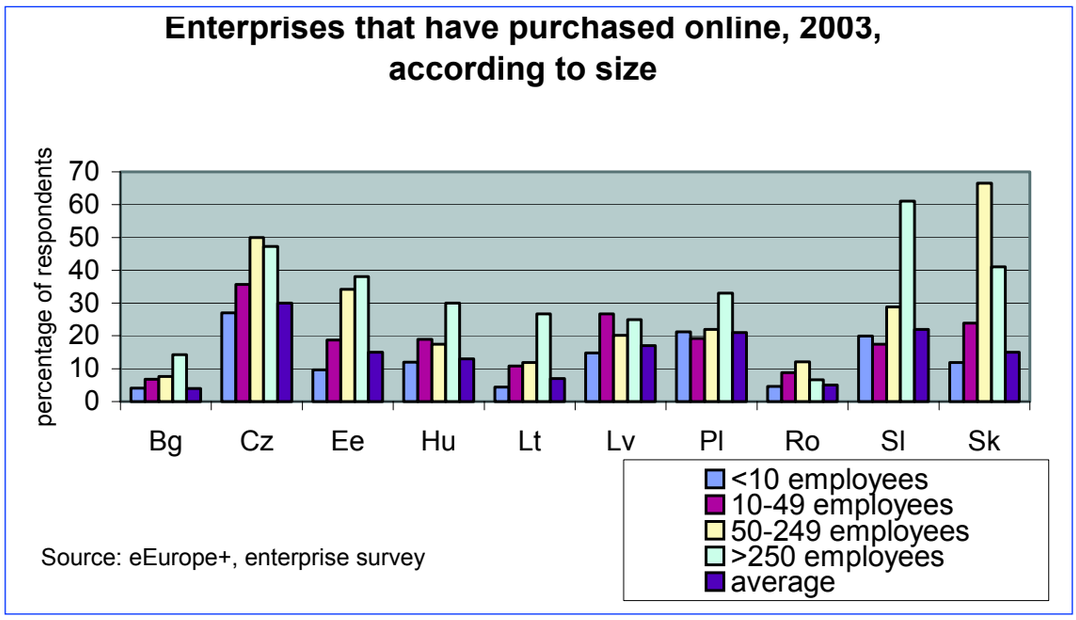
Graph 20 Enterprises that ordered online, purchased online, and paid online, 2003



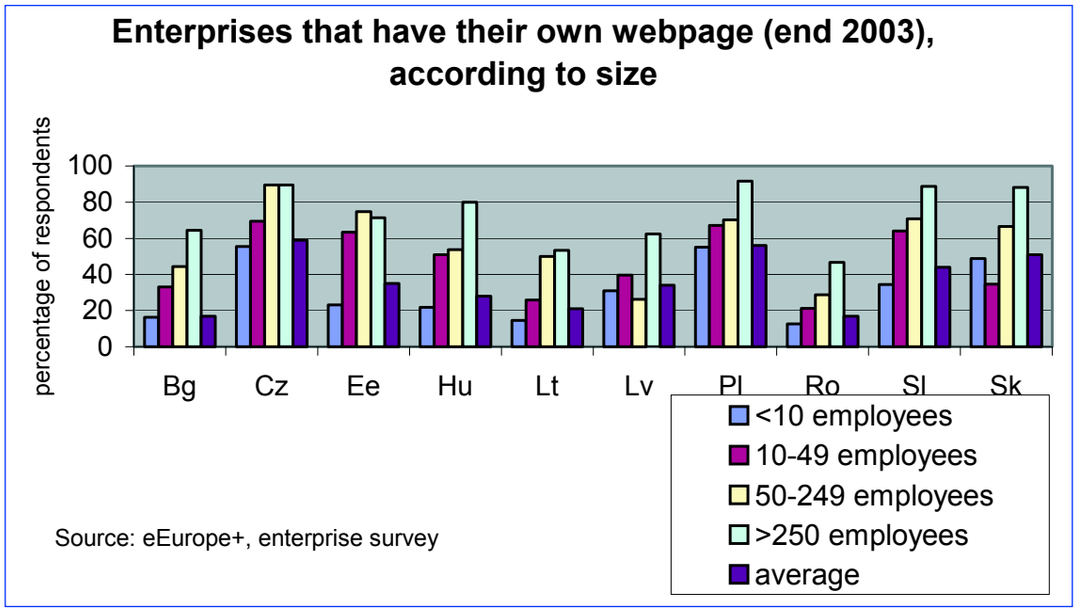
Graphs 21 and 22 show big differences in Internet usage when looking at the size of enterprises. It should be emphasized here that in the eEurope+ survey, aggregate figures for the enterprise sector as a whole are biased very much towards the micro enterprises (smaller than 10 employees) that comprise between 74 and 96 per cent of the weighted samples. While in Poland and Slovenia the micro enterprises are performing better than the small enterprises (10-49 employees) in 'purchasing online', in the Baltic Republics the small enterprises score approximately twice better. While Poland is performing much better with respect to Slovakia with respect to aggregate figures with 'purchasing online' (graph 20), the picture completely changes if looking at disaggregated figures according to size (graph 21). Therefore, aggregate figures should be handled with due caution. While with 'having own webpage', Estonian micro enterprises are on third place and Slovakian on seventh, with small enterprises (10-49 employees) the rank order is 6 respectively 3[55]. Another example: the Lithuanian statistical office counted 12.9 per cent of enterprises having purchased online while the eEurope+ survey 7 per cent (December 2003). However, the Lithuanian survey only took into account enterprises with more than 10 employees, while 73.8 per cent of the weighted sample in the eEurope+ enterprise survey are micro-enterprises (smaller than 10 employees). Graph 21 shows that the results of the eEurope+ surveys and the one of the Lithuanian statistical offices are actually rather close.

[55] Sample composition often explains significant differences in aggregate averages. For example, GKIeNet gives an average of 45 per cent of Hungarian enterprises with an own home page in 2003 while the eEurope+ survey gives a percentage of 20 per cent for June 2003 and 28 per cent for December 2003 (see Information Society in Hungary, 2004, p.23). The difference can be largely explained by the difference in sample composition, the GKIeNet having a much smaller share of micro-enterprises in the sample.

Graph 21 Enterprises that have purchased online, 2003, according to size

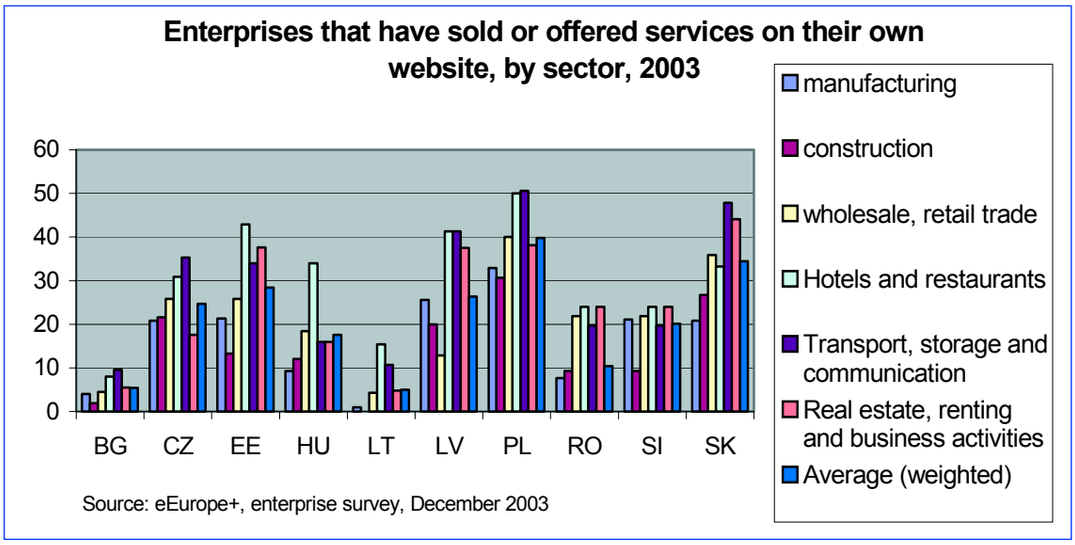


Graph 22 Enterprises that have their own webpage (end 2003), according to size



Graph 23 shows that for the indicator 'enterprises having sold online on their own website', patterns differ very much according to sector. For example, in Slovakia, Lithuania, and Hungary manufacturing scores much lower than the average for all sectors while in Latvia, Romania, and Slovenia the scores are almost the same.

Graph 23 Enterprises that have sold or offered services on their own website, by sector, 2003



There is a weak correlation between the percentage of the population that bought online on the one hand and percentage of enterprises that purchased online and received orders online (compare graphs 19 and 20). The most striking differences are in the cases of Estonia, Slovakia, and Poland. While in Estonia many respondents bought online (9.1 per cent), rank 2 in CEE 10), only 14.6 per cent of enterprises purchased online (rank 5, CEE 10) while 9.3 per cent of enterprises received orders online (eEurope+, December 2003). While in Slovakia only 3.5 per cent of the respondents bought online (rank 5), 18 per cent of enterprises purchased online (rank 4, CEE 10) and 16.3 per cent of enterprises received orders online (rank 2, CEE 10). In Poland 3.5 per cent of respondents bought online (rank 6, CEE 10), 21.3 per cent of enterprises bought online (rank 3, CEE 10) and 19.5 per cent of enterprises received orders online (rank 1, CEE 10). As the indicators point to more active Internet usage, the better Polish and Slovakian enterprises perform while Estonian enterprises perform less well.

E-Health

E-health data gives a much more differentiated picture across the CEE 10 countries and the wealthier countries do not always perform better. If looking at the pattern of percentage of GPs with Internet access in the consulting room, the pattern is similar to that of general Internet usage. However, if looking at impact indicators, the pattern looks different. 49 per cent of GPs in the CEE 10 countries are using electronic patient records with a high of 99 per cent in Hungary but only 59 per cent in the Czech Republic. However, on average only 3 per cent of these records are exchanged. This low percentage is sometimes related to legal impediments for exchanging sensitive personal information.

Despite financial difficulties in the health sector across the Central European countries, 54 per cent of GPs have a computer in their consulting room (see table 12). Only 23 per cent of GPs is having Internet access in their consulting room. It shows the big potential of increasing Internet access in the consulting room, especially in Bulgaria, Hungary, and Slovakia.

Table 12 E-health in Central and Eastern Europe: computer usage, Internet usage, and usage and exchange of electronic patient records: percentage of total responding General Practitioners, December 2003

	BG	CZ	EE	HU	LT	LV	PL	RO	SI	SK	CEE 10[56]
Computer in consulting room	74.5	92.5	93.0	98.8	19.3	22.1	29.8	47.5	56.1	87.0	54
Internet connection in consulting room	13.6	57.0	92.0	20.0	15.4	12.3	18.9	15.6	48.3	18.3	23
Exchange electronic patient records	2.2	8.6	12.5	2.7	14.5	5.2	0.5	29.0	4.3	0.5	3
Using electronic patient records	66.2	59.1	88.7	98.9	79.4	23.3	48.5	49.2	76.3	85.5	59

Source: eEurope+

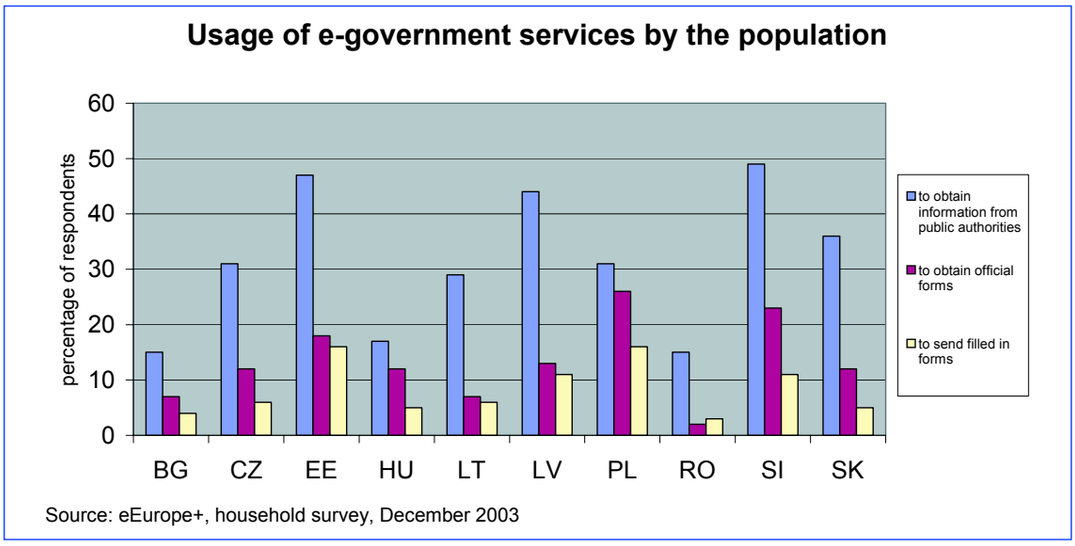
The use of smart cards in Slovenia and Estonia establishes Internet data exchange between all health insurance and health services.

[56] weighted average

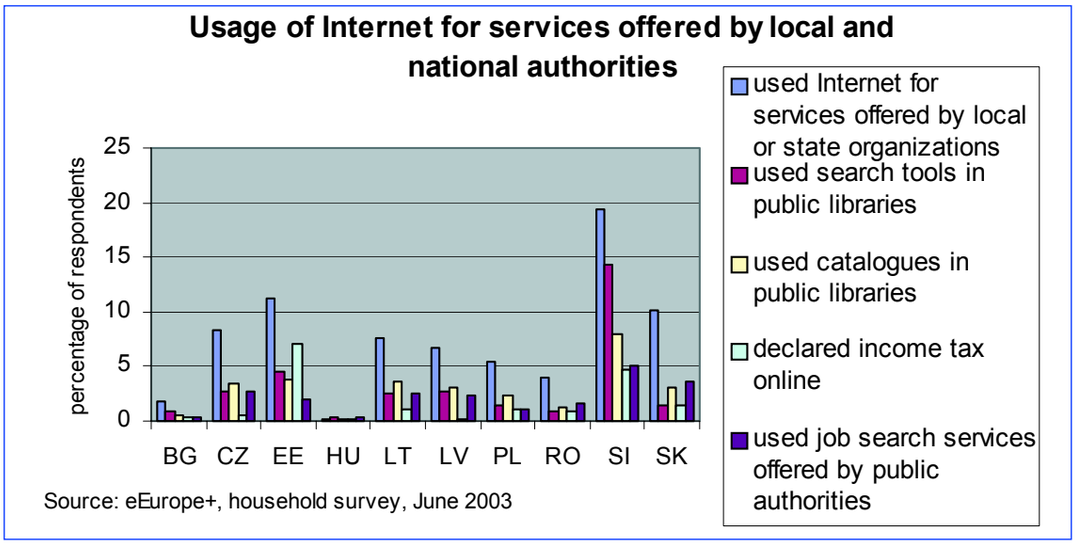
E-government

There is a great variety in the degree to which citizens that are using the Internet interact online with public authorities (graph 24). Especially in the Czech Republic, Slovakia, Estonia and Latvia there is a big discrepancy between the number of individuals looking for information from public authorities and the number who interact with public authorities. On the other hand, in Poland, Romania, Lithuania, and Hungary, all with low scores, the difference is rather small.

Graph 24 Usage of e-government services by the population



Graph 25 Usage of Internet for services offered by local and national authorities

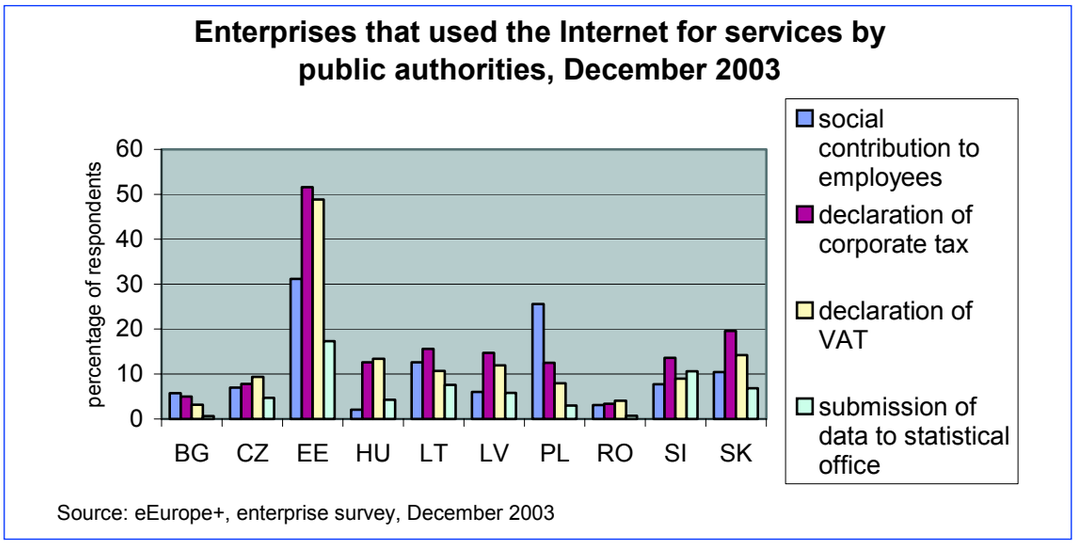


Graph 25 only shows those online services that are most frequently used. Slovenia is far ahead with respect to the part of the population that is interacting with government services online. Poland performs well below the CEE 10 average. In Hungary, citizens hardly use e-government services. While the usage of the in graph 25 mentioned five Internet services offered by local and national authorities was in

Hungary respectively 0.2, 0.3, 0.2, 0.1 and 0.3 per cent of the population, the respective percentages for neighbouring Slovenia were 19.3, 14.3, 8, 4.8 and 5 per cent. However, Hungary saw a substantial increase in the usage of e-government services by the general population between June and December 2003 from a very low level[57].

With respect to government, interacting online with enterprises the picture changes and Hungary is performing better while Bulgaria and Romania are left behind (see graph 26)[58]. Estonia is a forerunner while Poland is performing well.

Graph 26 Enterprises that used the Internet for services by public authorities, December 2003



Source: eEurope+, enterprise survey, December 2003

57 The share of respondents that downloaded official forms went up from 12 to 29 per cent of Hungarian respondents having used the Internet in last three months. For 'sending of official forms; the share went up from 5 to 20 per cent.

58 Between June and December 2003 many more Hungarian enterprises started to use e-government services: the share of enterprises that obtained information from public authorities went up from 17 to 27 per cent; the share of enterprises that downloaded official forms from 12 to 29 per cent and the share of enterprises that returned official forms went up from 5 to 20 per cent (eEurope+)

Information Society policies

Apart from deregulation and liberalisation of the telecommunication market, most EU accession countries pursued the policy of involving foreign capital, usually by selling off (part of) telecommunication companies. It appears that there are many modalities doing so. One important aspect of privatisation is that of competition. In some countries, like Hungary, lack of competition has contributed to high tariffs.

The timing of privatisation and deregulation is also important. Those countries that privatised their telecommunication companies after the stock market crash of 2001 in which above all IT companies lost value had greater difficulties in attracting investment capital.

Generally, the Information Society development path of most CEE 10 countries differs from that of the EU 15 in the sense that

1. Internet access and telephony is much more expensive than in the EU 15,
2. the expansion of fixed line penetration is stagnating or declining at a much lower level than in the EU 15 while
3. the role of mobile telephony has become relatively more important (compared to fixed lines) than in the EU 15,
4. the potential role of alternative channels of Internet access (including cable TV) has become more important given declining fixed telephone line penetration. Also
5. the role of public internet access points in the spread of Information Society has become relatively more important than in the European Union (15), given the low access ratios for households to telecommunications capable of Internet provision.

In this context, and given the financial constraints of CEE 10 countries and the lack of investment capital of telecommunication companies, the question of how to secure telecommunication access for all should be seen in a new light.

The UNCTAD report 'E-Commerce and Development Report 2003' (p. 90) describes the strategic divide between developed and developing countries. Highest on the list of priorities of developing countries are basic telecommunications, basic access, human capacity building, and affordable access. Highest on the list of developed countries are privacy, intellectual property rights protection, cross border certification and consumer protection. In addition, within the enlarged European Union, priorities with respect to Information Society development differ accordingly.

Conclusion and suggestions for further research

Although the purpose of this report is not to give a comprehensive picture of Information Society in CEE 10 it can be stated, based on data presented in this report, that the state of affairs with respect to Information Society in the CEE 10 countries is characterised by the following:

1. all CEE 10 countries were faced with the task to modernise a telecommunications infrastructure that had been neglected for decades, in the context of an overburdened policy agenda related to transition of all spheres of society and economy and a transitional recession
2. the disparity within the region in availability, affordability and uptake of telecommunications services remains big
3. a low fixed line penetration in most CEE 10 countries
4. in many CEE 10 countries penetration levels of fixed telephony have gone down recently while mobile telephony has experienced a boom although the June and December surveys showed and end of the boom in most CEE 10 countries
5. few profits can be made in the fixed-line market (see for details BuddeComm, 2003)
6. for most CEE 10 countries, a multi-channel Internet access policy is more topical than for most EU 15 countries, given declining fixed line penetration. The June and December 2003 surveys showed substantial increases in the use of cable modem to access Internet in Estonia and Latvia.
7. in many CEE 10 countries there is a rural/urban divide with respect to computer penetration and Internet usage
8. since 2001 especially Latvia, Lithuania and the Czech Republic have made big progress on most IS indicators, while Hungary shows stagnation.
9. with respect to regular Internet usage (at least one hour a week) during the year 2003 SIBIS and eEurope+ surveys revealed stagnation in Bulgaria, Estonia, Hungary, Latvia, Poland, Romania and Slovakia
10. According to the eEurope+ surveys, in half of the CEE 10 countries, regular Internet usage in metropolitan settlements decreased during the second half of 2003. This may point at a possible saturation at, for EU 15 standards, rather low levels
11. however, Internet access from home increased in all countries from January to December 2003 although there are signs of stagnation in Bulgaria and Hungary. During June-December 2003, stagnation and/or decline can be observed also in the Czech Republic, Slovenia, Lithuania, Latvia, and Romania.
12. computer penetration is increasing fast. However, on average, 35 per cent of households with computers in CEE 10 do not have an Internet connection (56 per cent in Latvia and 65 per cent in Romania).
13. with respect to levels of Internet usage and educational attainment, the big divide is, in all CEE 10 countries, between those with tertiary education and those who have not. Across CEE 10, there is a correlation between the share of the population with tertiary education and regular Internet usage
14. in the Czech Republic, Slovakia and Slovenia the gender gap with respect to Internet usage is very big. In the other CEE 10 countries, the gender gap is relatively small.

15. in all CEE 10 countries, youth of 16-20 years old is using the Internet more frequently than the general population. However, while the differences are rather small in Romania and the Czech Republic, they are particularly large in Bulgaria, Estonia, Lithuania, Poland, and Slovenia.

16. while the Czech Republic and Hungary have many students in ICT related education, Poland, Estonia and Slovakia have few students. In these studies, the gender gap is enormous.

17. there is a correlation between Internet access from home, average expenditures per month for Internet access and average monthly salary

18. costs of telephony and Internet access are higher than the EU 15 average in terms of purchasing power parity (see for details IBM 2003B). The purchase of a computer is often an obstacle for accessing Internet. In five CEE 10 countries, the price of a computer is more than double the average monthly salary.

19. with respect to e-health, the performance pattern across CEE 10 differs if compared with general IS indicators. For example, with many e-health indicators Bulgaria and Hungary are well above the CEE 10 average.

20. during 2003, online shopping by the general population stagnated in eight out of ten CEE 10 countries

21. the level of e banking and shopping online of the general population is not a good predictor for the level of e-commerce among enterprises. While Estonia and Slovenia are doing very well in B2C e-commerce while Poland doing less well, the roles are reversed with respect to B2B e-commerce

22. e-commerce is often developing faster in the sphere of business-to-business relations, while online financial transactions are lagging behind.

Based on the foregoing, the following suggestions for further research can be made:

- Given declining fixed line penetration and limited capital investment, the possibilities of leap-frogging with state-of-the-art technology should be investigated.
- Given the rural-urban divide in most CEE 10 countries and the potential use of ICTs for regional development, a study in the use of ICTs in regional development in Central and Eastern Europe should be made.
- Given the potential of e-banking, as shown in Estonia, a study could investigate the development potential of e-banking across Central and Eastern Europe[59].

[59] One can build here upon Centeno (2003)

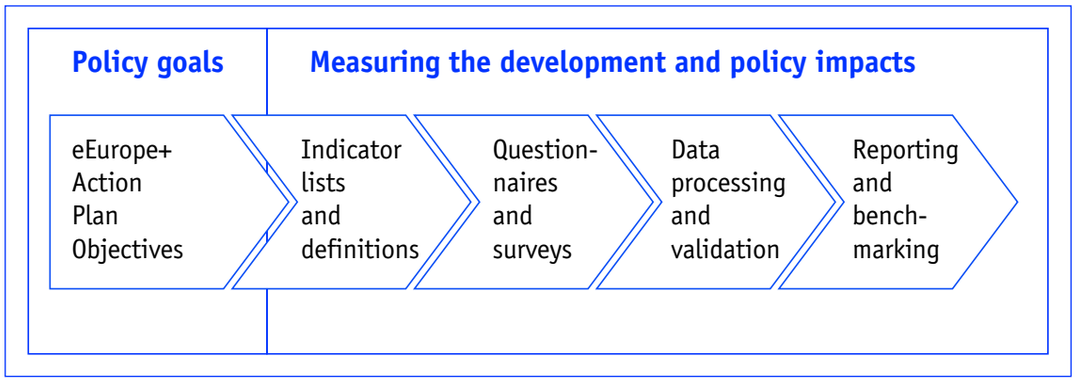
Annex 3 — Benchmarking Survey Methodology

This section gives an overview over the methodology of the benchmarking exercise and supplies technical information about the surveys carried out in the context of the eEurope+ benchmarking project.

The Policy Cycle as a conceptual framework

As an underlying conceptual framework for the benchmarking exercise, the Policy Cycle model was used. It states that actors in the political sphere, in governments and institutions define specific goals, which may be codified and published in action plans, target catalogues, or master plans. To implement these goals different measures and instruments can be used. After a certain time period, the impacts of the different measures need to be checked and further actions might want to be considered which might lead to a new or revised action plan. (see figure 1).

Figure 1: Conceptual framework of the benchmarking exercise: The Policy Cycle



In order to find out about the current state of the development and the impact of policy measures, adequate data, e.g. data referring directly to the policy goals, has to be available. According to the Policy Cycle approach, the eEurope+ benchmarking exercise thus started with the objectives set up in the eEurope+ Action plan.

The eEurope+ Action plan objectives and indicators

The four main objectives as defined in "eEurope+ 2003/2005" were translated into indicators and sub-indicators.

Examples of indicators are:

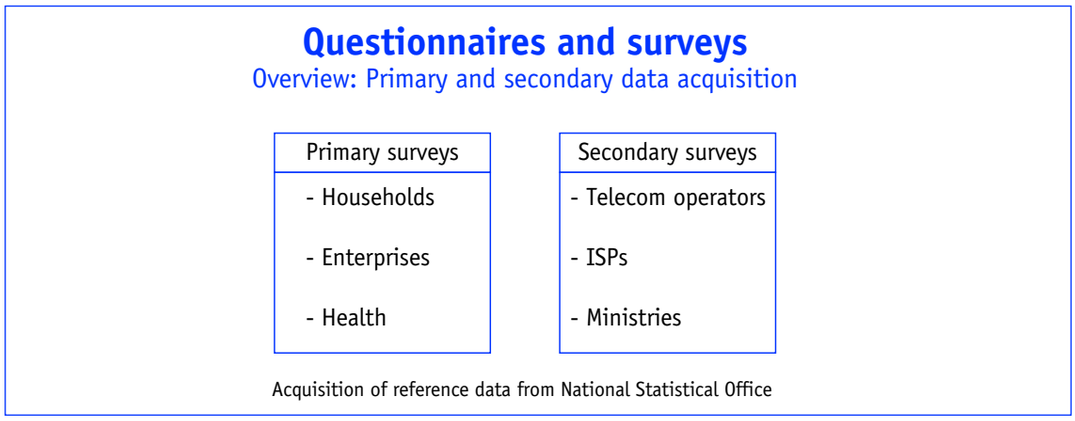
- 0.A.3 Percentage of households with access to the Internet broken down by type of service (fixed analogue, shared analogue, digital, ISDN, mobile, etc.).
- 0.A.3.1 Percentage of households with high-speed access at home, high-speed defined as xDSL, cable, satellite, fixed-wireless, UMTS.
- 1.A.2 Main reasons for not using the Internet.

Covering the broad spectrum of the four basic goals of the action plan, a long list of indicators, sub-indicators and definitions was compiled.

Questionnaires and surveys

Based on the indicator list, six different surveys were planned and carried out. These surveys were accompanied by data collection from the 10 National Statistical Offices (NSO) (figure 2).

Figure 2: Six surveys plus reference data from statistical institutes

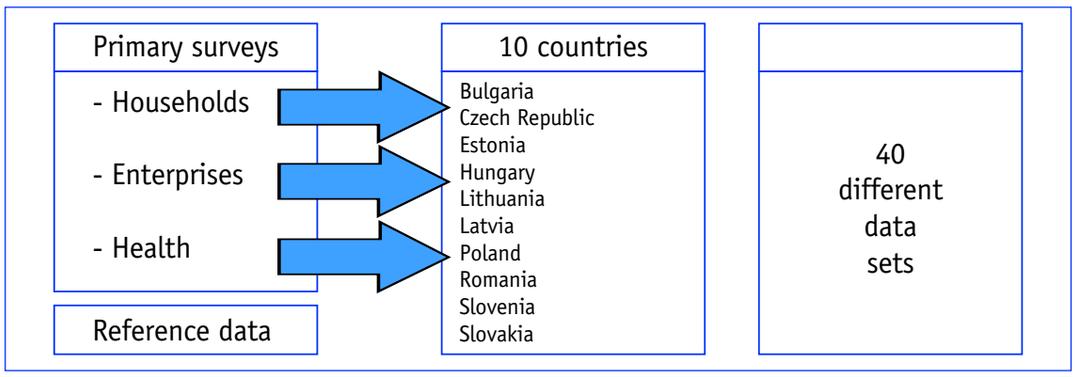


The data presented in this report originates from surveys commissioned and monitored by the Consortium with fieldwork carried out by global market information group TNS. The original surveys consist of three primary surveys (households, enterprises, health) and three secondary surveys (telecommunication operators, Internet Service Providers, Ministries). The most important surveys are the household, enterprise and health surveys because they supply original data collected by quantitative surveys. These have been accomplished by TNS. In the secondary surveys, data was collected from telecommunications operators, ISPs and Ministries by the Consortium members Danish Management and University of Sunderland in a more qualitative way. Here, no mass data had to be handled and processed.

Primary surveys

The three primary surveys alone produced a comprehensive data set consisting of 40 different files for each of the two waves (see figure 3).

Figure 3: Focus on primary surveys: Amount of data



The first wave of the surveys was carried out during October 2003 with the reference date being June 30, 2003. The second wave time frame was between February 27 and March 19, 2004 and had December 31, 2003 as a reference date.

In order to guarantee maximum comparability the methodology of the second wave surveys was consistent with the methodology of the first wave surveys. To enhance the quality of the surveys, comments by

the European Commission and the National Experts were taken into account for the second wave surveys, resulting in the following adjustments:

All data for the second wave of the household surveys was gathered using Face-to-Face interviews in all participating countries. Thus, uncertainties about representativeness of first wave data in the three countries where CATI (Computer Assisted Telephone Interviews) had been used (Estonia, Latvia, and Slovenia) could be eliminated. By applying the same interview method throughout all countries in the second wave, representativeness, comparability, and accuracy of the data was ensured.

Household surveys

In each of the participating countries, a survey was carried out in which 1.000-2.000 individuals in different households – chosen randomly - were asked 40 questions. The number of interviews necessary to produce representative results was determined individually taking into account the specific situation in the respective countries. The sample is representative for the whole population and is weighted according to age, gender, nationality, and regional distribution within the country. For questions referring to household equipment (computers, telephone, computer, TV reception, etc.) the weighting was done based on the distribution of households in the country using region and number of household members as the weighting factor. Interviews were carried out as face-to-face-interviews.

Enterprise surveys

The sample size of the enterprise survey was 434-550, depending on the set quotas. All companies participating in the enterprise survey were chosen by random sampling according to the sector they belong to, their size (number of employees), and the region in which they are located. The enterprise questionnaire consisted of 49 questions including questions on the company background (size of the enterprise, sector in which it is active, etc.). In order to assure representativeness of the data, quotas were used. The quotas determined the optimal number of companies to be interviewed in the sectors, size classes and regions, which were of interest in the survey. Concerning sectors, the European Commission requested that the surveys covered only NACE sectors D, F, G, H, I, and K.

The interview method of the enterprise survey was CATI for all countries - except for BG and RO where interviews were face to face - assuming that all enterprises in these countries should have at least one telephone connection. A person responsible for the company's ICT was interviewed. Thus the questions on IT policy are more likely to be reliable than questions on turnover from e-commerce.

Health surveys

To achieve representative data about ICT and Internet use in the health sector in the participating countries, about 185 general practitioners (GPs) - chosen by random sampling - were interviewed in each country. The health questionnaire consisted of 29 questions. Only two countries had a sample size below 185: RO (179) and SI (107). To test representativeness in these countries, spot tests were carried out in 20 private GPs. The results showed that even with the smaller sample the results were representative. The weighting in the health survey was the region in which the GP office is located. Structural data acquired by the institutes in the participating countries was collected in order to achieve appropriate weighting and to ensure representativeness. The interview method of the health survey was mostly CATI assuming that all GPs of the respective countries should have at least one telephone connection. Exceptions were Bulgaria, Lithuania, and Romania, where face-to-face interviews were carried out.

Secondary surveys

For a set of indicators, the quantitative surveys could not provide data and had to be complemented by qualitative/ secondary surveys. These secondary surveys asking for data from telecommunications operators, ISPs and Ministries were also carried out by TNS and CATI and partly supplemented by the Consortium members

Telecommunication operator surveys

The method for the telecommunication operators surveys was a combination of face-to-face and telephone interviews. Sometimes, the questionnaire was even sent to the responsible person and returned with the respective data. Sometimes, different people had to be contacted in order to get the information. The sample size for the telecommunications operator surveys ranges from 1 to 5 depending on the specific telecommunications operators structure in the respective countries.

Internet Service Provider Surveys

The same method as in the telecommunications operator survey was applied for the ISP surveys. The sample size of ISPs being interviewed ranges from 1 to 9. This again reflects the different structure of the markets in the different countries and the different cultures concerning assessment of data as confidential or freely available.

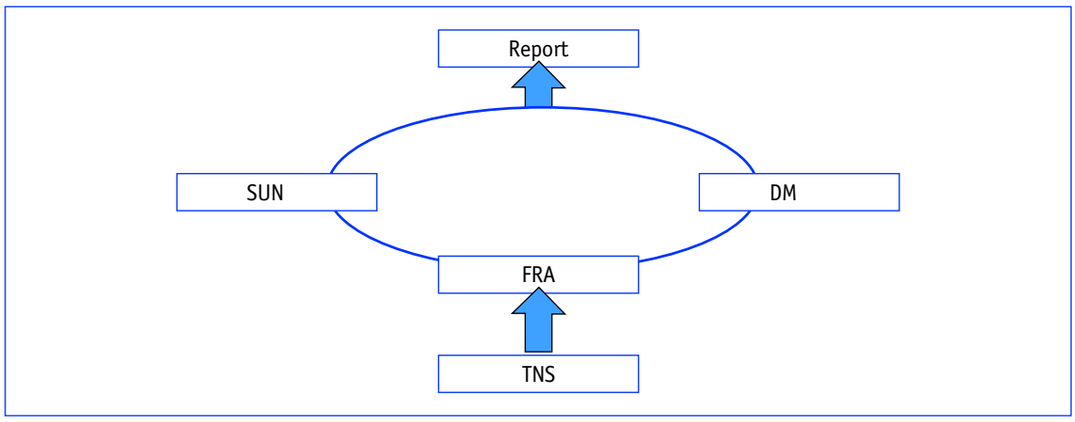
Ministry Surveys

The ministry surveys were conducted in a similar fashion as the telecommunications operators and ISP surveys. The ministry survey consisted of three parts: Questions were addressed to the Ministries of Education (ICT and Internet in schools and universities), the Ministries of the Information Society (E-Government), and Ministries of the Interior (Acquis Communautaire). Because responsibilities for the different topics are organized differently in the participating countries, different people within the ministries had to be contacted and interviewed. Usually the complete questionnaire or portions of the questionnaire were sent to the respective ministries or departments and then filled out by the internal experts. The actual number of interviews that were conducted ranges from 4 to 7.

Data Processing

Soon after the different surveys had been carried out, TNS and CATI sent their raw data sets in SPSS-format to the Consortium member Fraunhofer (FRA, see figure 4).

Figure 4: Organisation of the data flow



After checking the data for consistency and plausibility, the data was distributed within the consortium for processing and reporting. Tasks to be fulfilled in this stage were:

- combination of country data sets for country comparisons,
- re-assigning survey results to indicators,
- generating breakdowns and cross-tabulations
- combining results from 1st and 2nd wave
- providing tables and charts for reporting and benchmarking.
- calculation of standard error levels and application to data
- validation and comparison of data with other available data

Calculating weighted cross-country-averages

Instead of using arithmetic cross-country averages, weighted averages were calculated for the country comparisons. The weighting was done by population size or number of households (depending on the indicator) for the household survey and by the number of enterprises per country for the enterprise survey. For example, the weighting factors for enterprises were as follows:

	BG	CZ	EE	HU	LT
Enterprises	780937	235441	25486	182732	43986
Factor	0.178	0.054	0.006	0.042	0.010

	LV	PL	RO	SL	SK	SUM
Enterprises	38374	2642491	302739	72093	61713	4385992
Factor	0.009	0.602	0.069	0.016	0.014	1

For the health surveys, the weighting was done by the number of general practitioners. By taking into account the population size and the economic landscape as well as the structure of the health system in the different countries, weighted averages paint a better picture of the overall situation in the participating countries.

Total vs. valid percentages

In the charts used in the report, some data used refers to "valid percentages". On the other hand, where appropriate, "total percentages" were used. Valid percentages use as a basis all respondents who actually answered the respective question. However, not all respondents of the survey had to answer all questions: One example to illustrate this could be the question asking about B2B e-commerce in the enterprise survey. The question "Has your company sold products to other enterprises via a presence on specialised Internet market places?" was only asked to those enterprises that said they have access to the Internet.

Of all enterprises who qualify for this question for example in Bulgaria, 10.1% said they have used the Internet to sell products via a specialized Internet market place. 10.1% in this example is the "valid" percentage. It should be read as: Of all companies who have Internet access in Bulgaria, 10.1% have used the Internet to sell products to other enterprises via a presence on specialised Internet market places. However, the total percentage of companies selling online over specialized marketplaces in Bulgaria is only 0.9%. This figure refers to all companies that took part in the survey and this includes companies who do not have Internet access. In contrast to the "valid" answers, the total percentages give a representative picture as this data is weighted according to the respective structural data.

Annex 4 — Error Margins

In order to interpret the statistical significance of the survey results it is necessary to understand the confidence limits (margins of error) that apply to a survey. The validity of the results of any survey depends on the sample size, the actual results, and the required degree of confidence.

Summarising more detailed tables, with the following sample sizes, (N), for each of the eEurope+ Surveys, at a 95% confidence level, the percentages vary within these limits:

Observed percentages	**10% or 90%**	**20% or 80%**	**30% or 70%**	**40% or 60%**	**50%**
Confidence Limits if N= 1000 [Household Survey]	+/- 1.7%	+/- 2.3%	+/- 2.6%	+/- 2.8%	+/- 2.9%
Confidence Limits if N= 500 [Enterprise Survey]	+/- 2.6%	+/- 3.5%	+/- 4.0%	+/- 4.3%	+/- 4.3%
Confidence Limits if N= 185 [Health Survey]	+/- 4.1%	+/- 5.5%	+/- 6.3%	+/- 6.7%	+/- 6.9%

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