Central and Eastern Europe Information Society Benchmarks

Survey Results

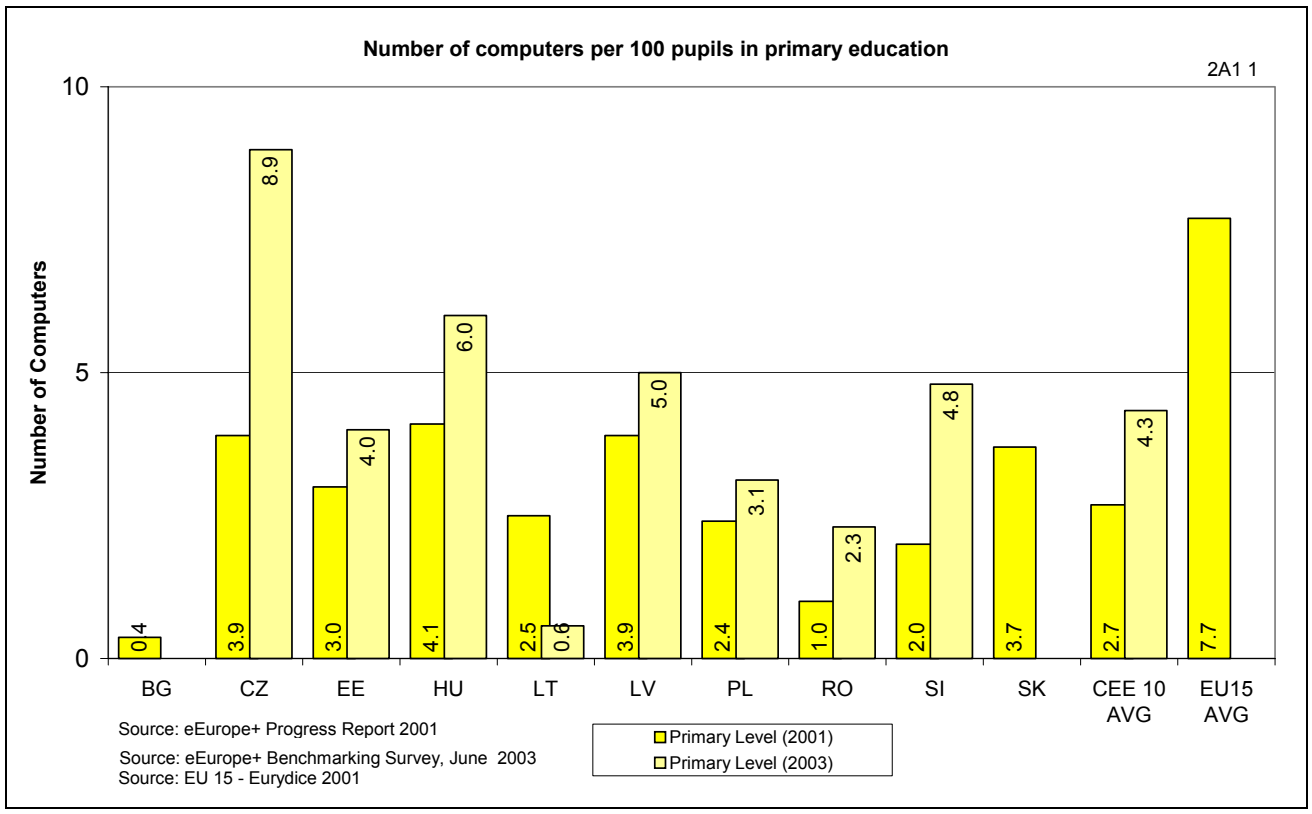
Objective 2

Investing in People and Skills

September 2004

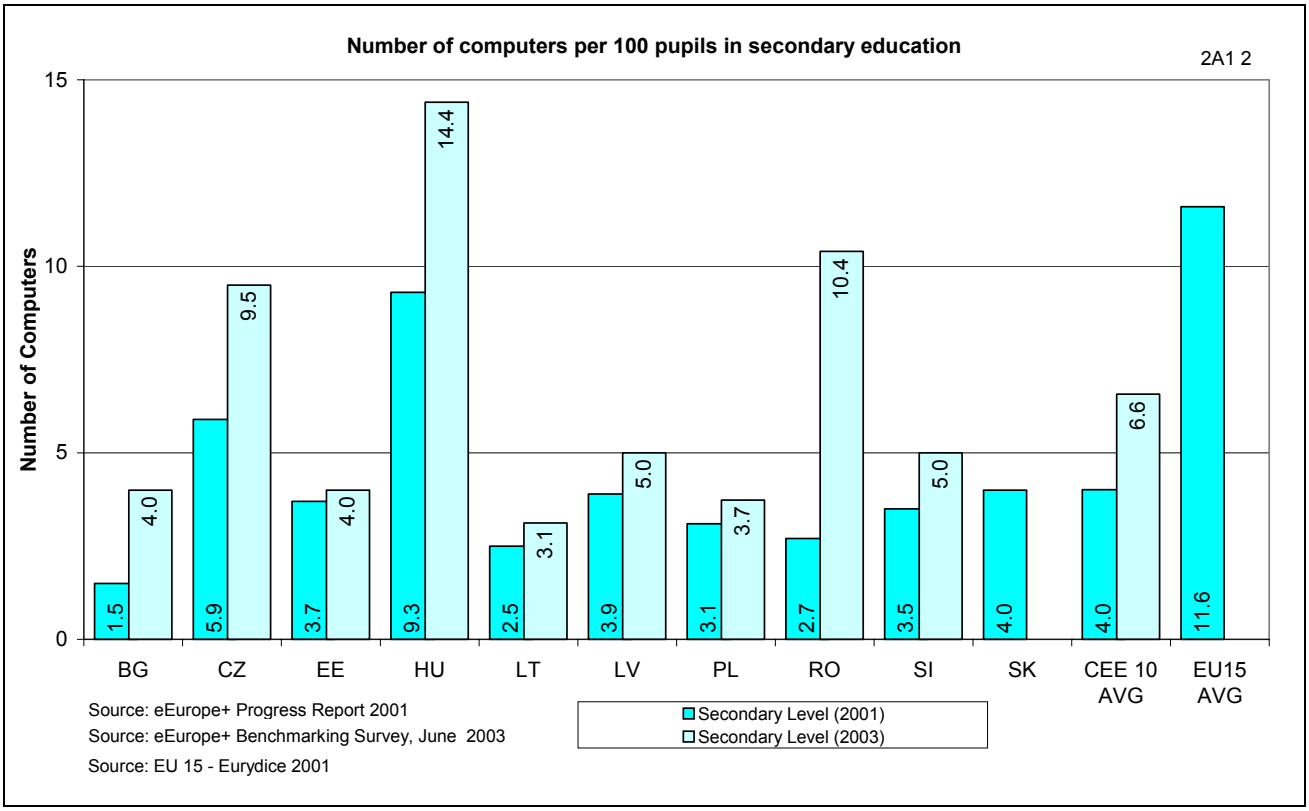
2.A EUROPEAN YOUTH INTO THE DIGITAL AGE

2.A.1 Number of computers per 100 pupils in primary/secondary/tertiary levels



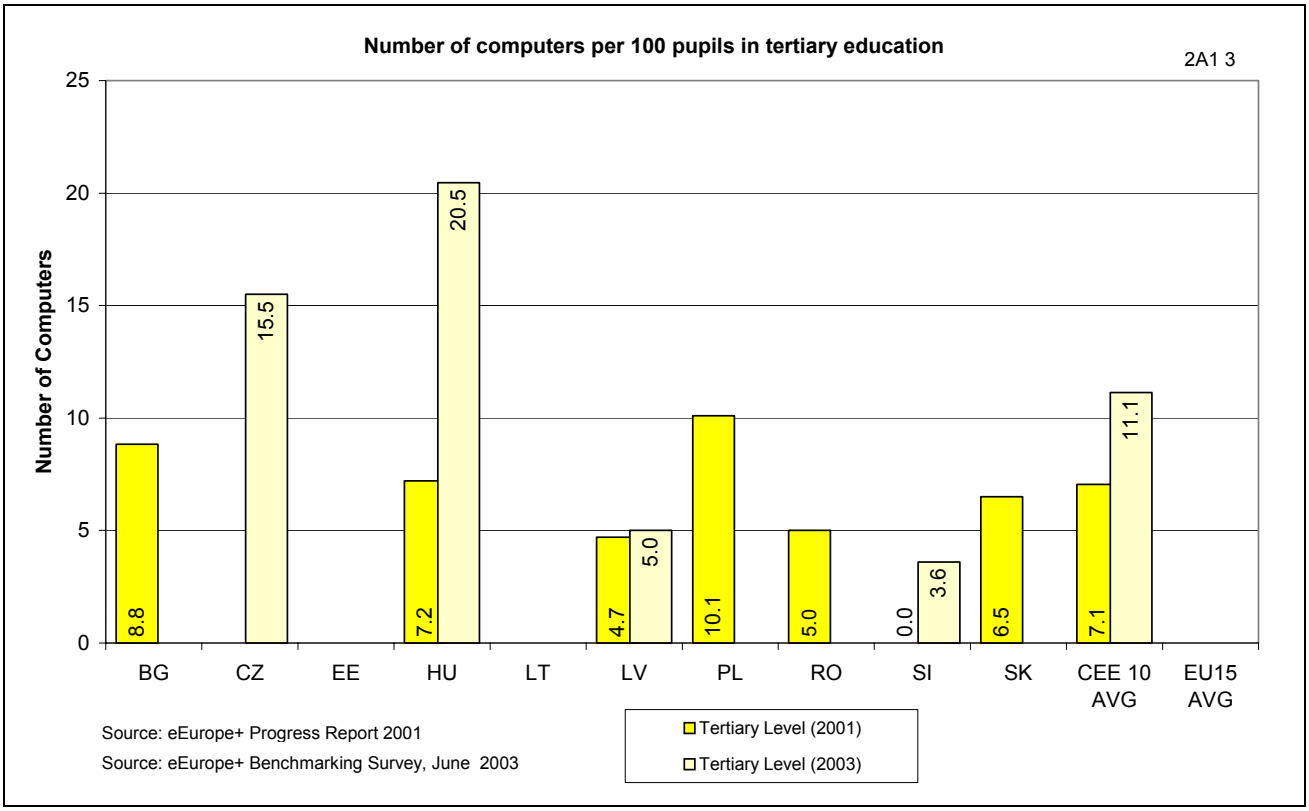
The Czech Republic leads for computer penetration in primary schools and has doubled penetration levels in two years

Primary schools: the Czech Republic is the leader with 8.9 computers per 100 pupils, followed by Hungary, 6.0/100 pupils, Latvia 5.0/100 pupils and Slovenia at 4.8/100 pupils. All countries apart from Lithuania show increases during two years, with the Czech Republic and Slovenia having doubled their penetration levels. The EU 15 average (Eurydice 2001) was 7.7/100 pupils compared to 4.3/100 pupils in December 2003 (eEurope+). The Czech Republic is the only country to have exceeded the 2001 EU 15 average for computer penetration in primary schools.



Whilst Hungary has the highest computer penetration in secondary schools at 14.4 per 100 pupils, Romania has tripled penetration levels during the last two years to reach 10.4 computers per 100 pupils.

Secondary Schools: Hungary is the leader with 14.4 computers per 100 pupils, followed by Romania at 10.4 and the Czech Republic at 9.5. All other countries have less than 5 computers per 100 pupils. With all countries showing some increase between 2001 and 2003, Romania has tripled computer penetration levels in secondary schools. With an EU 15 average of 11.6/100 pupils in 2001, the CEE 10 average is now 6.6/100 pupils, an increase of 2.6. Hungary is the only country to have reached EU 15 2001 computer penetration levels in secondary schools.

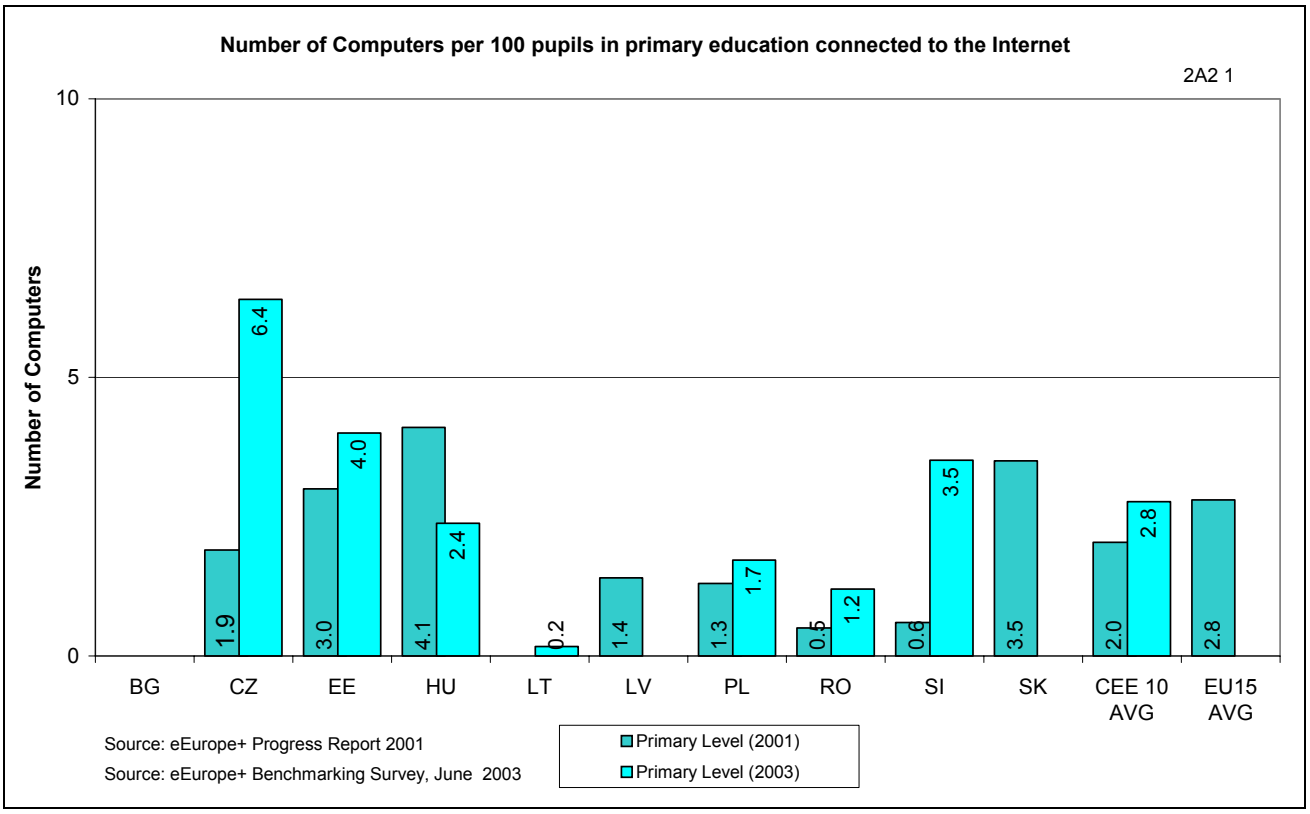


With an incomplete data set for this indicator, HUNGARY has the highest computer penetration levels among CEE 10 in Tertiary Education.

Hungary is the leader with 20.5 computers per 100 students and has tripled computer penetration levels between 2001 and 2003. Hungary is followed by the Czech Republic (15.5). All other countries have much lower penetration levels e.g. Latvia with 5.0 computers for 100 pupils and Slovenia with 3.6.

2.A.2 Number of computers connected to the Internet per 100 pupils in primary/secondary/tertiary levels

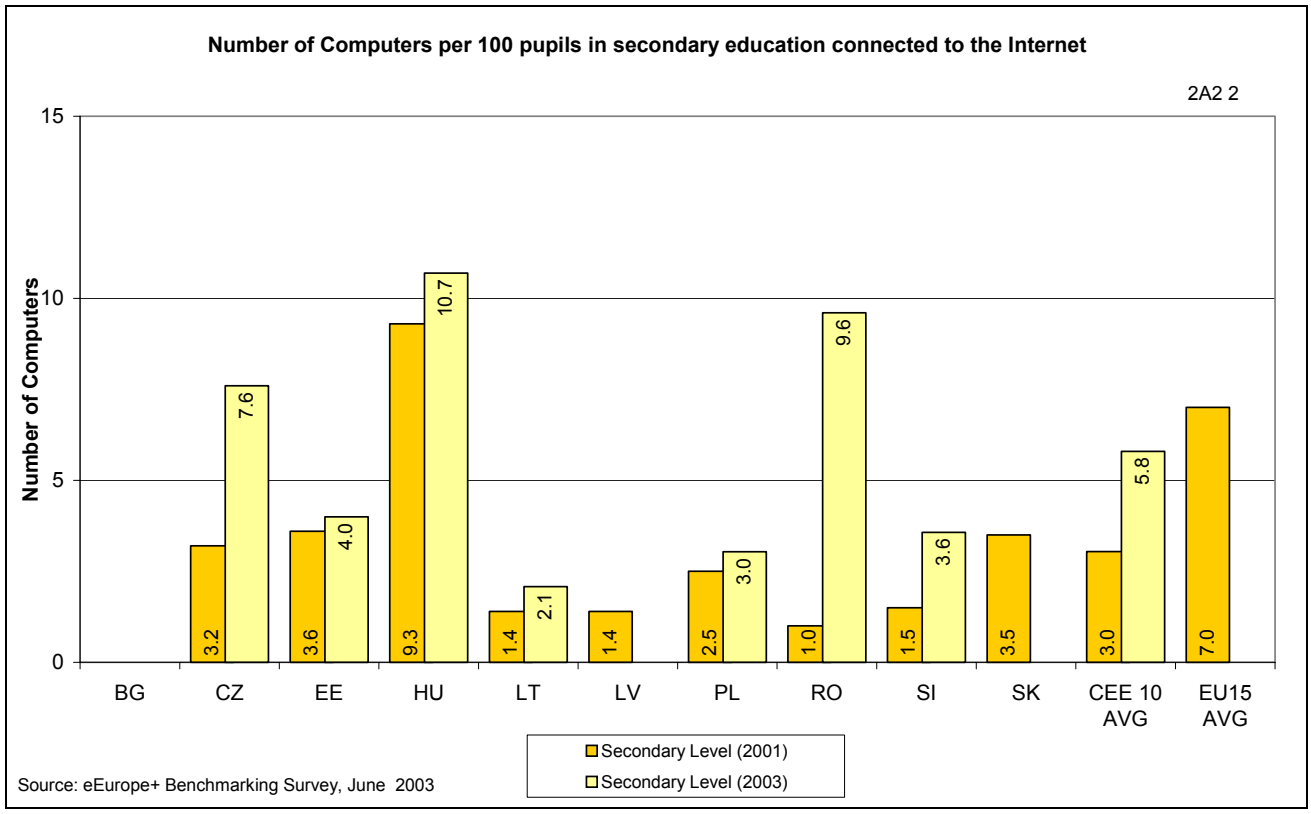
Levels of Internet penetration are slightly lower than computer penetration amongst primary, secondary and tertiary levels of education.



The Czech Republic is the leader for Internet penetration in primary schools with 6.4 computers connected to the Internet per 100 pupils and has tripled its penetration levels between 2001 and 2003.

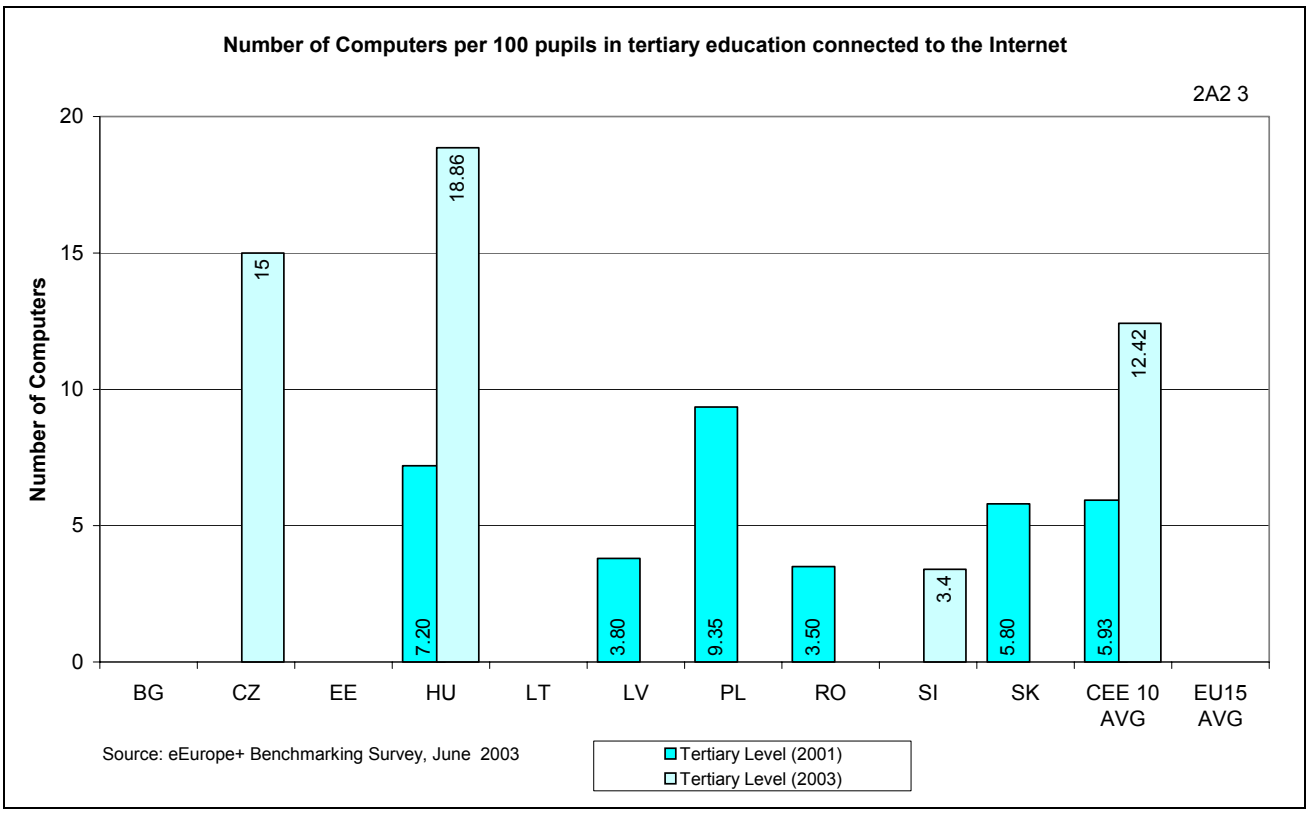
With incomplete data sets, the Czech Republic leads with 6.4 computers per 100 pupils connected to the Internet, followed by Estonia (4.0), Slovenia (3.5), and Hungary (2.4). All other countries have levels of less than 2.0. The Czech Republic has also tripled its penetration level, With an EU 15 average of just less than 3 computers with Internet per 100 pupils in 2001; the CEE 10 average at 2.8 is encouraging.

Hungary has the highest level of Internet penetration amongst secondary schools in the CEE 10 but Romania has connected almost all its secondary school computers to the Internet during the last two years.



With incomplete data sets for this indicator, Hungary is the leader at 10.7, followed by Romania at 9.6 and the Czech Republic at 7.6. All other countries lie at levels of 4.0 or less. Romania has connected almost all its secondary school computers to the Internet between 2001 and 2003. With an EU 15 (2001) average of 7 computers with Internet per 100 pupils, the CEE 10 average of 5.8 is looking encouraging, with three CEE 10 at levels above the EU 15 2001 level.

It was reported (Hulik, Warsaw April 2004) that the Czech Republic almost doubled computer penetration levels in schools between 2001/2003 but that there were negligible changes between 2003/2004. About 20% of computers have Pentium I or older and there are about 50% with Pentium II i.e. the quality of the hardware is significant regarding usefulness and at the end of 2004, all the Czech Republic schools will have an Internet connection, although mainly dial up.



The Ministries of Education have not provided enough information to enable any analysis to be performed on this indicator.

Tertiary education: with incomplete data sets, Hungary is the leader with 18.6 computers with Internet connection per 100 pupils, followed by the Czech Republic at 15.0.

2.A.3 Number of computers with high-speed connections to the Internet per 100 pupils in primary/secondary/tertiary levels

With an incomplete data set provided by Ministries of Education, a complete picture of computers with high-speed internet connections cannot be given. This is an important indicator as it determines which schools will be able to use the Internet more effectively. Since there is no agreement between data on broadband penetration levels (O.A.3) and the data relating to high-speed connections with National Research Institutes (1.B.3), this is an area where future efforts on data collection could be focussed.

In primary educational establishments the Czech Republic have one out of two computers with high speed access, followed by Estonia with almost all computers with high speed Internet access.

At secondary level, Hungary and the Czech Republic have almost one out of two computers with high speed access although computer penetration levels are higher in Hungary. Estonia has almost all computers with high speed access, although fewer of them.

Regarding Tertiary education, the Czech Republic has almost all computers with high-speed access, with two out of three in Hungary and almost all computers with high-speed access in Poland although at lower penetration levels.

2.A.4 Percentage of teachers using the Internet for non-computing teaching on a regular basis (primary/secondary/tertiary levels).

Most Ministries of Education are not in a position to collect data concerning teacher's usage of the Internet for non-computing teaching on a regular basis. Only Slovenia, Bulgaria, and Estonia were able to provide some inconclusive data.

With all countries currently having initiatives in place to informatise their schools and universities, and often using a mixture of public and privately funded initiatives, private funding can be more unreliable with some undesirable strings attached, but is an important means of funding computer and Internet provision. Local fund raising for computers and Internet connections is frequently encouraged where budgets are restricted but means that penetration levels are more difficult to control and monitor within an overall policy. Bearing in mind that the future ICT workforce is currently being created in schools, policy implementation will influence before 2010, hence the relevance of developing ICT in secondary schools in particular.

Effective teacher training is a critical factor in ensuring that the potential of resources is realised once adequate access is available. This is shown in Estonia where the Ministry of Education and Research found that the education system failed to exploit the full potential of ICT for changing learning processes. This was revealed in the State Audit Office presentation of proposals to the Ministry of Education and Research, re the Tiger Leap Plus Programme (Tiger Leap Plus).

2.A.5 The use of computers (basic computer training, language training, research tool, word processing)

There is almost no systematic monitoring and recording of students' usage of computers. Therefore, the ministries of education have been unable to supply any reliable statistics on this topic.

2.A.6 Hours of computer use per pupil per week (primary/secondary/tertiary levels)

Definition of computer for Indicators A.1 to A.6 is computers used for teaching purposes.

There is almost no systematic recording of the number of hours of student computer usage for teaching purposes. Therefore, the ministries of education have been unable to supply any reliable statistics on this topic.

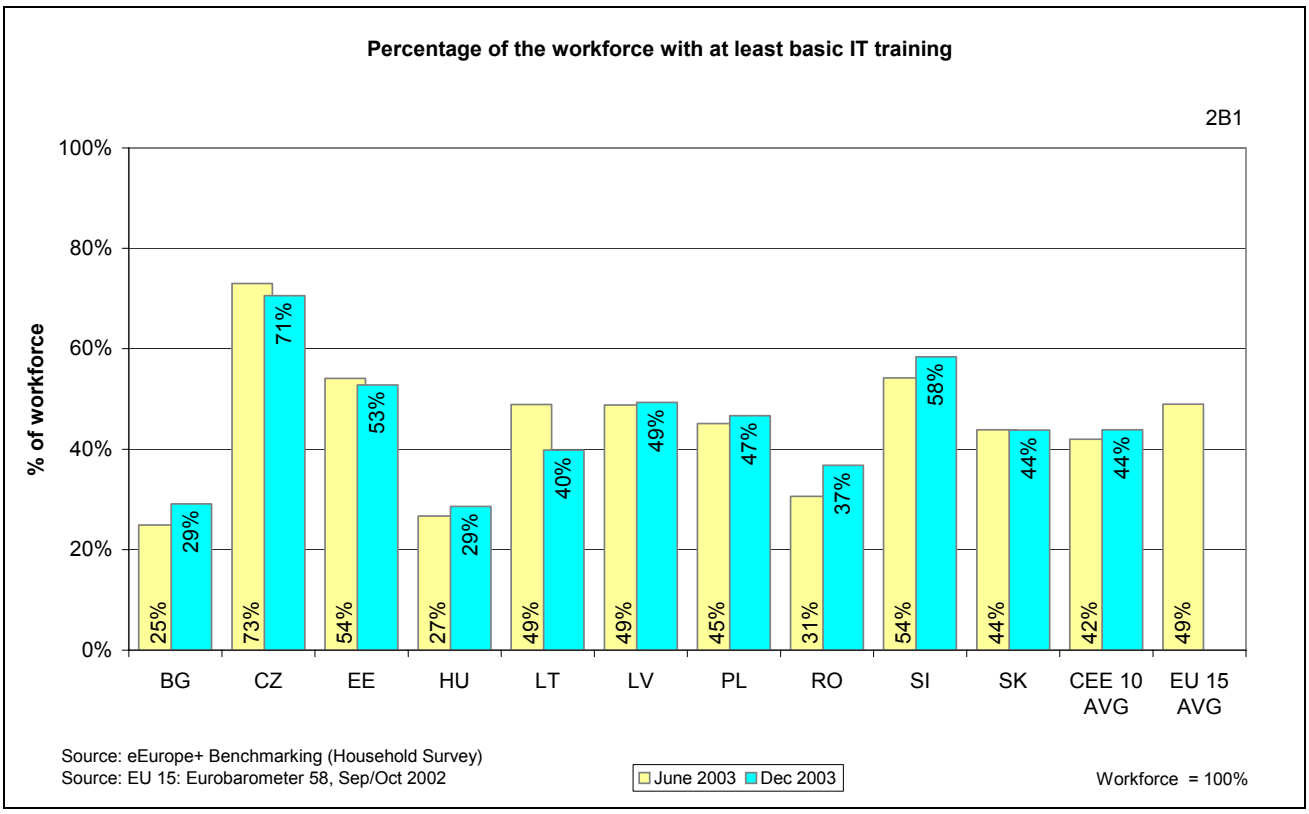
With no CEE 10 countries ready to collect data for these usage indicators, it will soon become a priority and a necessity to collect this type of information, given the extent of public funding involved in establishing ICT in the education sector and the need to measure the effectiveness of the investments.

2.B WORKING IN THE KNOWLEDGE BASED ECONOMY

2.B.1 Percentage of the workforce with (at least) basic IT training

This is broken down according to gender. For the household survey, 'workforce' is defined as those individuals in work or seeking work (including the unemployed).

Seven CEE 10 have more than 50% of their workforce without basic IT training



The Czech Republic (71%) is clearly the leader, followed by Slovenia (58%) and Estonia (53%). Four countries form a cluster: Latvia (49%), Poland (47%), Lithuania (40%), Romania (37%), with Bulgaria and Hungary trailing at 29%. Seven CEE 10 have more than 50% of their workforce without basic IT training and sometimes up to 70% without basic training (Bulgaria and Hungary).

2.B.2 Number of places and graduates in ICT related third level education

Only a few countries have been able to provide any data on his topic. From this limited data, it is apparent that significant gender gaps exist for example, the Czech Republic (86% male students out of 31,022), Estonia (77% male ICT students out of 3,946), Poland (87% male ICT students out of 104,363), the Slovak Republic (91% male students out of 6,401).

2.B.3 Percentage of third level students in ICT-related education. .

With an incomplete data set for the percentage of ICT students, Hungary (12.8%) is the leader, followed by the Czech Republic (10.8%), Estonia (6.59%), the Slovak Republic (6.43%) and Poland (5.3%),. However, many of the CEE 10 are outperforming EU 15 countries with this respect. This is partly attributable to their history of high standards in education in science related fields and the high profiles afforded to such study. As such, this is advantageous for these countries, as regards increasing future supplies of ICT workers.

This compares with the following data for proportions of Mathematics, Science and Technology graduates (2001) Bulgaria (19%), the Czech Republic (23%), Estonia (18%), Latvia (12%), Lithuania (26%), Poland (14%), Romania (25%), the Slovak Republic (26%), Slovenia (20%). The data for other EU countries has Ireland and Sweden (32%), France (31%), and Spain, Austria and the United Kingdom (27%) but the Netherlands (16%) and Portugal (17%) with a male imbalance of about 70%.

With '….candidate countries needing to take up new technologies and practices and train more workers in ICT if the EU is to achieve its aim of becoming the most competitive knowledge based economy in the world by 2010' (Euroabstracts 2003), technological development and growing skills demand has led to shortages of ICT professionals in the CEE 10. There are overall shortages at all levels with specific demand for technical programming skills. A critical mass of 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. With currently a mismatch between demand for and supply of ICT skills there is a shortfall in industry and also 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 implementation. (Fielder Warsaw 2004). Hungary and the Czech Republic are leaders at 10.72% and 9.33% respectively.

2.B.4 Percentage of workforce using telework

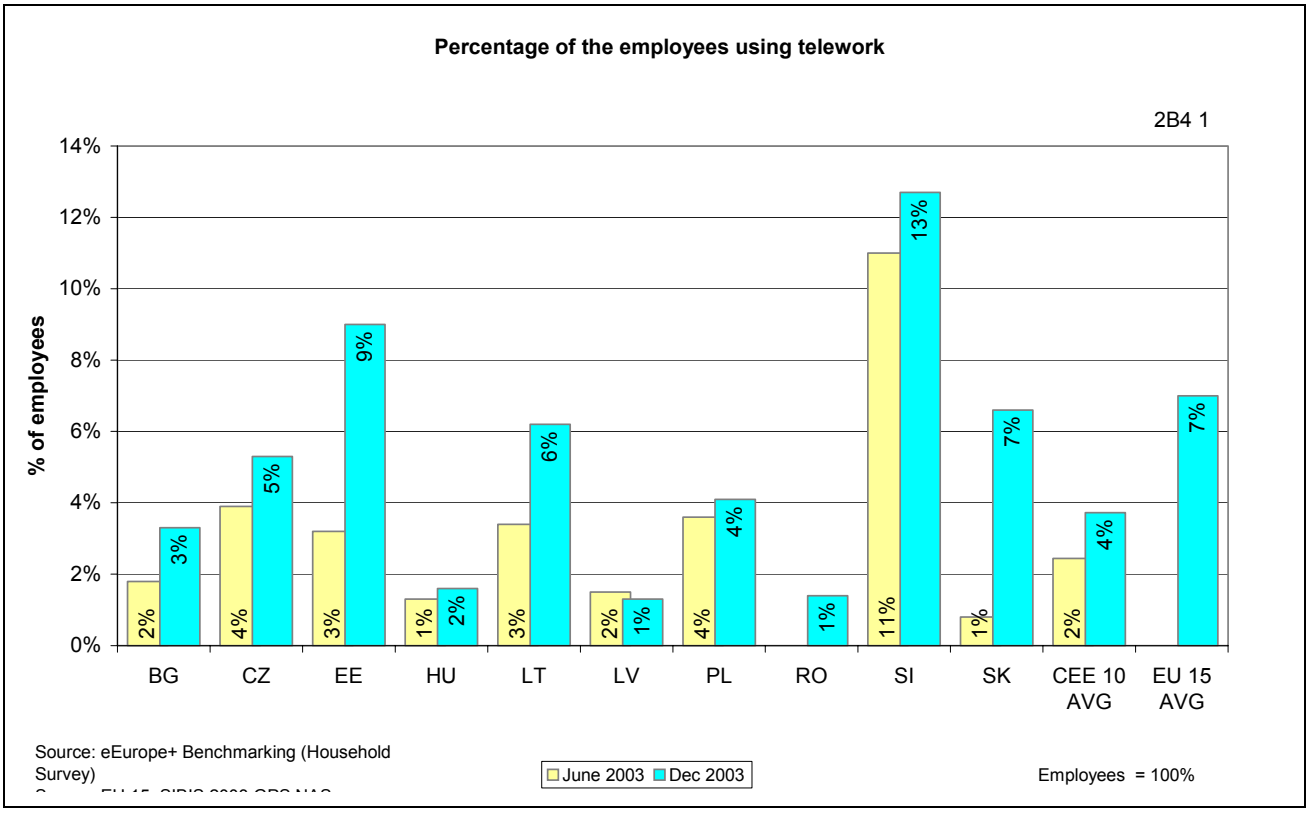
This covers those employed working part of their time, minimum of half a day a week, on average, away from work, away from enterprise premises and accessing the enterprise's IT systems remotely. Data disaggregated by gender.

2.B.4.1 Data on Telework provided by the Ministries of Employment

With the exception of Slovenia there are no official statistics concerning the number of employees that 'telework'.

2.B.4.2 Data on Telework obtained via the Household Survey

More than 10% of the workforce in Slovenia reports that it is teleworking.



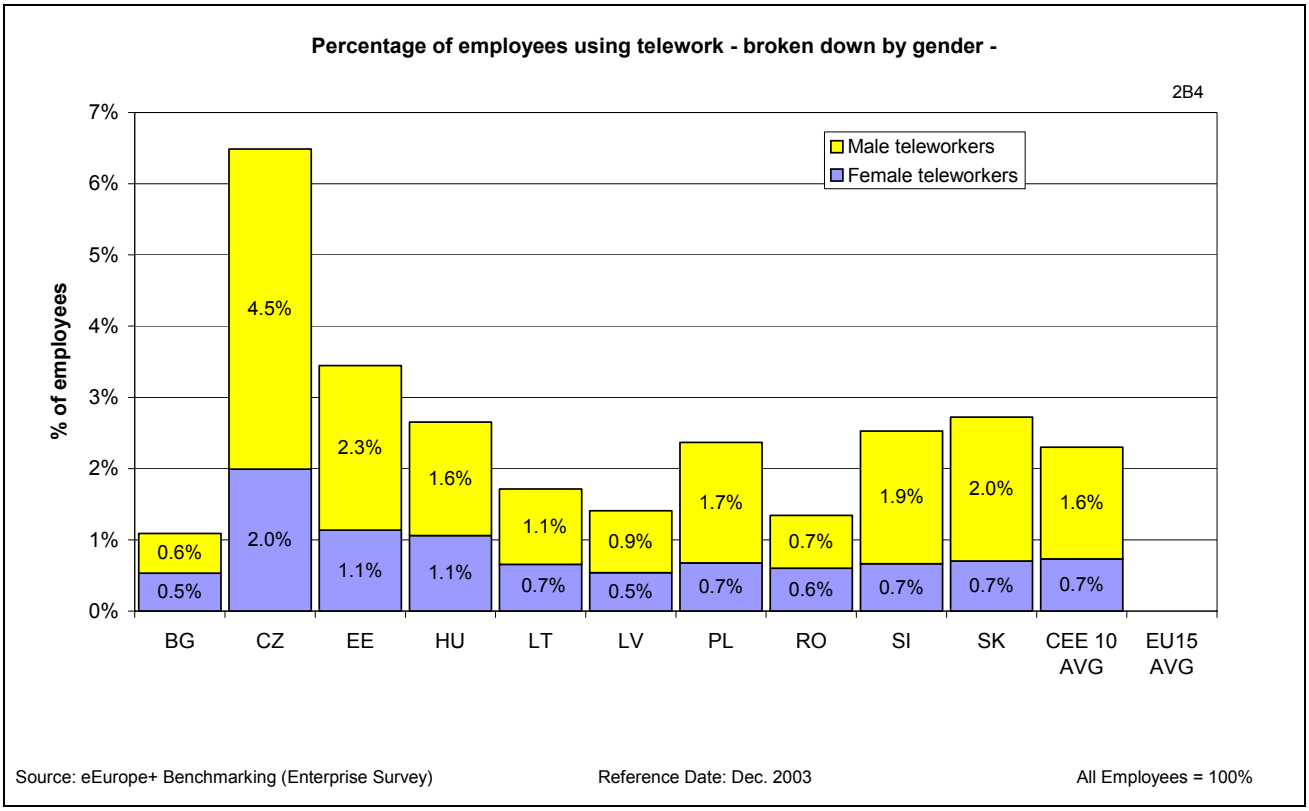
This data was obtained from those individuals currently employed. The leader is Slovenia (13%), followed by Estonia (9%), the Slovak Republic (7%), Lithuania (6%), and the Czech Republic (5%), with all other countries with percentages of 4% or less.

Teleworking is a new socio-economic activity associated with Information Societies; these results indicate that more than one tenth of the workforce in Slovenia is teleworking a minimum of half a day each week. This mirrors the levels of informatisation that have been recorded for Slovenia in (3.A.9), (3.A.12), (3.A.13) etc and the sophistication of ICT in Slovenia enterprises and organisations. An increase is seen in the levels of this activity between June and December 2003 for Estonia, Lithuania and the Slovak Republic.

SIBIS (SIBIS 2003 GPS NAS) records 7% of the EU 15 working population teleworking and 5% of CEE 10 teleworking, but this masks the usual wide variation in levels amongst countries ranging from 15% in Denmark and Finland, to 2% in Spain, Italy, and Portugal, so the better CEE 10 performers are as usual better than the poorer performers in the EU 15

2.B.4.3 Data on Telework obtained via the Enterprise Survey

The Czech Republic employees are the most frequent teleworkers although they represent only 6.5% of the workforce.



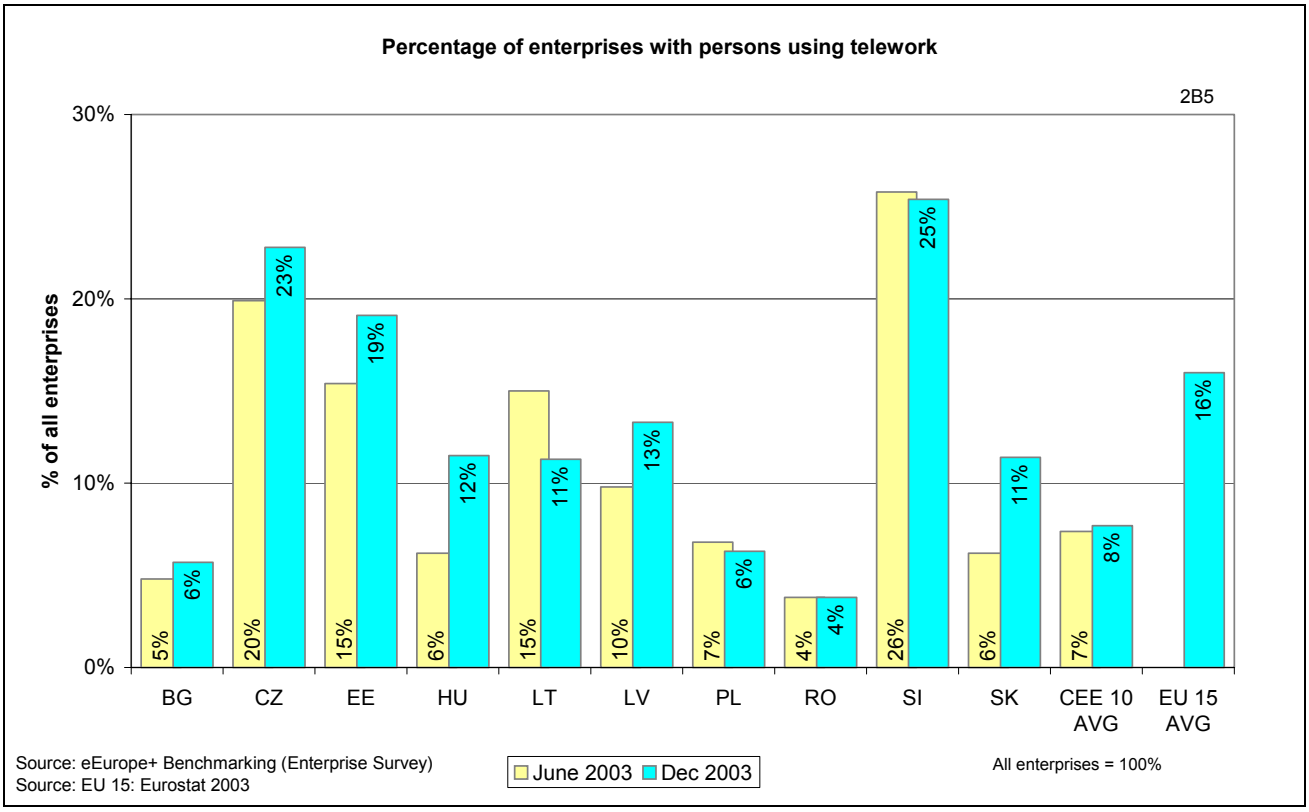
In December 2003, out of all enterprises with an Internet connection, the Czech Republic enterprises reported 6.5% of their employees were teleworking, followed by Slovenia (2.6%) and the Slovak Republic and Hungary (2.7%). Overall, more males are reported as teleworking than females. These are very low levels of activity.

There is variation between the results for 2.B.4.2 and 2.B.4.3 as the results from the Household Survey show higher levels of activity and vary in distribution to 2.B.4.3. This could be because of misunderstanding of the question or maybe more informal teleworking is taking place than employers believe to be the case.

2.B.5 Percentage of enterprises with persons using telework

These are employees that are employed working part of their time, minimum of half a day a week, on average, away from work, away from enterprise premises and accessing the enterprise's IT systems remotely.

Slovenia, the Czech Republic and Estonia have the most enterprises with teleworkers.



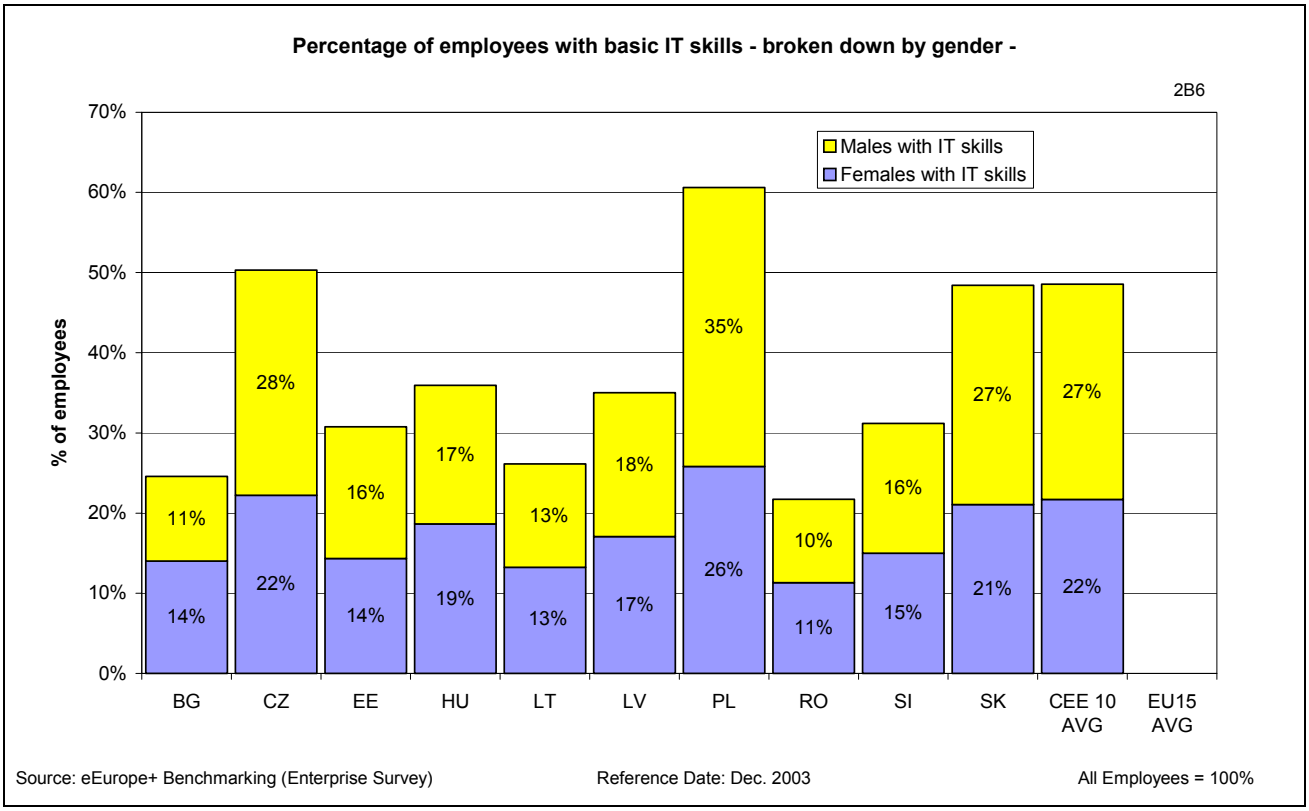
Slovenia (25%) and the Czech Republic (23%) lead with nearly one quarter of their enterprises with employees using telework. They are closely followed by Estonia (19%) and then by all other countries at 13% or less.

Not surprisingly, the two countries with high Internet penetration in enterprises (3.A.6), high personal use of the Internet (1.A.1) and high home Internet access levels (1.A.3), are also the leaders for teleworking in enterprises, Internet usage experience, access at home, and ability to access the Internet elsewhere if necessary are also important. the Slovak Republic (increase in usage at work, increase in general Internet usage) and Hungary (large increase in enterprise Internet penetration, increase in home Internet access, and increase in general Internet usage) are showing the greatest rates of increase of enterprises with teleworkers. However, teleworking does not only depend on Internet access but also on the ability to access the workplace IT systems, so the ability to telework also reflects the ICT sophistication of the employee's workplace, which is true for the Czech Republic, Estonia and Slovenia.

2.B.6 What IT skills employees have Employees' IT skills

This includes skills in working with common programmes such as word processors, spreadsheets, presentation tools, Internet browsers

About four out of ten users among CEE 10 knows how to use word processing software, three out of ten users can use spreadsheets, and only one out of ten can use presentation software.



Only three CEE 10 have 48% or more of their employees with IT skills in common applications, the leader Poland (61%), the Czech Republic (50%) and the Slovak Republic (48%) and other CEE 10 countries have 36% or less of their employees with IT skills. Lithuania (26%), Bulgaria (24%) and Romania (21%) are trailing.

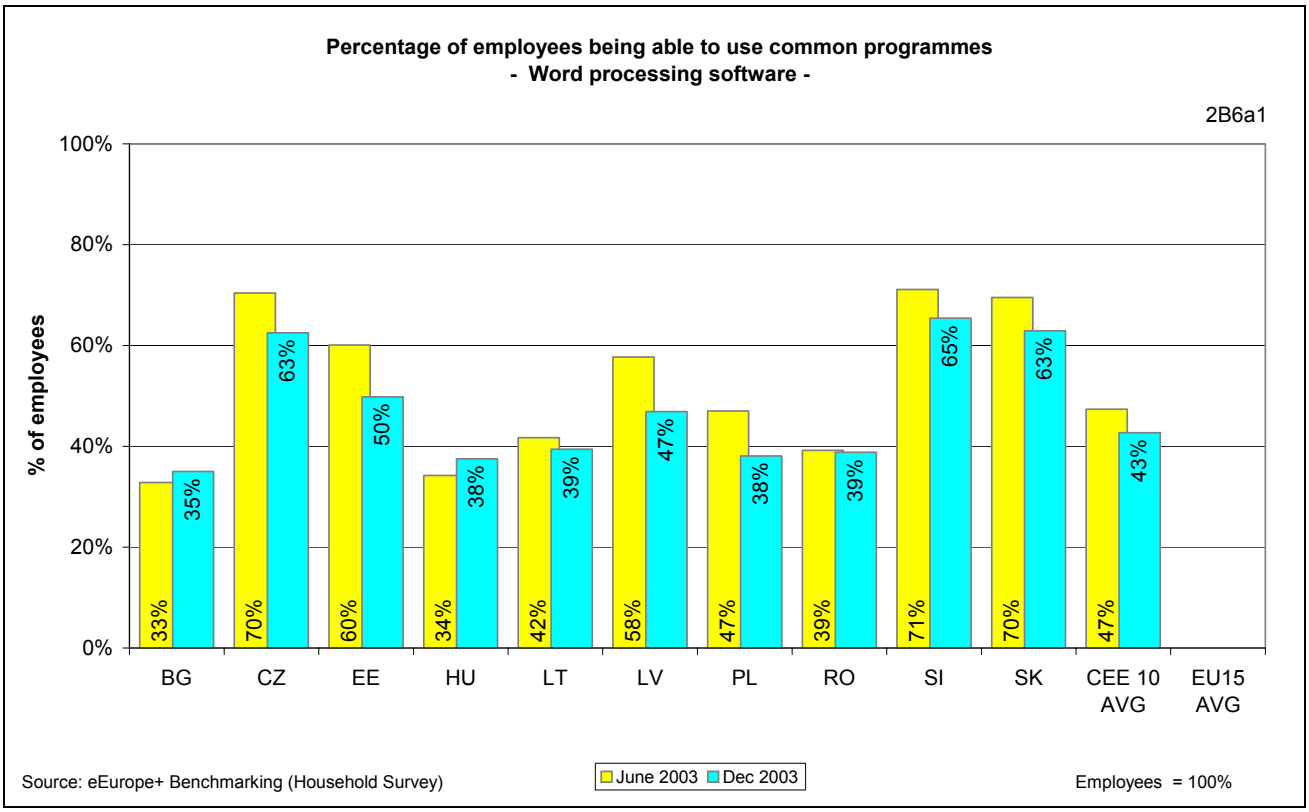
Being able to use word processing programmes is the most frequently used application (CEE 10 average 43% employees), followed by spreadsheet programmes (CEE 10 average 28% employees), and presentation software (CEE 10 average 13% employees). Clearly, usage levels fall with declining necessity of use. Most employees using a computer would be expected to be able to use word processing but not all would need to use spreadsheets and even fewer would need to use presentation software.

Regarding ability to use the Internet (CEE 10 average 34%), percentage levels of use follow the same trend as for use of word processing software, with the exception of Estonia, where levels of Internet use are higher (62%), than for use of word processing (50%). Could this be due to the more pervasive, widespread use of the Internet in Estonia rather than the more intensive use of computers for their other functionalities? Ability to use e-mail (CEE 10 average 29%), is less than the ability to use an Internet browser, as could be expected. Not all employees could be required to send/receive e-mails.

The largest gender gaps regarding IT skills in common applications according to the Household

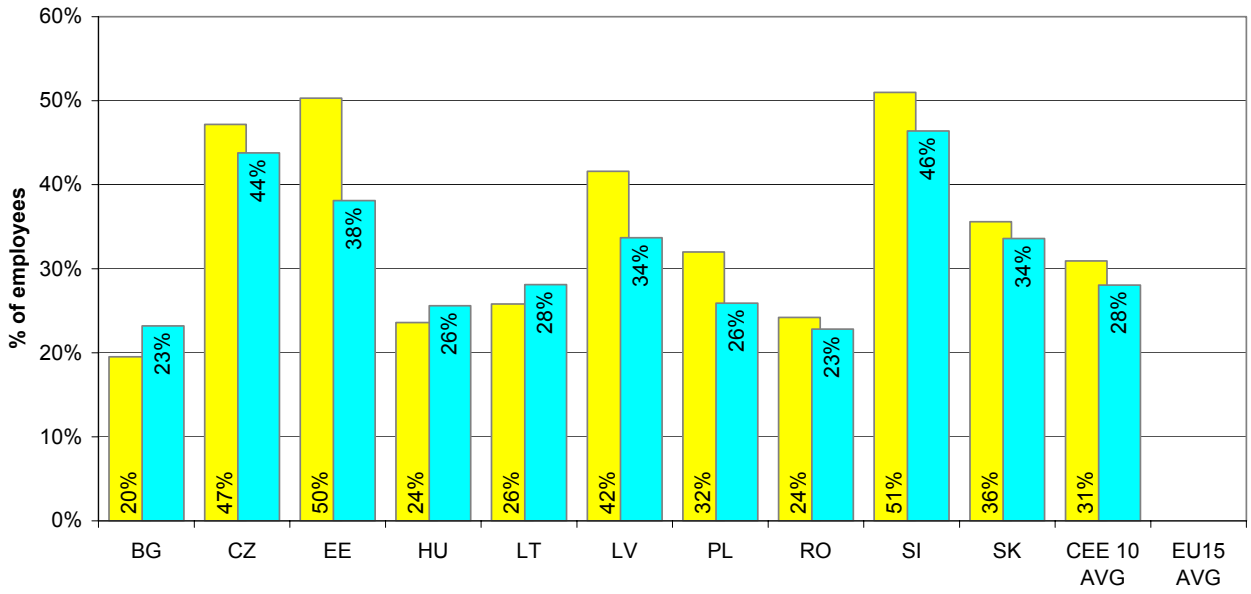
Survey are found in the Czech Republic (+6% male), Poland (+7% male) and the Slovak Republic (+6% male), but females outnumber males in Bulgaria (+3%), Hungary (+2%) and Romania (+1%).

Even with standard error levels of 4% for these response levels, there are large decreases in the percentage of IT skilled employees. This is thought to be due to systematic changes within the Survey. During the December Survey, employers were asked for an actual count of employees rather than choosing an appropriate band in the questionnaire. A higher percentage of Polish employees is reported to have basic IT skills but cannot use office programmes at levels that reflect this percentage.



Percentage of employees being able to use common programmes
- Spreadsheet software -

2B6a2



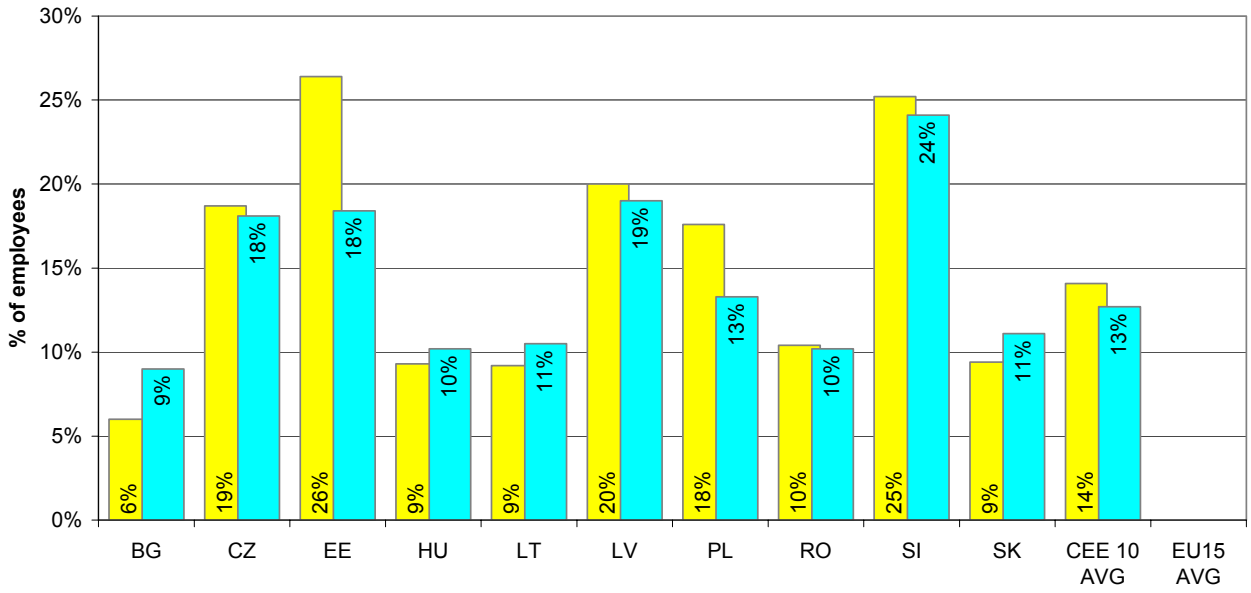
Source: eEurope+ Benchmarking (Household Survey)

June 2003 Dec 2003

Employees = 100%

Percentage of employees being able to use common programmes
Presentation software

2B6b1



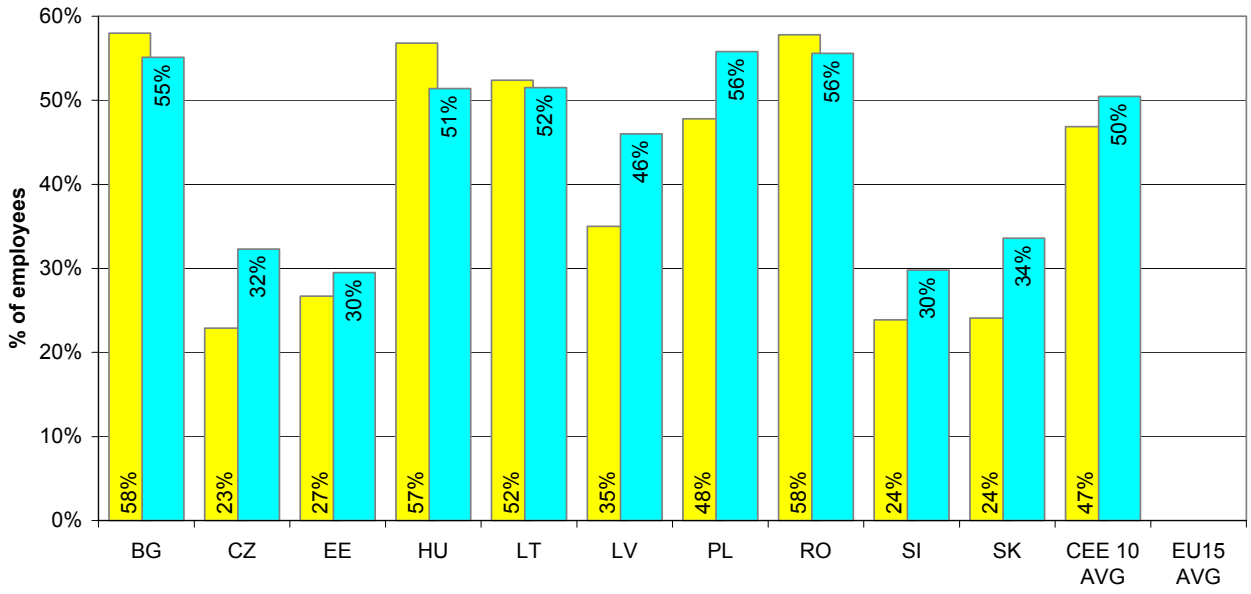
Source: eEurope+ Benchmarking (Household Survey)

June 2003 Dec 2003

Employees = 100%

Percentage of employees not being able to use common programmes

2B6b2



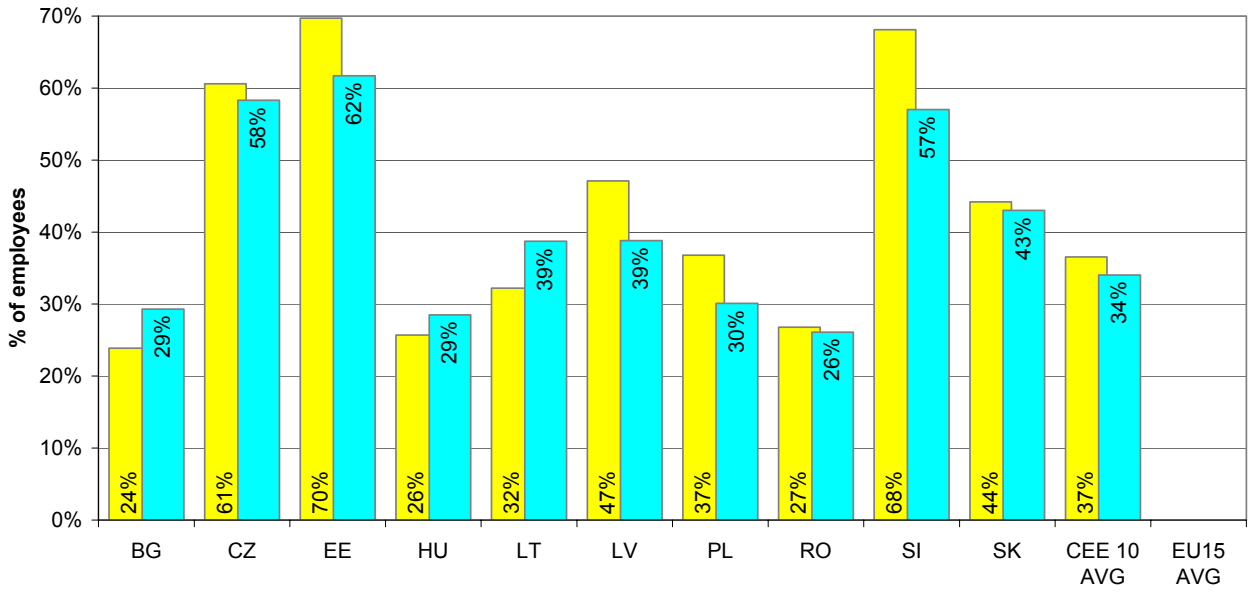
Source: eEurope+ Benchmarking (Household Survey)

June 2003 Dec 2003

Employees = 100%

Percentage of employees being able to use common programmes
- Internet -

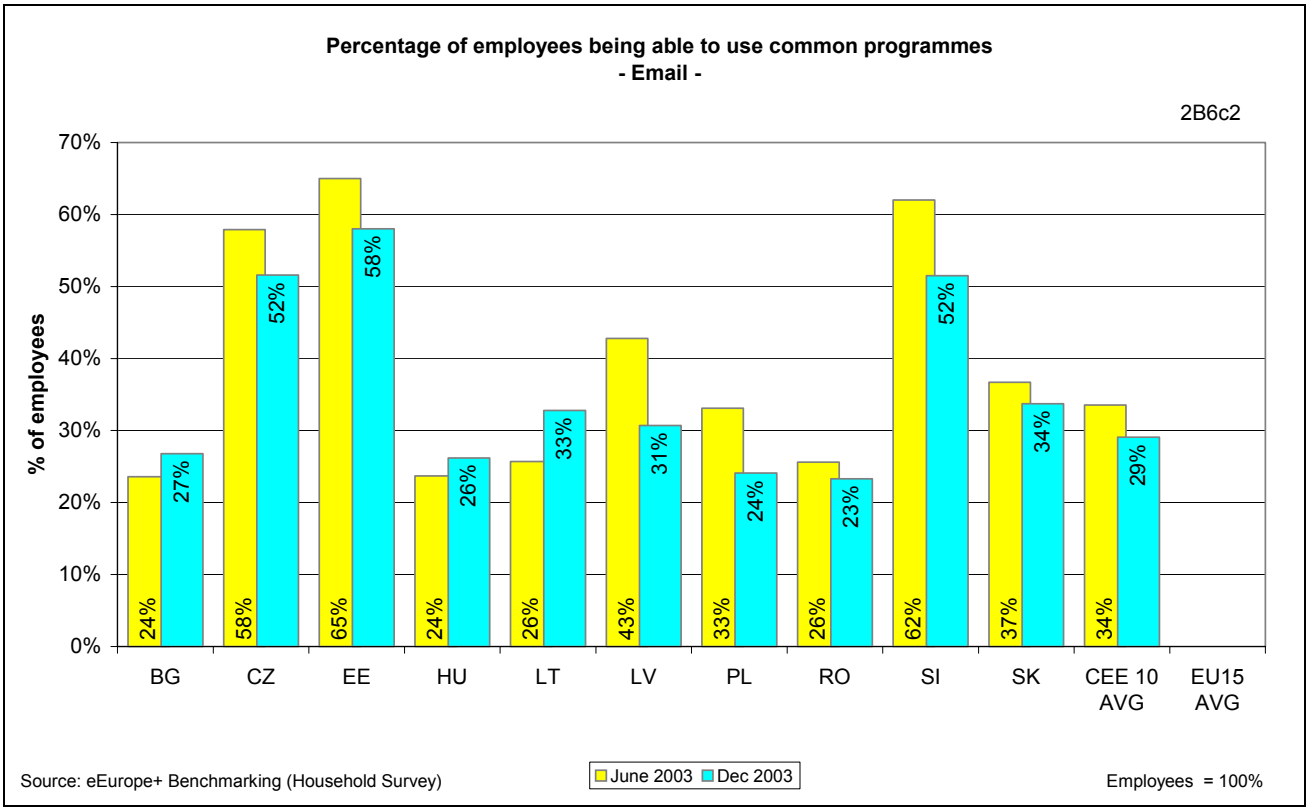
2B6c1



Source: eEurope+ Benchmarking (Household Survey)

June 2003 Dec 2003

Employees = 100%


Percentage of employees being able to use common programmes
- Email -
2B6c2
% of employees
70%
60%
50%
40%
30%
20%
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SI
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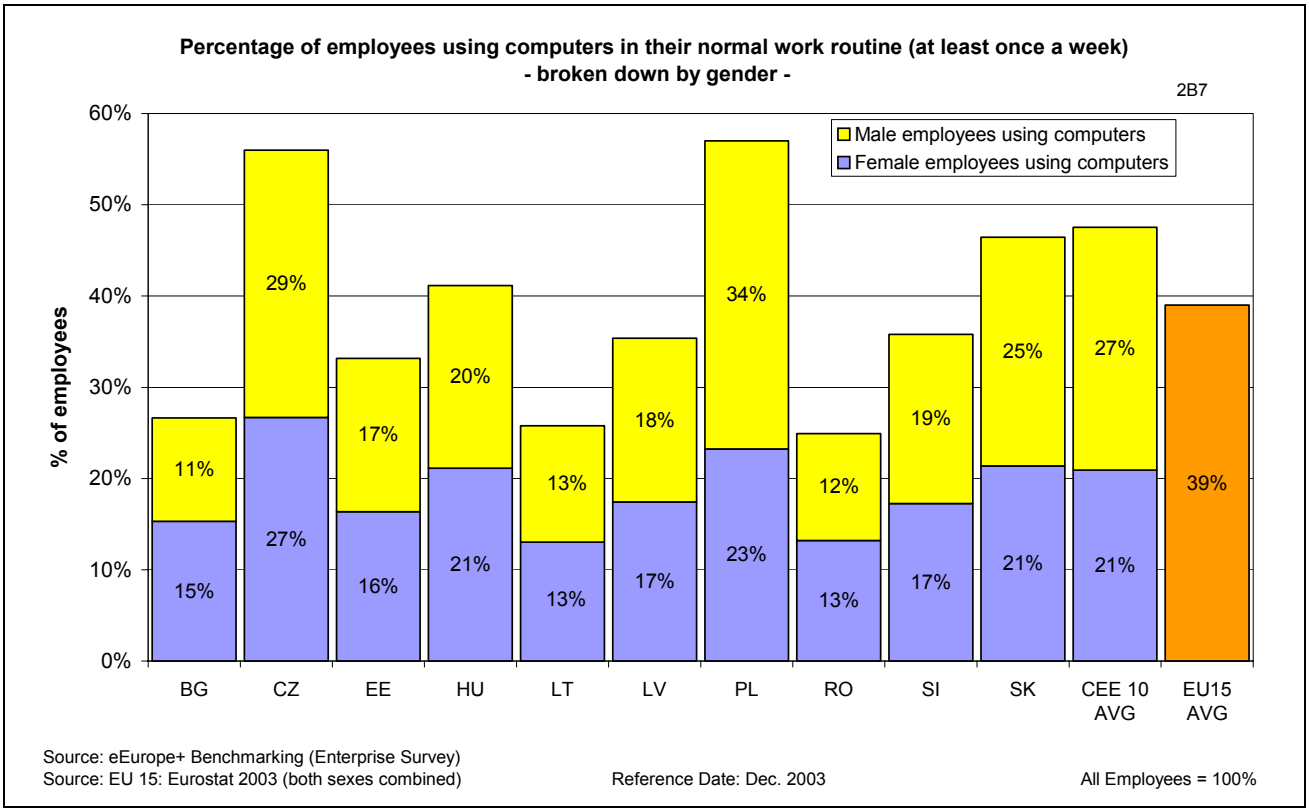
CEE 10 AVG
EU15 AVG
June 2003
Dec 2003
Source: eEurope+ Benchmarking (Household Survey)
Employees = 100%

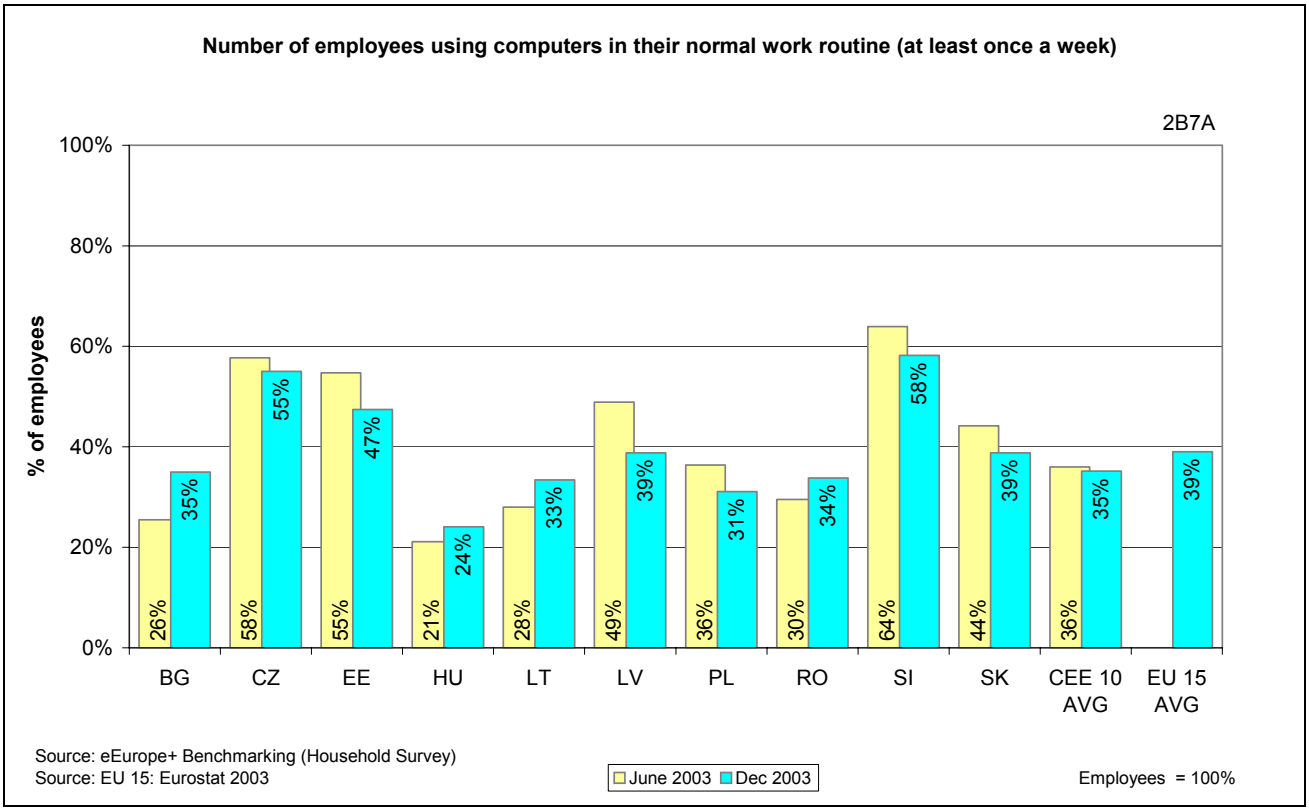
2.B.7 Percentage of total number of persons employed using computers in their normal work routine (at least once a week)

More then 50% of employees are using computers in their normal work routine in the Czech Republic and Poland.



Poland (57%) and the Czech Republic (56%) lead for having the most employees using a computer during their normal work routine, followed by the Slovak Republic (46%). Four other countries, Hungary, Slovenia, Estonia and Latvia form a cluster between (41%) and (33%) with Bulgaria (26%) and Romania (25%) trailing. It is interesting to note the relatively low position of Estonia (see 2B6a and c). This indicator has the same trends as for 2.B.6.

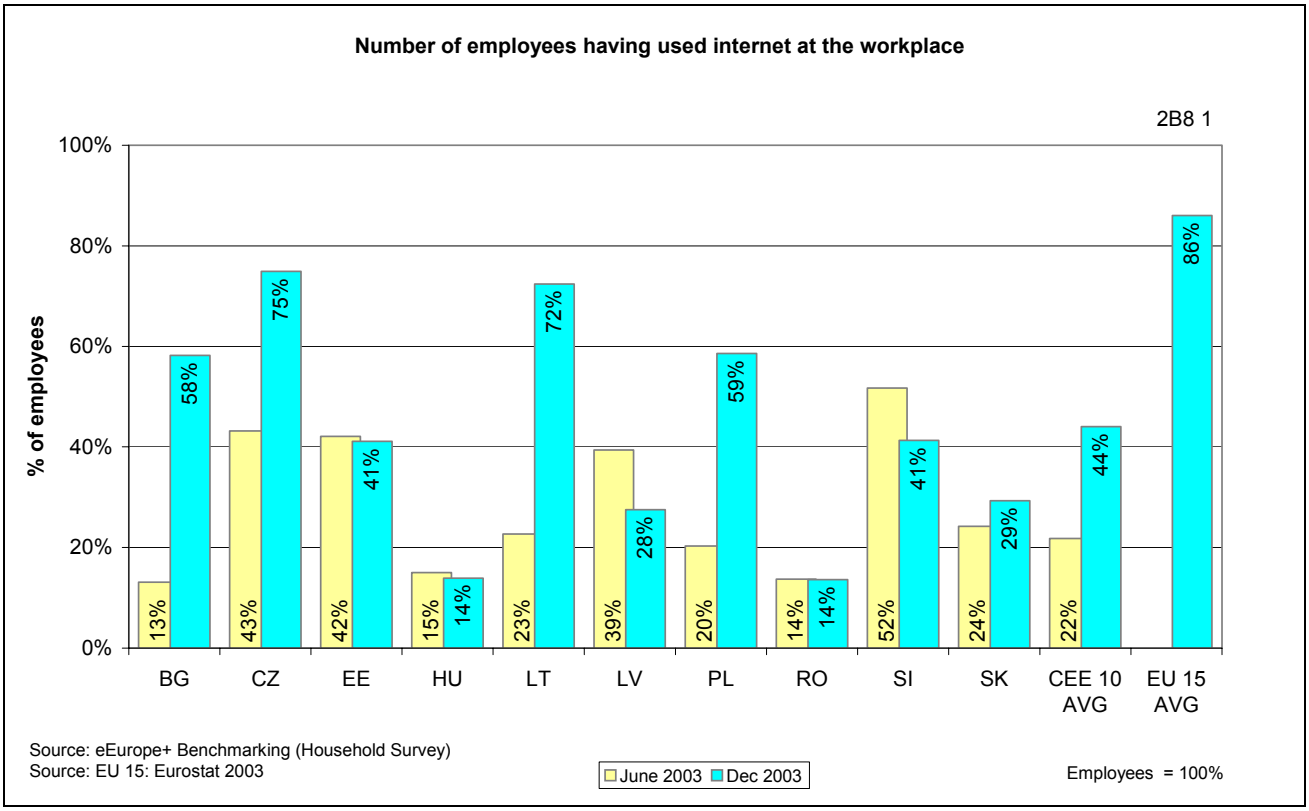
Disaggregation by gender shows that males out number females by (+11%) Poland (+2%) Slovenia and (+4%) the Slovak Republic. Females outnumber males by Bulgaria (+4%), Hungary and Romania (+1%).



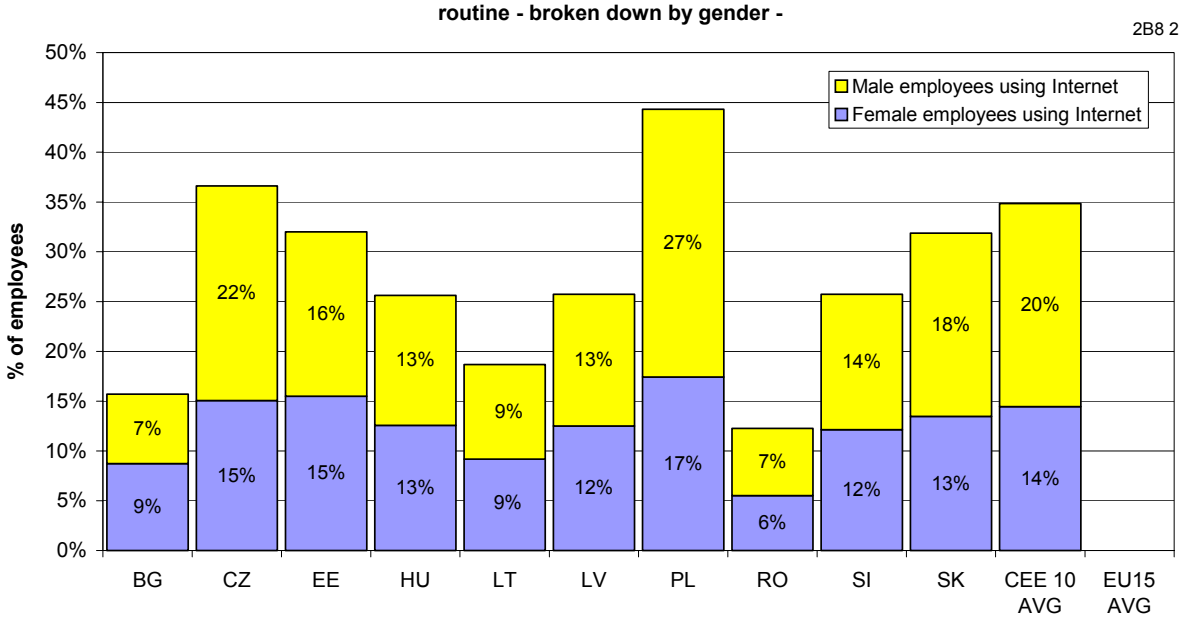
2.B.8 Percentage of persons employed using computers connected to the Internet, in their normal work routine

The Household Survey shows that people in three countries in particular access the Internet at work; the Czech Republic, Estonia, and Slovenia.

The Enterprise Survey shows that all CEE 10 countries have more than 25% or more of their employees accessing the Internet as part of their normal work routine.



The Czech Republic (75%) leads, followed by Lithuania (72%), Poland (59%), and Bulgaria (58%). All other countries lie at 41% or lower with Hungary and Romania trailing at 14%. The frequency of use is unqualified which explains the high values (higher than for use of computers at work), and the nature of use is also unqualified. It is not known whether the user is accessing for work purposes or for personal purposes. It would be pertinent to know the extent to which enterprises allow use of the Internet for personal reasons, particularly as the workplace is frequently the first or second most used place of access in Lithuania, Latvia and the Slovak Republic (See 1.A.3). This could be allowed for in a future refinement of the indicator.



Source: eEurope+ Benchmarking (Enterprise Survey) Reference Date: Dec. 2003 All Employees = 100%

Use of the Internet at work by employees for those enterprises connected to the Internet shows a different pattern than 2.B.8.1. Here, employees in Poland are using the Internet at work to a greater extent than in other countries. It could be that those enterprises that are connected are using the Internet to a greater extent. Use of the Internet at work would reflect the size and NACE sector of the enterprises, as enterprises in the services sectors could be expected to be more intensive Internet users. This would merit further analysis.

Gender disaggregation shows that there are gender gaps in the Czech Republic (+7% males), Poland (+10% males), the Slovak Republic (+5% males) and Bulgaria (+2% females). The gender gap between males and females is greater for Internet use in Poland than for use of computers but similar for other countries.

Comparison of the CEE 10 average (34%) with the EU 15 average (Eurostat 2003) of 29% is encouraging.

2.B.9 Percentage of enterprises using e-learning applications for training and education of employees

The Czech Republic (6%) is the leader, followed by Hungary (5%), Estonia (4%) and all other countries at or below 3% with a CEE 10 average of 1%. Increases are shown for Estonia and Hungary between June and December 2003 but decreases for Romania and Slovenia; these are low, volatile activity levels for early stage users. This is an area that requires monitoring as e-Learning applications for work are showing to be an effective means of training for individuals and not just for ICT.

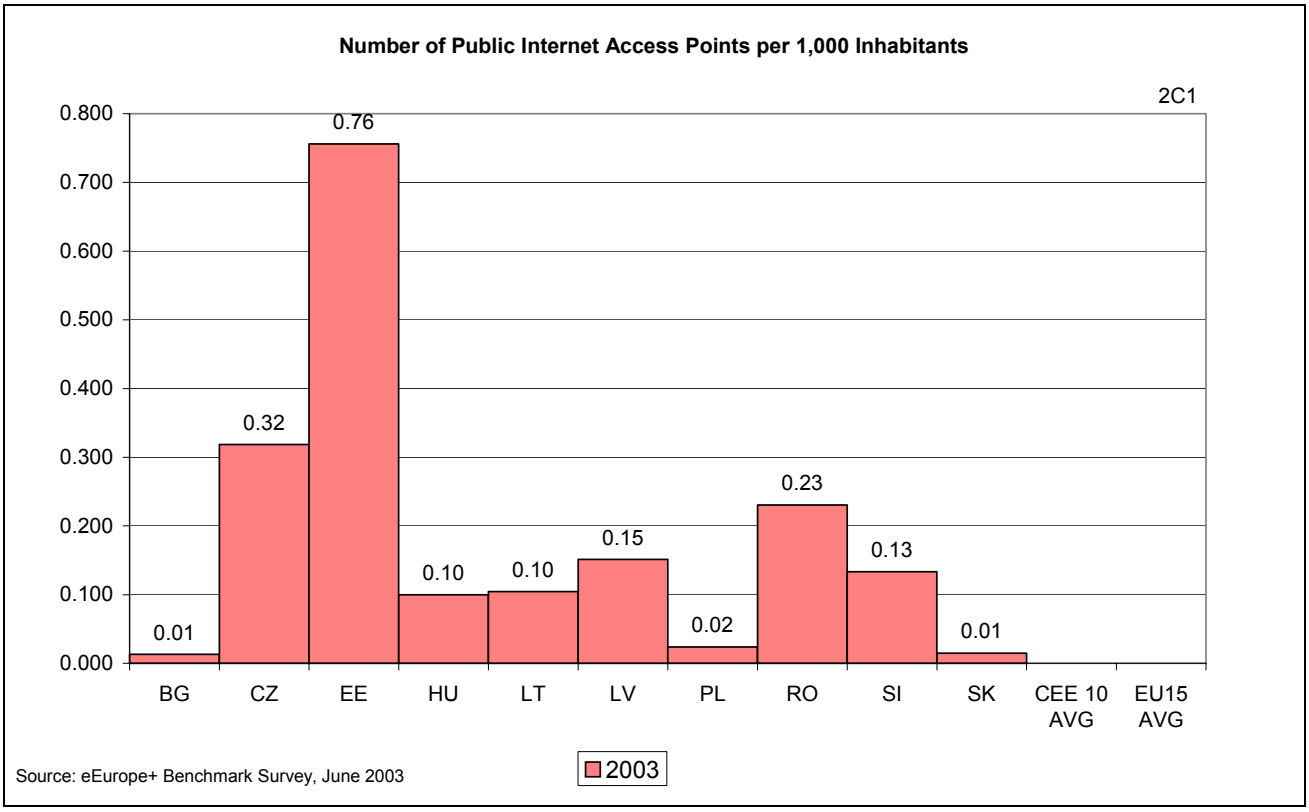
Comparison with EU 15: using SIBIS data (2003) (SIBIS GPS NAS 2003), the EU 15 average is 9% for online learning with Finland (16%), Sweden (14%), Germany and UK (13%) and the less well performing at Portugal (5%), France (3%) and Greece (2%). It is not surprising that e-learning is at a low level in CEE 10, as it requires sufficient Internet penetration levels within the enterprise along with availability of appropriate software. Eurostat (2003) gives and EU 15 average of 14% employees using the Internet (as customers), for training and education at work.

2.C PARTICIPATION FOR ALL IN THE KNOWLEDGE BASED ECONOMY

2.C.1 Number of Public Internet Access Points (PIAP) per 1000 inhabitants.

Definition: PIAP are publicly provided centres providing access to the Internet regardless of their public and/or private provider and whether access is free or not, though excluding fully private Internet cafés PIAP does not have to provide hardware (i.e. computers) needed to connect to the Internet and include WLAN access points. A PIAP is counted as one PIAP irrespective of the number of computers available.

Estonia is clearly the leader for the number of PIAPs with 0.76 per 1,000 inhabitants.



Bulgaria and Hungary record new data for Dec 2003 at 0.013 and 0.100 respectively and Estonia remains the leader at 0.756.

The provision of PIAPs is a means of providing Internet access where household Internet penetration levels are low. No data has been collected regarding numbers of access points per PIAP.

Estonia (Warsaw 2004)[1] adds that their first PIAP was established in February 1997 in the Estonian National Library, the OEF Internet Program 1995-2000 established 70 PIAPs, an additional 266 PIAPs were added as part of the Look@World initiative from 2001 and when all public libraries were connected an additional 278 PIAPs were added, but this does not account for the number submitted by the Ministry.

Bulgaria (Warsaw 2004) notes that the main place of access to Internet was in public places, both private and non-private, but predominantly in private ownership and eEurope+ records 46% Bulgaria Internet users accessing the Internet at Internet cafés, a very important feature of Internet

[1] eEurope+ Experts Workshop Warsaw April 2004

access in Bulgaria.

Hungary (Warsaw 2004) notes that the establishment of 'eHungary Points' is part of their recent policy to stimulate Internet access (recorded by eEurope+ at 8% households with Internet access). These enable citizens to use the Internet via modern computers in fixed opening hours at an affordable charge, providing a broadband network connection, operating in a network service system, use guaranteed by local community and state control, provision of integrated 'standardised' services with professional assistance for citizens to use the services.

It is debatable whether PIAPs or workplaces are appropriate environments for truly personal use of the Internet by more advanced users i.e. banking, submission of online forms or completion of transactions and e-mailing, when a user might prefer the privacy of their own home. As such, their existence may represent a transitory stage in the drive towards an initial increase in universal access to the Internet for early adopters, before household penetration rates are sufficiently high to allow advanced users to carry out these functions in their own homes. However, for e-learning, a more structured environment is probably required with efficient computers and high-speed connections, where users can spend as much time as they need and have expert assistance to hand. This means that trainers need to be provided, an additional expense. Additionally, particular socio-economic population sectors need to be targeted as users, in attempts to close digital divides.

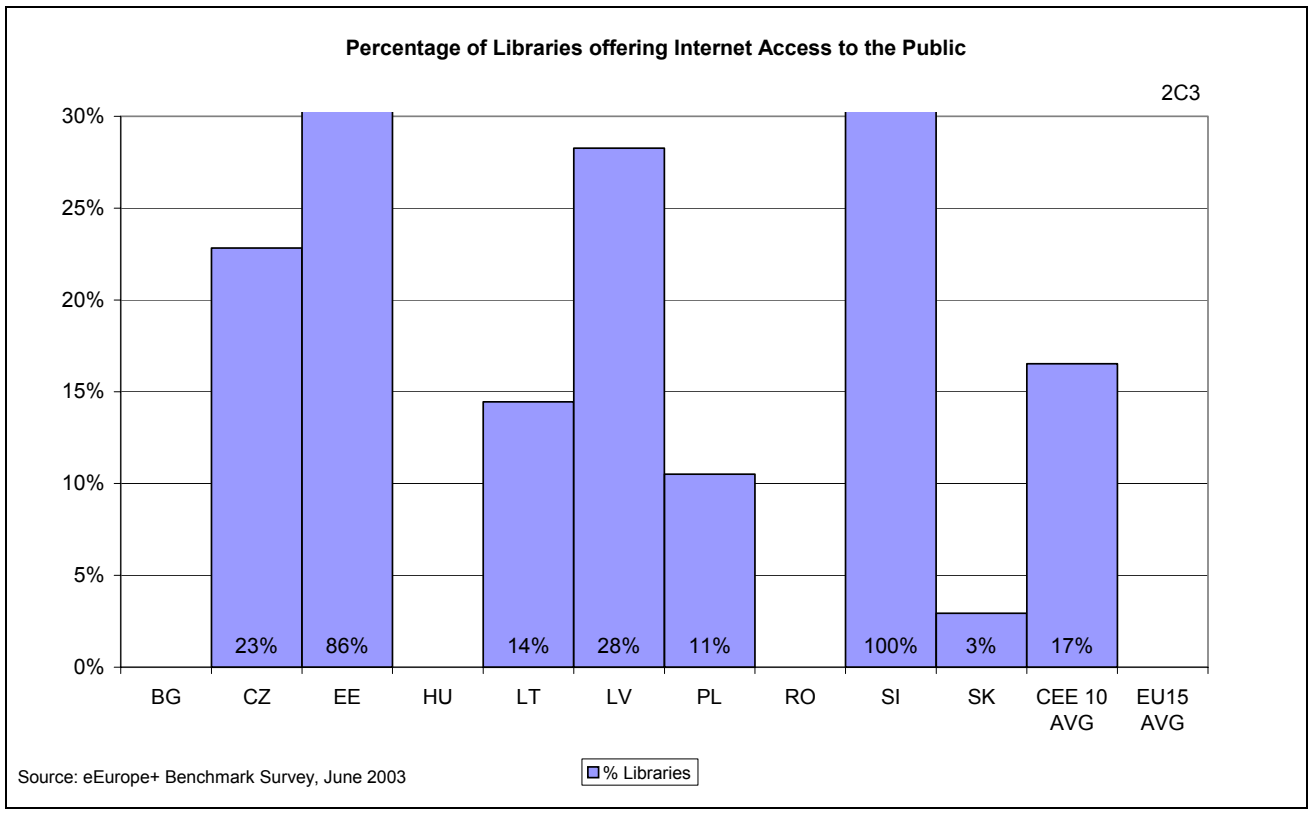
More refined data needs to be collected as to the size, usage, and purposes of PIAPs.

2.C.2 The average number of computers per PIAP.

There is insufficient information concerning the number of computers per PIAP to enable the average figures to be calculated.

2.C.3 Percentage of libraries offering Internet access to the public.

Slovenia has all its libraries with Internet connections, followed by Estonia with 86% of its libraries connected.



Slovenia is the leader with all its libraries offering Internet access, followed by Estonia at 86% All other CEE 10 lie at levels below 28% (Latvia). Public libraries offer an obvious location for Internet access as they are part of a familiar, community-centred network where an extension of their use in this way would seem to be logical and 'joined up' with other functions of libraries as sources of information and learning. Again, there is no information about numbers of access points in each library but the data does suggest that libraries in some countries are being underused as means of providing additional Internet access, providing that there is sufficient space.

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