



**Central and Eastern Europe  
Information Society Benchmarks**

**Country Analysis**

September 2004

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This report was prepared by a consortium led by Danish Management A/S (DK) that included the University of Sunderland (UK) and Fraunhofer Institute for Systems and Innovation Research ISI (D) with financial assistance from the Commission of the European Communities. The views expressed herein are those of the consortium and do not represent any official view of the European Commission.

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## Bulgaria

BULGARIA	Some basic indicators about Internet usage in a comparative perspective			
		CEE 10 lowest	CEE 10 average <sup>1</sup>	CEE 10 highest
1. Population (millions, 2004)	8.2	1.4 (EE)		38.2 (PL)
2. GDP Purchasing Power Parity per capita (as % of EU 15, 2003)	26	26 (RO, BG)		76 (SI)
3. Fixed telephony household penetration, December 2001 (IBM, 2003A)	83.0	49.9 (RO)		85.3 (SI)
4. Fixed telephony household penetration, June 2003 (IBM 2003B)	82.7	50.2(LT)		96.2(SI)
5. Percentage of households with a PC (December 2003, eEurope+)	16.7	16.7 (BG)	32.6	64.3 (SI)
6. Internet usage 2001, ITU	7.46	4.5 (RO)	10.1	30 (EE, SI)
7. Internet usage, December 2003, at least once a week (eEurope+)	16.9	12.7 (RO)	20.5	42 (EE)
8. Percentage of computers in secondary education connected to Internet (December 2003, eEurope+)	n.a.	2.1 (LT)		10.7 HU)
9. Percentage of GPs with Internet access in the consulting room (Dec. 2003, eEurope+)	13.6	12.3 (LV)	23	92 (EE)
10. Percentage of population using the Internet for interacting with public authorities (December 2003, eEurope+)(sent filled in forms)	1.9	0.5 (LT)	2.3	14.4(EE)
11. Percentage of population that has bought online (December 2003, eEurope+)	1.4	0.8 (LT)	3.4	12.3 (CZ)
12. Percentage of population that used e-banking (December 2003, eEurope+)	0.2	0.2 (BG)	4.0	40.1 (EE)
13. Percentage of enterprises that purchased online (Dec. 2003, eEurope+)	4.4	4.4 (BG)	14.9	29.8(CZ)

1 Averages are weighted averages, meaning that the population size of the country influences the weighting. For example, in the June 2003 survey, the non-weighted average for Internet usage for the CEE 10 countries is 27%, while the weighted average is 20. For 'households with a PC', the non-weighted average is 33.2 while the weighted average is 30.0, for 'GPs with internet access' the non-weighted average is 30.8 while the weighted average is 23.0; for '% of population that has sent in filled-in forms (e-government)', the non-weighted average is 3.2 while the weighted average is 2.3; for 'percentage of population that has bought online' the weighted average is 3.5, while the non-weighted average is 4.2; for 'percentage of population that had e-banking', the non-weighted average is 9.4 while the weighted average is 4.3. It shows that the smaller CEE 10 countries score, on average, higher on IS indicators than the larger ones.

## **Background**

Bulgaria and Romania are the economically least developed Central and Eastern European (CEE 10) countries with a GDP per capita of 26% of that of the average EU 15 GDP per capita (2003). Bulgaria aims to accede to the EU in 2007. More than most other accession countries, Bulgaria has been faced with a major depression during the 1990s. De-industrialisation was more pronounced here than in the northern CEE 10 countries. The 1990s meant a downturn especially for the high value added industries.

In the CMEA (the Soviet dominated economic bloc), Bulgaria specialised in computer hardware and software. This is still reflected in the high number of computer students and computer specialists. Bulgaria counts around 1,000 small and medium sized enterprises that are specialised in information technology.

## **ICT infrastructure**

The ICT infrastructure is weakly developed despite the fact that Bulgaria has one of the highest fixed line household penetration ratios in the CEE 10. The problem lies in the quality of service levels with 47% of all lines that are party lines (December 2002, IBM) and the fault rate per line is higher than for any other CEE 10 country. In June 2003 only 22% of telephone lines were digitalised (IBM 2003B).

Data on fixed lines per 100 inhabitants show a slight increase in penetration rate (from 36.0 in 2002 to 36.5 in June 2003).

However, 48% of households have cable TV. The mobile penetration ratio, at 34% (December 2003), is very low by CEE 10 standards<sup>2</sup>.

On 1 January 2003, the fixed line market was liberalised, ending the monopoly of the incumbent, and several alternative operators appeared. In mid-2003, the national telecommunications company BTC was still fully owned by the state. On January 1st 2004, cost oriented prices were introduced for telecommunication services. Fixed-to-fixed connection charges are above the EU 15 and CEE 10 average. Fixed to mobile charges are above the CEE 10 average but similar to the EU 15 average (IBM 2003B, p. 77)

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<sup>2</sup> According to the household survey of the Bulgarian statistical office (1 July 2003), 75.9% of respondents had a conventional phone, 31.1% a mobile phone and 43.5% cable TV.

## **Computer usage**

There are 17 computers per 100 households (December 2003) (ITU gives a figure of 3.5 computers per 100 inhabitants in 2002 while the Bulgarian household survey of 1 July 2003 gives a figure of 7% computer penetration rate in households). According to Vitosha Research surveys, 11% of the population had access to computers in May 2000, 16.3% in November 2002, 17.3% in June 2003, and 16% in October 2003 (Dinkova, 2003). This points at stagnation in levels of computer access.

Twenty seven percent of the workforce makes use of a computer (eEurope+, December 2003).

Dinkova (2003) also noticed a fall of computer usage in business in 2003. She relates this slowdown in buying new computers to increased costs related to complying with property rights for used software.

## **Internet usage**

Internet usage has doubled since 2001 to 17% in December 2003 (at least once a week, IBM-2003A gave an estimated Internet usage in January 2003 of 8% of the population). However, the Vitosha Research survey for October 2003 gave an Internet penetration rate of 12% (Dinkova, 2003).

Twenty% of computer owners access the Internet through cable modem (eEurope+, December 2003; CEE 10 average: 9). Thirty% of all individuals accessing the Internet from home do this using a cable modem (CEE 10 average: 14%, December 2003).

Forty% of Internet users access the Internet at PIAPs (SIBIS survey, January 2003, Internet cafés also counted as PIAPs). The Internet clubs, often unregistered and operating in garages and barns, constitute an important access channel. According to the eEurope+ survey (December 2003), 46% of those using the Internet access it at Internet cafés, an increase from 42% in the June 2003 survey (CEE 10 average: 19%). Vitosha Research showed that 4.9% of Bulgarians accessed Internet from home, 4.6% from work, 2.4% from school and university but 7.0% from public places (including Internet clubs) (Dimov, April 2004).

According to the household survey undertaken by the Bulgarian statistical office (1 July 2003), 7.2% of urban households had access to the Internet at home against 0.8% of rural residents.

## **e-Education**

In 2003, 39.5% of schools were not connected to the Internet. Thirteen percent of schools had 1 to 5 computers connected to the Internet, 21.8% had 6 to 10 computers connected to the Internet and 23.8% had 11 and more computers connected to internet (Dinkova, 2003). However, most computers are old. Most computers in education are donations from non-public institutions (Dimov, 2004). 63% of schools do not have teachers that are using the Internet in teaching non-mathematical courses, but 24% of schools have up to 5 teachers doing so, and 11 per of schools have 6 or more teachers doing so (MTC survey, sample of 261 schools, see Dinkova, 2003).

The percentage of the population with tertiary education is exactly on the EU 15 level (21% in 2002, 19% according to the eEurope+ survey, June 2003). This can be seen as an asset in Information Society development. However, digital literacy is extremely low (see section 6 about digital divides).

## **e-Health**

14% of GPs had Internet access in their consulting room in December 2003. These are high percentages given the low general Internet penetration rate. Nevertheless, 75% of GPs have computers in their consulting room. Sixty six percent of Bulgarian GPs use electronic patient records (eEurope+, December 2003). Sixteen percent of GPs use the Internet to exchange patient records (December 2003).

## **E-government**

E-government is hardly developed. An exception is the usage of the Internet by enterprises for interacting with public authorities for social contributions for employees. The percentage of enterprises having access to Internet that uses the Internet for this purpose increased from 49% in June 2003 to 90% in December 2003 (eEurope+).

## **E-commerce**

E-commerce and e-banking are hardly developed. Only 1.4% of the Bulgarian population has bought online (eEurope+, December 2003). Only 1.4% of the population has debit cards (SIBIS 2003D). In July 2003 only 24,735 Internet payments took place. Half of the goods bought through the Internet consisted of books and other printed materials (Dinkova, 2003).

1.3% of Bulgarian enterprises have received online payments for Internet sales in 2003 (December 2003, eEurope+, CEE 10 average: 3.0%). Only 3.4% of Bulgarian enterprises had received orders online (CEE 10 average:



9.1%). Nevertheless, only 29% of Bulgarian employees have received basic IT training (CEE 10 average: 44%) (eEurope+, December 2003)<sup>3</sup>.

### **Inhibitors**

Among the reasons cited by Bulgarians for not using the Internet the following stood out: '*I don't know how to use a computer*' (60.5% against a CEE 10 average of 33%), '*I don't know exactly what it is*' (27% against a CEE 10 average of 17%), '*Computer are too expensive*' (18% against a CEE 10 average of 18%), '*Internet is too complicated*' (11% against a CEE 10 average of 9%) and '*there are language barriers*' (7% against a CEE 10 average of 3%) (eEurope+, HS, December 2003).

### **IS Policy**

Although Bulgaria has many ICT specialists, there is the acute problem of brain drain. Because ICT specialists seldom receive large salaries in Bulgaria, the ICT specialists either choose non-ICT jobs or go abroad.

Bulgaria has the highest software piracy rate in The CEE 10 (78%; Global IT report 2001-2002).<sup>4</sup> The World-Wide E-Commerce Fraud Prevention Network estimates that Bulgaria belongs to the high-risk countries with respect to e-fraud, together with Singapore, Indonesia, Malaysia, and China ([www.merchantfraudsquad.com](http://www.merchantfraudsquad.com)). The Bulgarian government has recently started to tackle the problem of software piracy (see section about computer usage above).

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<sup>3</sup> Here it should be noticed that 59% of enterprises in the sample were active in wholesale and retail trade, 10.2% in transport and communications, 9.6% in real estate/renting/business activities, and 8% in hotel/restaurants. It means 86.8% of the weighted sample is in the service sector (in 2002 56.6% of Bulgarians worked in the service sector and 59.7% of GDP originated in the service sector, Eurostat).

<sup>4</sup> In 2003, the International AntiCounterfeiting Coalition recommended to the US government that Bulgaria, and also, among others, Turkey and Romania, be placed on the Watch List, identifying specific problems and deficiencies in obtaining adequate intellectual property protection.

<b>The SWOT of Information Society Performance in Bulgaria</b>	
<p><i>Strengths</i></p> <ul style="list-style-type: none"> <li>-traditionally high interest in ICT services</li> <li>-many ICT specialists</li> <li>-high general level of educational attainment of population</li> <li>-well developed competencies of small and medium sized ICT companies</li> </ul>	<p><i>Weaknesses</i></p> <ul style="list-style-type: none"> <li>-low per capita GDP</li> <li>-low level of PC penetration</li> <li>-low level of e-government</li> <li>-low level of mobile penetration</li> <li>-low quality of service of fixed lines</li> <li>-frequent and unpredictable changes in regulations</li> <li>-deep rural-urban divide</li> <li>-low digital literacy</li> </ul>
<p><i>Opportunities</i></p> <ul style="list-style-type: none"> <li>-integration into EU structures</li> <li>-national strategy of IS development</li> <li>-human potential</li> <li>-growth of IT sector in country</li> <li>-pace of Internet spread among young people</li> <li>-use of cable TV network for Internet access</li> </ul>	<p><i>Threats</i></p> <ul style="list-style-type: none"> <li>-insufficient demand for ICT sector products and services (compared with their supply)</li> <li>-brain drain</li> <li>-software piracy</li> </ul>



## Czech Republic

<b>CZECH REPUBLIC</b>	<b>Some basic indicators about Internet usage in a comparative perspective</b>			
		CEE 10 lowest	CEE 10 average	CEE 10 highest
1. Population (millions, 2004)	10.2	1.4 (EE)		38.2(PL)
2. GDP Purchasing Power Parity per capita (as % of EU 15, 2003)	61	26 (BG, RO)		76 (SI)
3. Fixed telephony household penetration, December 2001 (IBMA)	71.0	49.9 (RO)		85.3 (SI)
4. Fixed telephony household penetration, June 2003 (IBM 2003B)	66.5	50.2(LT)		96.2 (SI)
5. Percentage of households with a PC (December 2003, eEurope+)	55.2	16.7 (BG)	32.6	64.3(SI)
6. Internet usage 2001, ITU	14.7	4.5(RO)	10.1	30 (EE, SI)
7. Internet usage, at least once a week (December 2003, eEurope+)	40.8	12.7(RO)	20.5	42 (EE)
8. Number of computers in secondary education per 100 students connected to Internet (2003, eEurope+)	7.6	2.1 (LT)		10.7 (HU)
9. Percentage of GPs with Internet access in the consulting room (December 2003, eEurope+)	57.0	12.3(LV)	23	92(EE)
10. Percentage of population using the Internet for interacting with public authorities (December 2003, eEurope+)(sent in filled forms)	5.6	0.5(LT)	2.3	14.4 (EE)
11. Percentage of population that has bought online (December 2003, eEurope+)	12.3	0.8(LT)	3.4	12.3(CZ)
12. Percentage of population that has bought online (TNS 2002)(BG, RO, LV not included)	2	1 (PL. LT)		3 (EE)
13. Percentage of population that used e-banking (December 2003, eEurope+)	9.9	0.2(BG)	4.0	40.1 (EE)
14. Percentage of enterprises that purchased online (December 2003, eEurope+)	29.8	4.4(BG)	14.9	29.8 (CZ)

## **Background**

The Czech Republic belongs to the group of early-industrialised countries in Europe and used to serve as the industrial base of the Austrian Empire. This legacy can be considered as an asset and despite orthodox communist rule until 1990, the Czech Republic managed to keep the transitional recession of the 1990s less deep than in many other accession countries. Nowadays, the Czech Republic is among the forerunners in transition and its economic development level is high by Central and Eastern European standards. The Czech Republic became a major destination, within Central and Eastern Europe, for foreign direct investment, with the stock of inward FDI as a percentage of GDP in 2001 of 64% (World Investment Report, 2003, p. 61)

January 2003 a separate Ministry of Information Technology was established.

## **ICT infrastructure**

The Czech Republic took the first steps to reform the telecommunication sector in 1995 when SPT (state owned) sold about one third of its shares to KPN Telecom (Dutch). SPT, now called Cesky Telecom, is still under governmental control with 51% of the shares belonging to the State. Cesky Telecom is to remain in public hands until 2005 (SIBIS 2003E, p. 17 and p. 30). Unbundling took place during the second half of 2003 (SIBIS 2003E, p. 17).

Over 30 operating licenses have been issued since liberalisation (started in 2001) at the start of 2003, but 99% of telephone lines still belong to the incumbent operator (SIBIS, 2003E, p. 17). Local access has not been liberalised yet (IBM, 2003A). Czech regulators worry that the dominant local telecommunications company is impeding liberalisation (SIBIS 2003E, p. 29).

Cesky Telecom subsidiary Eurotel also leads the fast growing mobile segment of the market. The Czech mobile telephone market is the fastest growing in Central and Eastern Europe. There are three operators active on this market. They all provide GPRS services. The Czech Republic has become a leader (together with Slovenia) in mobile telephony with a penetration rate of 75% in December 2003 (eEurope+; 76% in January 2003, SIBIS 2003E).

The Czech Republic spends more on ICT than the average EU 15 country (as a percentage of GDP). On the other hand there are still many barriers for the improvement of fixed telephony network and the Czech Republic has only 36 lines per 100 inhabitants (four other CEE 10 countries perform better in this respect) (2003, eEurope+). Residential fixed line penetration has stagnated.

The fixed incumbent started to provide xDSL services in March 2003 but tariffs are relatively high. Alternative fixed operators already provided sDSL lines in January 2003 on their own networks but the number of lines is not available.

The tariffs of the fixed incumbent are not reported as fully rebalanced yet (IBM 2003 B, p. 84).

The interconnection charges for termination in fixed networks were lowered by approximately one third and are now closer even though higher than the EU 15 average (mid 2003). The fixed to mobile charges are the lowest in CEE 10 and below the EU 15 average charge (IBM 2003B, p. 85).

Cable TV has 33% household penetration (IBM, 2003A, p. 78) and one of the largest cable TV providers is providing voice telephony services to end-users. Internet access through TV cable is possible (4.7% of Czechs with a computer at home use the cable TV network for Internet access, eEurope+, December 2003).

### **Computer usage**

Computer usage is very high by CEE 10 standards.

### **Internet usage**

There has been great progress in Internet penetration since 2002 (from 14 to 41%). The Czech Republic has also made great progress with the number of Public Internet Access Points. The number increased from 0.107 per 1,000 in 2001 to 0.319 per 1,000 in June 2003, the second highest, after Estonia, among the CEE 10 countries (eEurope+ surveys). In early 2004, there were free PIAPs in local authorities and public libraries.

Eleven percent of Czechs with Internet access at home do this through mobile phone (eEurope+, December 2003).

Only 35% of women are using the Internet regularly, against 43% of men (December 2003).

The Czech Republic leads in CEE 10 (with Poland) in the percentage of employees using the computer during their normal work routine (56% in December 2003; eEurope+).

### **e-education**

In The CEE 10, the Czech Republic has the highest number of computers with Internet access in secondary schools. Recently (June-December 2003, eEurope+) there has been a spectacular increase in computers in schools. However, only 23% of Internet users are in the age category 16-24 years (eEurope+, June 2003). According to Hulin (2004), there have not been significant increases in computer usage during the school year 2003-04.

The Czech Republic also has a very high percentage of students in tertiary education in ICT related studies (eEurope+, June 2003; 11%; most of them -

86% - are male)<sup>5</sup>.

All Czech universities have high-speed Internet connections.

### **e-government**

The Czech Republic has only recently begun implementing e-government and many e-government services are still in a preparatory phase. 5.6% of the population interacted with public authorities through the Internet (i.e. sent filled-in forms online; CEE 10 average: 2.3%; December 2003). However, in the February 2004 eEurope+ household survey it appears that 17.4% of respondents obtained information from public authorities and 8.3% downloaded official forms.

There are few online government services available (SIBIS 2003E, p.9). It is only road tax, download of tax declaration and request for unemployment benefits and customs declarations (SIBIS, 2003E, p. 8). Nevertheless, 80% of customs declarations are submitted electronically (Global IT report, 2002).

Nine percent of enterprises submit VAT returns electronically and 7% do so with corporate tax (eEurope+, December 2003).

Between June 2003 and December 2003, a significant increase in the use of e-government services by the general population could be observed.

### **e-health**

Czech GPs use the Internet far more than the CEE 10 average but only 16% of those GPs using the Internet in their consulting room use it for exchanging patient records (December 2003; 14% in June 2003). While 35% of Czech GPs used electronic patient records in June 2003, this increased to 59% in December 2003 (eEurope+). However, extremely high numbers of refusals in the CATI interviews (sample 186; refusals 263) makes the survey results here less reliable.

### **Enterprises, IT usage, and e-commerce**

The SIBIS country report for the Czech Republic (SIBIS 2003E, p. 33) noticed a slowdown of e-commerce development and TaylorNelsonSofres also noticed a large fall in online shopping behaviour in its 2002 report. The SIBIS country report (SIBIS 2003E) relates this above all to the small number of services available online and the level of security.

It seems that with respect to e-commerce, 2003 showed dynamism again. Whereas about 5% of the Czech population has bought goods or services online, or conducted e-banking according to the SIBIS survey (January 2003, slightly above the CEE 10 average), according to the eEurope+ survey, in

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<sup>5</sup> Forty one percent of Czech students have home Internet access (SIBIS 2003E, p. 18).

December 2003 12% of the population has bought online, therefore being a leader in Central and Eastern Europe (10).

Seventy five percent of Czech companies only use the Internet for web presentation and e-mail (SIBIS 2003E, p. 33). Fifty nine percent of Czech enterprises have websites (eEurope+, December 2003).

Seventy one percent of the workforce has basic IT training (eEurope+, December 2003, by far the highest in Central and Eastern Europe, the CEE 10 average being 44%). But only 22% of those in paid employment have access to the Internet (SIBIS 2003E, p. 19). The Czech Republic is in second place in the CEE 10, after Poland, in the percentage of enterprises that have more than 1% turnover from e-commerce (15.7% in December 2003, eEurope+). Only 5.4% of Czech enterprises have received online payments pointing to the underdevelopment of e-banking.

Especially Czech enterprises with Internet access encountered unauthorized access (4% of them). Only Polish enterprises scored as high. (eEurope+, December 2003).

### ***Inhibitors***

Average spending on Internet is 5.6% of monthly household income (December 2003) and is therewith below the CEE 10 average (5.4%) although the mean monthly spending on Internet access is € 19 against a CEE 10 average of € 17 (eEurope+, December 2003). Dial up Internet access costs are high in peak time but relatively low in off-peak time (IBM 2003, p.79).

### ***IS policy***

Czech government policymaking lagged behind actual developments in the sphere of Information Society and was re-active rather than pro-active. Also, the liberalisation of telecommunications services started late. Nevertheless, the Czech Republic is performing very well in a CEE 10 perspective and better than the fast reformers, Poland and Hungary.

The SWOT of Information Society Performance in the Czech Republic	
<p><i>Strengths</i></p> <p>Recent dynamism in e-commerce  High educational attainment of population  E-learning and ICT training of workforce  Many ICT specialists  Central authority for Information Society issues  High mobile penetration rate</p>	<p><i>Weaknesses</i></p> <p>Re-active government IS policies  Low Internet usage among youth  Low and stagnating level of fixed line penetration  Low broadband penetration  Relatively low level of e-banking  Low motivation to use ICT and insufficient awareness of the role of ICT in economic development</p>
<p><i>Opportunities</i></p> <p>High percentage of workforce with ICT skills  Location in the heart of Europe  EU integration</p>	<p><i>Threats</i></p> <p>Slow implementation of strategies and legislation</p>

## Estonia

ESTONIA	Some basic indicators about Internet usage in a comparative perspective			
		CEE 10 lowest	CEE 10 average	CEE 10 highest
1. Population (millions, 2004)	1.4	1.4 (EE)		38.2 (PL)
2. GDP Purchasing Power Parity per capita (per cent of EU 15, 2003)	44	26 (BG, RO)		76 (SI)
3. Fixed telephony household penetration, December 2001 (IBM 2003A)	68.2	49.9 (RO)		85.3 (SI)
4. Fixed telephony household penetration, June 2003 (IBM 2003B)	62.9	50.2 (LT)		96.2 (SI)
5. Percentage of households with a PC (December 2003, eEurope+)	41.0	16.7(BG)	32.6	64.3(SI)
6 .Internet usage 2001, ITU	30	4.5 (RO)	10.1	30 (EE, SI)
7. Internet usage, at least once a week (December 2003, eEurope+)	42.0	12.7(RO)	20.5	42(EE)
8. Number of computers in secondary education per 100 students connected to Internet (December 2003, eEurope+)	4.0	2.1 (LT)		10.7 (HU)
9. Percentage of GPs with Internet access in the consulting room (December 2003, eEurope+)	92.0	12.3 (LV)	23	92 (EE)
10. Percentage of population using the Internet for interacting with public authorities (December 2003, eEurope+) (sent filled in forms)	14.4	0.5 (LT)	2.3	14.4 (EE)
11. Percentage of population that has bought online (December 2003, eEurope+)	7.9	0.8 (LT)	3.4	12.3 (CZ)
12. Percentage of population that has bought online (TNS 2002)(BG, RO, LV not included)	3	1 (PL, LT)		3 (EE)
13. Percentage of population that used e-banking (December 2003, eEurope+)	40.1	0.2 (BG)	4.0	40.1 (EE)
14. Percentage of enterprises that purchased online (December 2003, eEurope+)	14.6	4.4 (BG)	14.9	29.8 (CZ)



## Background

Estonia, like Latvia and Lithuania, was under Soviet rule until 1991. Although small, Estonia (1.4 million inhabitants) belonged to one of the most economically developed Soviet republics, the fact that it has been in many ways cut off from main-stream Europe impeded economic development. The transitional recession has been deeper than in most other Central and Eastern European countries, partly because of the fact that most of its economic relations with the rest of the former Soviet Union have been severed. The special relationship with Finland (the Finnish language is very close to Estonian) furthered economic relations with the country that has one of the most developed IS societies in the world. The value of inward Foreign Direct Investment as a percentage of GDP was 66% in 2001, the highest in Central and Eastern Europe (World Investment Report 2003, p. 61). Above all, Finnish and Swedish companies (Swedish Telia and Finnish Sonera) invested in the telecommunication infrastructure (Kalvet, 2004).

## ICT infrastructure

Estonia has been a leader in Central and Eastern Europe in liberalising its fixed line telecommunications market from 1 January 2001 (Global IT report 2001-2002). Eesti Telefon, the fixed incumbent, lost some market share as there are 31 alternative operators providing public telephony services as of June 2003 (IBM 2003B, p. 87). The State does not have a majority share in any of the telephone operators. Since 2002, real competition on the telecommunications market has been introduced.

All of the fixed incumbent operator's tariffs (business and residential monthly rentals and national and international calls) are lower compared to other CEE 10 countries and prices in EU 15 member states. Prices of national and international calls for alternative operators are up to 6% to 12% lower than those of the fixed incumbent (IBM 2003B, p.88). Tariffs are already re-balanced.

According to IBM (2003A) 68.2% of Estonian households have a fixed telephone line as per December 2002. According to the eEurope+ survey (December 2003) it was 62%.

One hundred percent of households in metropolitan areas have fixed lines, while only 23% of households in rural areas (up to 2,000 inhabitants) and 53% of households in urban areas (2,000-100,000 inhabitants) (eEurope+, December 2003). 7.4% of the population has xDSL (February 2004, eEurope+). This is one of the highest percentages in Europe<sup>6</sup>. According to the eEurope+ household survey (December 2003), 62% of Estonians have a digital telephone line and 2% ISDN.

On 31 January 2003, local loops were fully unbundled. Interconnection charges are cost oriented and at a similar level as in the EU 15 (IBM 2003B,

<sup>6</sup> According to IBM (2003A) Estonia had per 31 Dec 2002 only 31 406 xDSL lines (IBM 2003A p. 80: nr of ISDN lines in Estonia highest in EU new member states (together with Malta). IBM 2003A, p. 80: 7% of all fixed lines are xDSL.

p. 89). Fixed to mobile interconnection charges are one of the lowest among CEE 10 countries.

Three mobile operators with GSM/DCS licenses are competing on the mobile market. Two mobile operators are providing GPRS service and the number of users (about 23,000) of these services is the second highest among CEE 10 countries (IBM 2003B, p. 88). The mobile penetration rate reached 68% in June 2003 (IBM 2003B, p. 88) and 67% in December 2003 (eEurope+)<sup>7</sup>.

If the number of international telephone calls is used as a yardstick for internationalisation, Estonia is very much internationalised. In the year 2000, Estonia had 149 minutes of international calls per telephone subscriber against Latvia 78 minutes and Lithuania 33 minutes (World Bank, 2003, p. 199).

According to the 2003 yearbook of EESTI Telekom, in 2003 there were 250 places for wireless Internet access (city squares, hotels, pubs, petrol stations etc.) half of which are free of charge.

### **Computer usage**

Estonia counts a relatively low number of computers at home (37% of households) but many of these are used for Internet connection.

59% of Internet users are accessing from home, against 50% for the CEE 10 average (eEurope+, December 2003)<sup>8</sup>.

### **Internet usage**

By intensity of online usage, Estonia occupies the seventh place among all EU 15 and CEE 10 countries, after Denmark, Sweden, Finland, Germany, the Netherlands, and the UK (2003). However, according to the SIBIS and eEurope+ surveys Internet usage stagnated during 2003<sup>9</sup>.

Sixty seven percent of age group 6-14 are regular Internet users and 88% of them have used the Internet at least once (SIBIS 2003F, p. 22). 88% of 16-20 year olds are using Internet at least once a week during the last three months (eEurope+, June 2003; 78.9% in December 2003).

To what extent Public Internet Access Points (PIAPs) may have contributed to Estonia's outstanding performance in the Information Society? PIAPs were first established in 1997 with the help of Western donors (Kalvet, 2004). Estonia has by far the highest number of PIAPs in the CEE 10 with 0.756 per 1,000 against 0.319 for the Czech Republic that is the second best performing CEE 10 country (eEurope+, June 2003). Estonia has now approximately 500 public Internet access points (SIBIS, 2003F). Since

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<sup>7</sup> According to the mobile telecommunications operators mobile penetration in Estonia increased further to attain 77% by the end of 2003.

<sup>8</sup> Ninety four% of Estonian households have a computer according to SIBIS (2003 F), 68% according to IBM (2003A). These are very high percentages given the low per capita GDP of Estonia.

<sup>9</sup> TNS Emor surveys do not confirm such a trend.

2002/03 all Estonian libraries offer free Internet access. However, Estonian Internet users are not making more use of PIAPs than the CEE 10 average and relatively few are using Internet cafés (8.5% against 19% for the CEE 10 average- eEurope+, December 2003, HS).

Mobile operators offer a broad range of services. Mobile parking services are widely used (SIBIS 2003 F, p. 19). 50% of parking tickets are paid in this way. There is also mobile purchasing of public transport tickets, and mobile verification of bank accounts.

What opportunities does the cable TV network offer for expanding Internet access? According to SIBIS (2003F, p. 12) some major and some smaller TV networks have started to offer Internet access. Eleven percent of all those having a computer at home use the cable TV network in order to access the Internet (eEurope+, December 2003). Thirty one percent of Estonians with Internet access at home use the cable modem (eEurope+, December 2003).

In Estonia, Estonians are much more connected than Russians are: 42% of Russians (29.5% of the sample) had never used the Internet while 32% of Estonians (65.8 percent of the sample) (eEurope+, June 2003). In Latvia, with a large Russian minority, there is no difference in Internet usage between these two ethnic groups.

### **e-education**

In 1997-1999, the Tiger Leap programme was implemented in order to connect every school to the Internet. The Tiger Leap plus programme (2001-2005) furthers ICT education in Estonian schools. However, the eEurope+ survey showed that there are only 4 computers per 100 students in secondary education connected to the Internet.

### **e-government**

Estonia stands out with respect to e-government with 14.4% of the population interacting with the government online (eEurope+, December 2003)<sup>10</sup>. Fifty nine percent of enterprises use Internet for interacting with public authorities, mainly for tax purposes (eEurope+ 2003, Enterprise Survey).

One third of tax declarations are through the Internet (SIBIS 2003F, p. 38). Even the minutes of government meetings are online (Ibidem, p. 38). Twenty six percent of Estonians had paid taxes and fees via the Internet, a TNS survey found (8 January 2004, Radio Free Europe). Thirty percent of respondents obtained information from public authorities websites (December 2003, eEurope+).

Out of 112 respondents that used the Internet for services offered by local or state organisations the services most frequently mentioned were: 'used search tools in public libraries' (46), 'used catalogue in public libraries' (38),

<sup>10</sup> According to a survey of TNS Emor (August-September 2004) during August 2003-August 2004 53% of Estonians (15-74 years old) have used the Internet and 67% of these Internet users have communicated with government agencies via the Internet.

'notified income tax' (20), 'used job search services offered by labour offices' (20), 'applied for passport' (15), and 'applied for higher education' (9) (eEurope+, June 2003).

According to the e-government readiness index of the UN, Estonia is occupying 10<sup>th</sup> place in the European ranking while the second best performer, Slovenia, occupies 19<sup>th</sup> place (2003). Estonia ranks even before Ireland and France. In the e-participation index, Estonia occupies 5<sup>th</sup> place in the European ranking (UN, 2003).

### **e-health**

Ninety three percent of all GPs have a computer in their consulting room (December 2003; 97% in June 2003) and 92% can access Internet (December 2003; 92% in June 2003- eEurope+). One of the explanations for these high figures is the fact that all GPs have to check insurance cards electronically. Forty three percent of GPs used the Internet to exchange patient records in June 2003 but the percentage declined to 13% in December 2003 (eEurope+). This is related to the adoption of a Personal Data Protection Act according to which there are strict limitations on the exchange of personal data.

### **Enterprises, IT usage, and e-commerce**

Forty percent of the population is using e-banking (eEurope+, December 2003) and 7.9% of Estonians have bought online (December 2003). Currently, a large part of e-commerce is connected with financial services.

Only 35% of Estonian enterprises have their own website (5<sup>th</sup> place among CEE 10 countries) while 69% of Estonian enterprises have broadband which is very high for CEE 10 standards (eEurope+, December 2003). Seventy two percent of Estonian enterprises with Internet access use the Internet for banking or financial services (eEurope+, December 2003).

Is the high level of e-banking in Estonian enterprises related to the presence of Scandinavian, especially Finnish banks? It also points to a high level of trust in banking services. This is remarkable given the fact that the societies emerging from the Soviet Union were facing the challenge of transition from a low trust into a high trust society. By the end of 2002, there were around 650,000 Internet bank users in Estonia, with a population of 1.4 million. It is also remarkable given the economic development level of Estonia with 44% of average EU 15 GDP per capita (in PPP terms, 2003).

With such a high level of e-banking, would one expect more e-commerce (7.9% of the population that has bought online which is anyhow high for EU and CEE 10 standards)? In Estonia, 72% of all Internet users are searching but only 16% are buying (December 2003, eEurope+). Low e-commerce levels could be related to the lack of supply of online offers. An alternative explanation could be that economic activity and Internet usage is concentrated in the capital. Why e-commerce if everything is nearby?

In Estonia only 14.6% of enterprises have purchased online (6<sup>th</sup> place in the CEE 10), but 7.2% of enterprises have received online payments (1<sup>st</sup> place in the CEE 10; December 2003). Comparatively, B2B e-commerce is less developed than B2C e-commerce.

In the Estonian weighted sample, 78% were micro enterprises (1-9 employees), 37% were in wholesale/retail trade and 25% in real estate/business services.

### ***Inhibitors***

Average spending on Internet access is € 16 a month per household in Estonia (CEE 10 average: € 17, eEurope+, December 2003). This helps to explain the high Internet penetration levels in Estonia. However, the number of respondents that do not use the Internet say that 'Internet is too expensive'. An increase from 9% in June 2003 to 14% in December 2003 (eEurope+).

There are two major groups of non-users: 60% of non-users are above 50 years old and are interested, above all, in health-related information. 27% of non-users are blue-collar workers (Kalvet, 2004).

### ***IS policy***

Estonia takes the Universal Service Obligation seriously. The World Bank (2003B, p. 19) refers to a concession agreement with the Estonian telephone company. The company helped to ensure connectivity in rural and scarcely populated areas in return for lucrative urban contracts (25.6% of the population is in rural areas, 2000). Estonian government now ponders to include broadband provision in USO requirement.

The Estonian government has also been very active in the spread of Public Internet Access Points. Now, all public libraries give access to Internet (eEurope+).

There is state financed Internet access for government, education, and medical sectors and affordable dial-up Internet access costs for the public.

IT Brain drain is increasingly seen as a problem (ranking in IT brain drain: 29; Global IT Outlook).

The SWOT of Information Society Performance in Estonia	
<p><i>Strengths</i>  High levels of Internet usage  Broadband relatively well developed  Strong in e-banking  Pro-active government IS policy  Strong in e-government  Large number of PIAPs</p>	<p><i>Weaknesses</i>  Low fixed line penetration  Low purchasing power of population  Rural/urban divide</p>
<p><i>Opportunities</i>  Huge potential of e-commerce given high usage of e-banking among population  EU integration</p>	<p><i>Threats</i>  Saturation levels could be soon reached with respect to Internet penetration</p>

## Hungary

HUNGARY	Some basic indicators about Internet usage in a comparative perspective			
		CEE 10 lowest	CEE 10 average	CEE 10 highest
1. Population (millions, 2004)	10.2	1.4 (EE)		38.2 (PL)
2. GDP in Purchasing Power Parity per capita (as percentage of EU 15, 2003)	59	26 (BG, RO)		76 (SI)
3. Fixed telephony household penetration, December 2001 (IBM 2003A)	80.4	49.9 (RO)		85.3 (SI)
4. Fixed telephony household penetration, June 2003 (IBM 2003B)	72.9	50.2(LT)		96.2 (SI)
5. Percentage of households with a PC (Dec. 2003, eEurope+)	33.2	16.7(BG)	32.6	64.3(SI)
6. Internet usage 2001, ITU	14.8	4,5(RO)	10.1	30 (EE, SI)
7. Internet usage, at least once a week (Dec. 2003, eEurope+)	17.4	12.7 (RO)	20.5	42 (EE)
8. Number of computers in secondary education per 100 students connected to Internet (2003)	10.7	2.1 (LT)		10.7 (HU)
9. Percentage of GPs with Internet access in the consulting room (Dec. 2003, eEurope+)	20.0	12.3 (LV)	23	92 (EE)
10. Percentage of population using the Internet for interacting with public authorities(sent in filled-in forms) (Dec. 2003, eEurope+)	4.4	0.5 (LT)	2.3	92 (EE)
11. Percentage of population that has bought online (December 2003, eEurope+)	1.9	0.8 (LT)	3.4	12.3 (CZ)
12. Percentage of population that has bought online (TNS 2002)(BG, RO, HU, LV not included)	n.a.	1 (PL, LT)		3.9 (EE)
13. Percentage of population that used e-banking (December 2003, eEurope+)	2.6	0.2 (BG)	4.0	40.1
14. Percentage of enterprises that purchased online (Dec. 2003, eEurope+)	13.2	4.4 (BG)	14.9	29.8 (CZ)



## **Background**

Hungary is one of the early reformers in Central and Eastern Europe. As early as 1968, Hungary introduced market-oriented reforms and during the 1980s, significant economic and political openings have been made regarding the West. This legacy of economic reforms and an opening up towards the West gave Hungary a competitive lead in its transition to a market economy.

In 1971, a large-scale computer development program was launched. Many programmers were trained in (West) Germany. In 1984, the development program for the electronic industry was launched. Desk computers started to spread during the 1980s, facilitated by eased travel restrictions and the growth of small and medium sized enterprises.

The establishment of a National Information Network started in the second half of the 1980s, due to the realisation of the National Information Infrastructure Program, targeted at the diffusion of modern ICT applications.

Hungary started the deregulation of telecommunications in 1989, when the government separated the regulatory and operational function of PTT. In 1992, a law on telecommunications abolished the state monopoly on telecommunications. Since then a series of laws harmonised ICT regulations with that of the EU.

In 1995, the Steering Committee for Hungary's National Information Strategy was set up and in 2002, the Ministry for Information Technology and Telecommunication was established. Government focused on adequate legal regulations for ICT development and the development of an ICT infrastructure. Of particular significance for Hungary was the huge inflow of foreign capital that helped to spread modern ICT in industry and services. During 1990-96, Hungary attracted more than half of all foreign direct investment into Central and Eastern Europe. The cumulative foreign direct investment since 1989 was more than 23 billion dollars (SIBIS, 2003G, p. 6).

## **ICT Infrastructure**

Hungary has a fairly sophisticated ICT infrastructure. The liberalisation of the telecommunications market took place in 2001 (Pinter, 2004). An important objective today is the introduction of competition.

However, there has been a significant decrease in fixed line household penetration (from 80% in December 2001 to 72.9% in June 2003 and to 62% in December 2003; IBM/eEurope+). The fixed line penetration ratio per 100 inhabitants decreased from 38 in 2001 to 35 in June 2003. This is related to high subscription and usage fees for fixed telephony and the cheaper alternative of mobile telephony. The mobile penetration rate at the end of 2002 was 68% (IBM 2003A, p. 83). In September 2003, it was 73% according to the Communications Authority of Hungary and in December 2003, it was 62.5% according to the eEurope+ survey. Hungary has issued

3G mobile licenses but no UMTS licenses (IBM 2003B, p. 91). Cable TV household penetration is 53% (Fabian 2003, p.9).

The Hungarian telecommunications market is still undergoing a process of liberalisation that started in 2001. The incumbent telecommunications operator, Matav Deutsche Telecom, has 59.5% of shares (but the State has a golden share that gives it special voting rights in special cases). Matav had exclusive monopoly rights on the fixed line infrastructure. In December 2001, Matav's exclusive rights ended and about 20 licensed operators became active on the fixed line market, mainly in the business communications market (IBM 2003B, p. 90). Hungary was the first country to un-bundle its local loop.

The Hungarian government has acknowledged that there was insufficient competition among ICT providers.

Fixed tariffs are still not reported as re-balanced; they are regulated using a price cap mechanism. The charges for termination on the fixed network grew in comparison with the situation as of June 2002 and are significantly above the EU average and the CEE 10 average (June 2003, IBM 2003B, p. 93). The fixed-to-mobile charges is below the EU average and one of the lowest in Central Europe (IBM 2003B, p. 93)

Broadband provision is only found in large cities and mainly used by enterprises and institutions.

In early 2003, there were about 44,000 ADSL lines in total in Hungary (IBM 2003A, p. 86). About 16,000 ADSL lines are provided by alternative operators (IBM 2003A, p.85). The Hungarian Central Statistical Office claims that broadband subscribers went up from 63,000 at the end of 2002 to 260,000 by the end of 2003.

### **Computer usage**

Computer penetration is lower than the CEE 10 average. The Hungarian ministry gave a percentage of 17% for computer penetration in April 2003 (SIBIS, 2003G, p. 15); Istri/Tarki (2002) gave a computer penetration ratio of 26% for 2002 while the eEurope+ survey found a 33.2% computer penetration ratio (December 2003). In 2002, the top quintile household income had a 55% PC penetration rate while the lowest quintile 4% (Istri/Tarki, 2002).

### **Internet usage**

Hungarians began using the Internet earlier than in other CEE 10 countries but Internet usage is now much below the CEE 10 average.

Compared to the ITU figures for Internet penetration in 2001, the eEurope+ survey (December 2003) shows a slightly higher percentage, but the eEurope+ figure measures regular Internet usage (at least once a week). This points to a possible stagnation of Internet usage in Hungary. Other

surveys (Fabian 2003, p. 10) show slow growth of Internet usage (regular, i.e. weekly Internet use was 14% of the population in 2001, 17% in 2002, and 19% in 2003). The Ministry (2004) survey shows Internet access of 17% of the population in 2001, 21% in 2002, and 25% in 2003<sup>11</sup>.

In 2003, 12% of households had Internet access, which is twice more than in 2001 (Fabian, 2003, p. 9). Only 47% of Hungarian Internet users access the Internet at home (CEE 10 average 50%; eEurope+, December 2003).

Fifty percent of home subscribers use an analogue modem while 15% use the cable network to access the Internet.

The eEurope+ surveys observed a sharp decline in the number of Public Internet Access Points in Hungary per 1,000 inhabitants (from 0.300 in 2001 to 0.100 in December 2003).

With respect to the number of hosts per 1,000 inhabitants, an indicator that points to intensity of Internet usage, Hungary is doing well: 32 hosts per 1,000, just behind Estonia, the CEE 10 leader with 47 hosts (June 2003, IBM 2003B, p. 67).

The regional variation in Internet access at home is big. Settlements smaller than 2,000 inhabitants have a 2% access ratio while Budapest 16% (2002, Istri/Tarki). Many Hungarians live in rural areas: 7.8% of the population lives in settlements smaller than 1,000 inhabitants and 33.5% in settlements between 1,000 and 10,000 inhabitants (Hungarian Statistical Office, 2002). According to the Ministry of Informatics (2004), there is 17% and 18% of Internet penetration in the Northern and Eastern provinces of Hungary, against 37% in Central Hungary and 30% in Central Transdanubia (p. 12).

With respect to purpose of Internet usage: Hungarians are writing relatively (in a CEE 10 perspective) few e-mails but are very active with chatting.

Between June 2003 and December 2003, Hungarians started to use the Internet more intensively. With respect to purpose of usage, significant changes were 'sent/read e-mail' from 63% to 75% of all Internet users; 'made phone calls': from 7% to 11%; 'Listened to web-radios/web television': from 6% to 15%; 'other financial services': from 2.5% to 5%. The combined usage of 'Internet banking' and 'other financial services' increased from 12% to 17% of all Internet users. 'Purchase of goods' from 5.4% to 9% while 'sold goods and services' increased from 1.5% to 3.9% (eEurope+).

## **e-Education**

Hungary stands out among the CEE 10 countries with respect to high Internet usage among students (SIBIS, 2003G, p. 22).

Hungary is leading in the number of computers with Internet access in secondary schools. According to the Ministry of Informatics and Communications (2004), 79% of all primary schools had Internet access,

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<sup>11</sup> The Hungarian Central Statistical Office has more encouraging figures. It claims that Internet usage went up between end 2002 and end 2003 by 50%.

100% of secondary schools, and 85% of all schools (p. 17). Moreover, all tertiary educational establishments have Internet access (Fabian 2003, p. 19). 18% of the teachers working in primary and secondary education used computers for educational purposes.

Seventy seven percent of 14-17 year olds use the Internet compared to only 25% of the general population (Fabian, 2003). These youngsters access Internet mostly at school (58%) and only 9% at home. An interesting experiment is that of the Electronic Information Service that provides free and full access to national and international databases in all higher educational establishments, thereby creating big savings for university libraries and students. All databases are financed centrally and are replacing paper based acquisition periodicals and reviews in higher educational libraries.

However, digital literacy is very low in Hungary (with Bulgaria, Romania, and Poland the lowest in the CEE 10, SIBIS, 2003A).

Improvement of Internet access in Hungarian schools may be contributed very much to increase in Internet penetration. Of all respondents having had access to the Internet, 26% had access at the place of education in June 2003, but 35% in December 2003 (eEurope+).

### **e-government**

According to the eEurope+ Survey (December 2003), 4.4% of the population submitted a filled in form online to public authorities. On most e-government indicators, Hungary's performance is rather weak. However, there has been a substantial increase recently in the usage of e-government services amongst the general population: 'Obtained information from public authorities' increased from 3.1% of all respondents in June 2003 to 5.9% of all respondents in December 2003. For 'downloading official forms' the increase is from 2.3% to 6.3% and for 'sent filled-in forms' from 0.9% to 4.4% (eEurope+).

### **e-Health**

The eEurope+ survey found that 20% of Hungarian GPs had access to Internet in their consulting room (December 2003)<sup>12</sup>. 99% of Hungarian GPs use electronic patient records and only 3% exchange these (December 2003).

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<sup>12</sup> GKI economic research found that 32.5% of Hungarian GPs had Internet access in their consulting room (first Q 2003, Fabian 2003, p. 21). The Ministry of Informatics and Communications maintains that 33% of GP's surgeries have Internet access.

## **Enterprises, e-commerce, and ICT usage**

Why have only 2.6% of Hungarians used e-banking compared to 40% of Estonians (eEurope+, December 2003)? Is there a problem with the supply side, i.e. mainly Western owned banks?

The percentage of respondents that used Internet banking increased from 1.7% to 2.6% between June 2003 and December 2003 and the use of the Internet for purchasing goods and services increased from 1.0% to 1.9% of respondents. Remarkable is that unlike in most CEE 10 countries more women are using Internet-banking and are purchasing online than men.

Hungarians use the Internet less at work compared with other CEE 10 countries (SIBIS, 2003G, p. 20 and eEurope+). Forty one percent of Hungarian employees use computers in their normal work routine (close to CEE 10 average) (eEurope+, December 2003). In Hungary there is much less interest in work based IT training than the CEE 10 average (SIBIS, 2003G, p. 31). On average, 29% of the workforce had received basic IT training (eEurope+, December 2003)

According to the eEurope+ survey (December 2003), 73% of Hungarian enterprises have access to the Internet (6<sup>th</sup> place in the CEE 10) and only 27.8% have their own website (7<sup>th</sup> place in the CEE 10)<sup>13</sup>. Only 0.2% of enterprises have received online payments for Internet sales (lowest score in the CEE 10). Moreover, only 6.9% of Hungarian enterprises have received orders online (6<sup>th</sup> place) and 13.2% of all enterprises had purchased online (7<sup>th</sup> place; eEurope+, December 2003). However, 47.2% of enterprises use the Internet for banking and financial services (place 6).

The low level of e-commerce and ICT usage in Hungarian enterprises is remarkable given the prominent presence of foreign enterprises, the degree of market development of the Hungarian economy, GDP per capita, government efforts to promote Information Society and the quality of telecommunications infrastructure.

## **Inhibitors**

One of the major barriers for Internet usage is Internet access costs (and telephone tariffs). 15% of Hungarian non-users of Internet said that 'the Internet connection is too expensive' (CEE 10 average 8%) while 9% said 'computers are too expensive' (CEE 10 average 12%, eEurope+, December 2003) (see also IBM 2003, p. 27)<sup>14</sup>. The average spending in Hungary for Internet access was € 32 (highest in CEE 10), while the CEE 10 average was € 17 (eEurope+, December 2003).

<sup>13</sup> According to SIBIS (2003G, p. 28) 89% of companies in Hungary have their own website. According to GKI economic research (Fabian 2003, p.17) 44% of enterprises with more than 10 employees have their own website (first quarter 2003). According to the Ministry of Informatics and Communications (2004), 78% of enterprises have access to the Internet and 45% have their own website (p. 18, 19).

<sup>14</sup> In Hungary, about 63% agree completely with the statement that Internet is too expensive to use (SIBIS, 2003G, 40% in Estonia, and 54% in the Czech Republic).

Now, ISPs and telecommunications operators compete over fees.

According to Pinter (2004), it is not mainly 'economic reasons' for not using the Internet, but the fact of not having a computer (30% of non-users) and cultural reasons ('no need' 36% of respondents, 'no interest', 26% and 'incompetence' 17%); 'The price' is mentioned by 18% of non-users. The Ministry of Informatics and Communications (2004) noticed that '*the usage of digital tools is blocked by cultural factors - the lack of digital literacy and interest (lack of attractive and encouraging online contents and services)*'. It must also be noted that only 19% of the Hungarian population speak foreign languages, which is lower than that of the other CEE 10 countries.

## **IS Policy**

In December 2000, the government launched the e-Hungary programme, meant to modernise the country. An Information Society Strategy was launched in 2003.

According to a Hungarian government report (2003), 'last years conditions of creating Information Society have deteriorated' (SIBIS 2003G, p. 30). Among others, high access fees have been mentioned.

Hungary, as one of the first Central and Eastern European countries, paid attention to Information Society development. It was one of the first to liberalise and deregulate the telecommunications sector and in the early 1990s, much was invested in ICT development. Given this background, the performance of Hungary on most IS indicators is disappointing. Compare for instance with the Czech Republic that was initially lagging behind in opening up the economy and privatising/deregulating the telecommunications sector: the Czech Republic is performing much better than Hungary on most IS indicators

The SWOT of Information Society Performance in Hungary	
<p><i>Strengths</i>  High levels of Internet usage among students  Well developed ICT infrastructure  High levels of Internet usage at schools  ICT usage by GPs</p>	<p><i>Weaknesses</i>  Lack of competition in telecommunications market  Rapidly declining fixed line penetration  Low digital literacy  Low Internet and computer usage in enterprises  Weak e-government, especially in relation to online interactions with citizens  Weakly developed e-banking  Low level of e-commerce  Content provision market is under-developed</p>
<p><i>Opportunities</i>  Pronounced presence of foreign investors  EU integration</p>	<p><i>Threats</i>  Stagnation in Internet usage</p>



## Lithuania

LITHUANIA	Some basic indicators about Internet usage in a comparative perspective			
		CEE 10 lowest	CEE 10 average	CEE 10 highest
1. Population (in millions, 2004)	3.5	1.4 (EE)		38.2 (PL)
2. GDP in Purchasing Power Parity per capita (as percentage of EU, 2003)	41	26 (BG, RO)		76(SI)
3. Fixed telephony household penetration, December 2001 (IBM 2003A)	72.8	49.9 (RO)		85.3 (SI)
4. Fixed telephony household penetration, June 2003 (IBM 2003B)	50.2	50.2(LT)		96.2 (SI)
5. Percentage of households with a PC (December 2003, eEurope+)	25.1	16.7 (BG)	32.6	64.3 (SI)
6. Internet usage 2001, ITU	6.7	4.5 (RO)	10.1	30 (EE, SI)
7. Internet usage, at least once a week (December 2003, eEurope+)	21.0	12.7 (RO)	20.5	42 (EE)
8. Number of computers in secondary education per 100 students connected to Internet (December 2003, eEurope+)	2.1 (LT)	2.1(LT)		10.7 (HU)
9. Percentage of GPs with Internet access in the consulting room (December 2003, eEurope+)	15.4	12.3 (LV)	23	92 (EE)
10. Percentage of population using the Internet for interacting with public authorities (send in filled in forms)(December 2003, eEurope+)	0.5	0.5 (LT)	2.3	14.4 (EE)
11. Percentage of population that has bought online (December 2003, eEurope+)	0.8	0.8 (LT)	3.4	12.3 (CZ)
12. Percentage of population that has bought online (TNS 2002)(BG, RO, HU and LV not included)	1	1 (PL, LT)		3 (EE)
13. Percentage of population that used e-banking (Dec. 2003, eEurope+)	2.8	0.2 (BG)	4.0	40.1 (EE)
14. Percentage of enterprises that purchased online (Dec. 2003, eEurope+)	6.8	4.4 (BG)	14.9	29.8 (CZ)

## **Background**

In Soviet times, Lithuania specialised in electronics and computer software and hardware. In general, the level of computerisation in Lithuania was quite high according to Soviet standards. Networks of enterprises located in Lithuania, including military ones, had produced a wide range of chips, computer equipment, and peripherals. The network of enterprises was linked to a network covering branch institutes, research units in enterprises, laboratories, and research centres at universities. This technological heritage provided the country with a favourable infrastructure for hardware development, the dominant part of the national ICT market. Lithuania is still an exporter of components of electronic equipment (exports in 2002: 557 million LTL, imports 303 million LTL). To what extent has this asset been exploited in IS development?

Since the beginning of the 1990s, programmes were prepared and supervised by the Ministry of Informatics and Communication. However, ambitious programmes were being formulated on paper but seldom implemented. This was above all related to the transitional recession that hit Lithuania severely. In 2002, the GDP was only 78% of its 1989 level. This hampered efforts in Information Society development. Developments in the sphere of ICT have become more dynamic since the late 1990s.

## **ICT infrastructure**

Lietuvos Telekomas, the fixed line provider in Lithuania, was privatised in 1998 but retained fixed line exclusivity until 2003. Sixty percent of Lietuvos Telekomas is owned by TeliaSonera group (which also owns Omnitel, i.e. the largest mobile provider).

The liberalisation of the fixed line market started in 2003.

As in many other CEE 10 countries, fixed line penetration has dropped recently. However, in Lithuania it went down from 33.8 per 100 inhabitants in 2000 to 24.7 per 100 inhabitants in 2003, i.e. a decline of 27%. This should be seen in the context of the fact that fixed line household penetration rates in Lithuania were the lowest in the CEE 10 in 2003. To what extent is this related to higher fees and to what extent related to the cheaper alternatives of the mobile phone?

Only 70% of households have a telephone (fixed and mobile telephone lines) (eEurope+, December 2003). Among the CEE 10 countries only Romania (65%) scored lower (eEurope+, December 2003).

The rural-urban divide is very pronounced in Lithuania where 31% of the population lives in rural areas. However, 80% of fixed lines are in urban areas. In rural settlements (smaller than 2,000 inhabitants) only 35% of households have fixed lines, in urban settlements (2,000 to 100,000 inhabitants) there is a 42% household penetration rate while in metropolitan areas 62% (December 2003, eEurope+, household survey). Thirty seven

percent of respondents in rural areas had neither mobile, nor fixed telephone line<sup>15</sup>.

The cable TV network is used for Internet provision. Twenty seven percent of Internet users that access the Internet from home use the cable TV network (eEurope+, December 2003, Household Survey). Only 0.6% of Internet users (from home) access the Internet through a mobile phone (eEurope+, December 2003, HS)<sup>16</sup>. It is for these reasons that the Lithuanian government uses a multi-channel access approach to develop Internet usage.

The mobile market is characterised by competition between three mobile operators with GSM/DCS licenses. Two of the three operators are providing GPRS services to customers and there are more than 9,689 of them (0.52% of the total number of subscribers) (IBM 2003N, p. 100).

The most remarkable development during June 2003-December 2003 is the decline in the number of respondents with a mobile telephone in the household: from 625 to 446 respondents (i.e. from 59.4% to 44.5% of respondents). IBM (2003B, p. 46) already showed a stagnation of mobile penetration in Lithuania between December 2002 and June 2003 at 40%, just below the CEE 10 average. Among the CEE 10 countries, only Bulgaria and Romania scored lower. However, these data do not correlate with data from the Communications Regulatory Authority in Lithuania that show an increase in mobile phone subscriptions from 1.645 million in January 2003, 1.935 million in July 2003 to 2.169 million in January 2004.

Rebalancing of fixed tariffs took place in the first half of 2003 (based on current costs system). Fixed to fixed interconnection charges are already set and are equal to mobile-to-fixed charges (only one unified charge is applied for all types of interconnections). These charges decreased since mid-2002 but are still the highest in the CEE 10 (IBM 2003B, p. 100).

### **Computer usage**

The number of computers per 100 households is significantly below the CEE 10 average and presents an important impediment regarding the spread of Internet usage. Only a small proportion of home computers are used for Internet connection. The Lithuanian statistical office noticed a 39% increase in computer ownership during the second half of 2003 (Kligiene, 2004).

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<sup>15</sup> According to the National Statistical Office of Lithuania, only one out of four rural households had a fixed telephone line in December 2003 (eEurope+).

<sup>16</sup> SIBIS (2003I, p.16) found that about 5% of Lithuanians of up to 24 years in age are mobile Internet users.

## **Internet usage**

Although Internet usage is on the CEE 10 average, progress has been considerable since 2001 when Lithuania was one of the least connected countries among the CEE 10 countries. Many 16-20 years old are using the Internet.

Nine percent of Lithuanians access the Internet from home while 11% access it from the workplace, 9% from the place of education and 5% from an Internet café (eEurope+, December 2003). More than the CEE 10 average, Lithuanians are accessing the Internet from their work and place of education.

Among respondents living in metropolitan areas, 28% used the Internet at least once a week, 16% of respondents in urban settlements and 9% of respondents in rural settlements (eEurope+, December 2003, household survey) (21% for the average of Lithuania)

Only 1.7% of rural households have Internet at home (first half of 2002), 10.2% in large towns, and 4.4% in towns (SIBIS, 2003I, p. 22). The eEurope+ survey shows a similar pattern.

## **e-education**

In Lithuania, according to official figures and Eurostat, 45% of the population (25-64 years) has a tertiary education (one of the highest in the world). However, in terms of digital literacy, Lithuania scores only 0.4 against 0.8 for EU 15 (SIBIS, 2003A). Also, in the eEurope+ sample, the share of those with tertiary education (16-64 years) is only 18%.

Lithuania has the lowest percentage of computers in secondary education connected to the Internet. However, 40% of Lithuanian Internet users are in the age category 16-24 years and 82% among them are accessing Internet at the place of education (eEurope+, June 2003).

## **e-government**

Fewer people in Lithuania interact online with public authorities than the CEE 10 average. In December 2003, only 3.1% of respondents have obtained information from public authorities online (eEurope+, household survey).

In December 2003, only Lithuanian 31 respondents obtained information from public authorities, while in June 2003 there were 67 respondents. The decline can be attributed, above all, to those with medium/upper secondary education that used the Internet less for this purpose (from 5% to 1.6%; the percentage of those with only primary and higher education that used the internet to obtain information from public authorities remained relatively stable).

## **e-health**

Nineteen percent of Lithuanian GPs have computers in their consulting room and 15% have Internet access. However, 79% have electronic patient records and 36% exchanged these records (December 2003, eEurope+).

## **Enterprises, IT usage, and e-commerce**

High access costs and slow data transfer are the main obstacles for broader applications of Internet in e-business for Lithuanian enterprises according to SIBIS (2003 I, p. 11). However, 65% of Lithuanian enterprises that access the Internet do this through broadband (eEurope+, enterprise survey, December 2003).

Very few Lithuanians bought online (1% of total population, eEurope+, December 2003, the worst performing country in CEE 10; the CEE 10 average is 3.5%). It means that only 3.5% of Lithuanian Internet users have bought online (eEurope+, December 2003). This poor performance might be related to the fact that Lithuania was slow to pass the EU e-commerce regulations<sup>17</sup>.

Remarkable for Lithuania is, that unlike most CEE 10 countries, proportionately more women than men are using Internet banking and using the Internet for purchasing goods and services.

5.1% of the population used e-banking in June 2003 and 2.4% in December 2003<sup>18</sup>. This is far below the Estonian figure of 40% of the population (December 2003, household survey, eEurope+).

17.5% of Lithuanian enterprises have a LAN (3<sup>rd</sup> place in the CEE 10). The overwhelming majority of enterprises with a LAN are in the service sector.

## **Inhibitors**

According to the eEurope+ household survey, average spending on access to the Internet in Lithuania is 8.5% of monthly household income (CEE 10 average 5.8%, December 2003). Dial up Internet access costs are second highest in Central Europe according to IBM (2003A, p. 94). According to IBM (2003B, p. 71), Internet access costs in Lithuania were (off-peak time, 20 hours) 58.2 euro (in PPP), the second highest in CEE 10 (after Latvia) and very high compared to the EU 15 maximum (18.8 euro).

When asked about reasons for not using the Internet, 13% of all Lithuanian respondents who do not use the Internet answered that computers are too expensive (CEE 10 average: 12%), 10% answered 'the Internet connection is too expensive (CEE 10 average 8%). 6.5% answered 'I don't know how to use a computer (CEE 10 average 21%) (eEurope+, December 2003).

<sup>17</sup> According to SIBIS (2003 I, p. 8) Lithuania failed to pass e-commerce regulations.

<sup>18</sup> According to the Lithuanian statistical office, e-banking increased from 10% of Internet users during the first quarter of 2003 to 20% during the third quarter of 2003.

## IS policy

Fifty-one out of sixty Lithuanian municipalities are involved in establishing PIAPs (SIBIS, 2003I, p.33). Nevertheless, Lithuania scores low in the number of PIAPs per 1,000 population (0.1; eEurope+, June 2003).

Lithuania is performing weakly on most IS performance indicators and the discrepancy with Estonia is big.

The SWOT of Information Society Performance in Lithuania	
<p><i>Strengths</i>  Legacy of well developed ICT sector  Many IT specialists  Rapidly increasing Internet usage  High Internet usage among youth</p>	<p><i>Weaknesses</i>  Rapidly declining and very low fixed line penetration ratio  Weak IS government policy, slow in transposing EU acquis  Enormous discrepancy between potential of e-commerce and actual level of e-commerce  Low digital literacy</p>
<p><i>Opportunities</i>  Proximity and good relations with highly digitalised Nordic countries and Baltic neighbours  EU integration  Use of wireless solutions for Internet access and use of the cable TV network</p>	<p><i>Threats</i>  High Internet access costs and high fixed telephony charges</p>

## Latvia

LATVIA	Some basic indicators about Internet usage in a comparative perspective			
		CEE 10 lowest	CEE 10 average	CEE 10 highest
1. Population (in millions, 2004)	2.3	1.4 (EE)		38.2 (PL)
2. GDP in Purchasing Power Parity per capita (as percentage of EU, 2003)	38	26 (BG, RO)		76(SI)
3. Fixed telephony household penetration, December 2001 (IBM 2003A)	77.6	49.9 (RO)		85.3 (SI)
4. Fixed telephony household penetration, June 2003 (IBM 2003B)	68.4	50.2(LT)		96.2 (SI)
5. Percentage of households with a PC (Dec. 2003, eEurope+)	25.4	16.7 (BG)	32.6	64.3 (SI)
6. Internet usage 2001, ITU	7.3	4.5 (RO)	10.1	30 (EE, SI)
7. Internet usage, at least once a week (Dec. 2003, eEurope+)	24.7	12.7 (RO)	20.5	42 (EE)
8. Number of computers in secondary education per 100 students connected to Internet (Dec. 2003, eEurope+)	N.A.	2.1 (LT)		10.7 (HU)
9. Percentage of GPs with Internet access in the consulting room (Dec. 2003, eEurope+)	12.3	12.3 (LV)	23	92 (EE)
10. Percentage of population using the Internet for interacting with public authorities (send in filled in forms)(Dec. 2003, eEurope+)	3.5	0.5 (LT)	2.3	14.4 (EE)
11. Percentage of population that has bought online (Dec. 2003, eEurope+)	1.5	0.8 (LT)	3.4	12.3 (CZ)
12. Percentage of population that has bought online (TNS 2002)(BG, RO, HU and LV not included)	n.a.	1 (PL, LT)		3 (EE)
13. Percentage of population that used e-banking (Dec. 2003, eEurope+)	8.6	0.2 (BG)	4.0	40.1 (EE)
14. Percentage of enterprises that purchased online (Dec. 2003, eEurope+)	17.3	4.4 (BG)	14.9	29.8 (CZ)



## **Background**

Latvia, by CEE 10 standards, is a medium developed country with a per capita GDP of 38% of the EU 15 level, slightly below that of Lithuania and Estonia. Thirty percent of the population live in rural areas. Latvia went into a deep transitional recession, aggravated by the severance of economic relations with the area of the former Soviet Union of which it was part (in 2002 GDP was only 81% of the 1989 level).

## **IT infrastructure**

The fixed telephony market was liberalised from January 2003 onwards and by June 2003, there were about 40 alternative operators. The State still holds a majority share (51%) of the fixed incumbent Lattelekom (the other 49% is owned by Sonera). No local loop unbundling has taken place so far. The older of the two mobile operators is publicly owned (IBM 2003A, p. 87). Fixed tariffs were not rebalanced as of 30 June 2003 and the regulation is performed via a price cap (IBM 2003B, p. 95). The ranking in Telecommunications Competition is 59 out of 75, related to Lattelekom's monopoly position that ended in late 2002 (Global IT Outlook).

Broadband is relatively developed (1.4% of fixed telephone lines, June 2003). In December 2003, 70% of household survey respondents with a fixed telephone answered that they have a digital telephone at home (eEurope+ 2003). The mobile penetration rate was 59% in December 2003 (eEurope+; 40% at the end of 2002 - IBM 2003A, p. 89).

There is little hope that in the near future the services of fixed network lines will be available for many inhabitants in rural areas (SIBIS, 2003H, p. 6). Forty percent of Latvians do not have a fixed telephone at home and many of these reside in the countryside (eEurope+, December 2003, HS). According to the World Bank (2003B, p. 120) teledensity in Latvia is 30.3 fixed lines per 100 inhabitants, 52.6 in its largest town and 19.6 in the rest of the country (2000).

The weak link in Latvia's IS development is the telecommunications service infrastructure.

## **Computer usage**

Few households have a computer (below the CEE 10 average) and 56% of the Latvian households with a computer and a telephone do not have Internet access (eEurope+, December 2003).

## **Internet usage**

There has been an enormous increase in Internet usage with a leap forward from 7.3% of Internet users in 2001 (ITU) and 13% in 2002 (ITU) to 25% of the population in December 2003 (at least once a week). In December 2003, Latvia was above the CEE 10 average for Internet usage. However, there are signs of stagnation in 2003. The SIBIS survey found 28% regular Internet usage in January 2003 (SIBIS 2003A, p. 11). In addition, metropolitan Internet usage fell between June 2003 and December 2003 by 11% while regular Internet usage in urban areas fell by 2.7% and rural usage went up by 5.1%. It could point to a saturation of Internet penetration levels at a rather low level.

Compared to other CEE 10 countries, relatively few 16-20 year olds are using the Internet.

Fifty one percent of Latvians who use the Internet access it from work, 32% from home, 31% from the place of education and 15% from an Internet café (eEurope+, December 2003, the proportions correlate with the SIBIS survey of January 2003: 3% of the total population access Internet at home or at work, only 2% at home, 12% from work and only 11% usage from somewhere else, including education). Therefore, Latvia is very atypical in the CEE 10 where most Internet users (50%) access the Internet from home, then at the workplace (43.5%) and then at a place of education (27%) and Internet café (19%) (eEurope+, December 2003). Latvia's considerable progress in Internet usage is largely related to the massive Internet usage at work, education, and Internet café. In June 2003, of all respondents that have accessed Internet, 21% accessed it from the place of education, while it increased to 31% in December 2003 (eEurope+). Here it should be noticed that Internet access from home also increased dramatically in the period June 2003-December 2003 (from 27% to 32% of all those who used the Internet during the past three months), despite high Internet access costs.

In Latvia the percentage of respondents that have never used the Internet was 58% both for Latvians and Russians residing in Latvia (Russians comprised 31% of the sample and Latvians 57%) (June 2003).

## **e-education**

In 2002, according to SIBIS (2003H, p.7) 97% of schools have an Internet connection but only 75% of schools reported real Internet usage related to the high price of Internet usage, mainly telephone costs. In 2002, there was one computer per 25 pupils. Up to the end of 2002, 66% of all teachers had obtained basic computer literacy skills. This is reflected in the high percentage of youth that uses the Internet.

## **e-government**

The Latvian government is rather inactive concerning e-government and the government hardly reacts to private initiatives and proposals concerning e-government. 3.5% of Latvians downloaded official forms (CEE 10 average: 4.7%) while 3.5% of Latvians have sent filled in forms (CEE-average: 2.3%, December 2003, eEurope+).

## **e-health**

Only 12% of GPs have Internet access in their consulting room (the lowest percentage in the CEE 10) (eEurope+, December 2003). Fifty three percent of GPs use electronic patient records (the lowest in the CEE 10), 24% exchange them (second highest in the CEE 10) and only 22% of GPs have a computer in their consulting room (the lowest in the CEE 10) (December 2003).

Furthering e-health is hampered by very low salaries in the health sector, including those of GPs, postponing of reforms in the health sector and lack of strategy.

## **Enterprises, IT usage, and e-commerce**

Fewer Latvians shop online than the CEE 10 average (1.5% against 3.5%, eEurope+, December 2003). This is confirmed by the SIBIS survey (January 2003) that found for Latvia the second lowest score for shopping online in the CEE 10.

This contrasts with the 8.6% of the general population that used e-banking services (against the CEE 10 average of 4.0%). The fact that the Latvians have 1 million credit cards also points to the huge unused potential for e-commerce. Here it should be highlighted that most Latvians receive their salary on a bank account and that banks are good in offering a range of e-services. As in Estonia, the e-commerce potential might be limited due to the small size of the country, the fact that Internet users are concentrated in a few urban areas and the fact that cross-border online purchases are very difficult.

As in Estonia, banking in Latvia made the jump from cash transactions to Internet banking, skipping the phase of cheque transactions. In principle, e-banking could function as a trigger for the spread of e-commerce and other types of Internet usage. For example, some banks offer access to property registers and other state registers through e-bank services. However, seventeen percent of Latvian enterprises had purchased online and only 3.3% of Latvian enterprises received online payments (CEE 10 average: 3.0%, December 2003). Why the discrepancy between the scores for e-banking by the general population and the level of e-commerce by enterprises? A similar discrepancy can be observed in Estonia.

In this context a remarkable achievement is the 10% of Latvian enterprises that is selling to other enterprises via specialised Internet market places (December 2003, eEurope+).

### **Inhibitors**

It seems that financial barriers are relatively less important. Only 9.8% of Latvian respondents who do not use the Internet claim that 'The Internet connection is too expensive' as a reason for not using Internet (CEE 10 average 13%), while 19% say 'computers are too expensive' (CEE 10 average is 18%) (eEurope+, December 2003). However, other recent surveys such as IBM (2003A) suggest that Internet access costs are very high in Latvia. On average, 6.2% of average monthly household income is spent on Internet access (December 2003, eEurope+). On average, € 20 in Latvia is spent on Internet access per month (CEE 10 average is € 23; December 2003)<sup>19</sup>.

### **IS policy**

The Latvian government is often lagging behind developments in the sphere of the Information Society. An example is the creation of the possibility to download and submit tax forms online. However, citizens are still obliged to submit tax forms on paper. Although Latvia has institutions dealing with the Information Society, they seldom meet and are rather inactive.

The SWOT of Information Society Performance in Latvia	
<p><i>Strengths</i> High levels of Internet usage at school Well developed e-banking</p>	<p><i>Weaknesses</i> Telecommunications service infrastructure Low level of Internet access from home. Low level of e-commerce Low level of e-health Few households with a PC Re-active government IS policies</p>
<p><i>Opportunities</i> E-banking can be used as trigger for other ways of Internet usage EU integration</p>	<p><i>Threats</i> Exclusion of rural areas Lack of competition in telecommunications services</p>

<sup>19</sup> Both peak and off-peak Internet access costs are the highest among new member states and accession countries and far above maximum charges in the EU 15 (IBM, 2003, p. 89). In addition, according to the SIBIS survey Internet access costs are highest in Latvia (SIBIS, p. 17).

## Poland

POLAND	Some basic indicators about Internet usage in a comparative perspective			
		CEE 10 lowest	CEE 10 average	CEE 10 highest
1. Population (in millions, 2004)	38.2	1.4 (EE)		38.2 (PL)
2. GDP in Purchasing Power Parity per capita (as percentage of EU, 2003)	40	26 (BG, RO)		76(SI)
3. Fixed telephony household penetration, December 2001 (IBM 2003A)	65.5	49.9 (RO)		85.3 (SI)
4. Fixed telephony household penetration, June 2003 (IBM 2003B)	72.4	50.2 (LT)		96.2 (SI)
5. Percentage of households with a PC (December 2003, eEurope+)	32.8	16.7 (BG)	32.6	64.3 (SI)
6. Internet usage 2001 (ITU)	9.8	4.5 (RO)	10.1	30 (EE, SI)
7. Internet usage, at least once a week (December 2003, eEurope+)	18.0	12.7(RO)	20.5	42 (EE)
8. Number of computers in secondary education per 100 students connected to Internet (December 2003, eEurope+)	3.0	2.1(LT)		10.7(HU)
9. Percentage of GPs with Internet access in the consulting room (December 2003, eEurope+)	18.9	12.3 (LV)	23	92 (EE)
10. Percentage of population using the Internet for interacting with public authorities (send in filled in forms)(December 2003, eEurope+)	1.4	0.5(LT)	2.3	14.4 (EE)
11. Percentage of population that has bought online (December 2003, eEurope+)	3.2	0.8 (LT)	3.4	12.3 (CZ)
12. Percentage of population that has bought online (TNS 2002)(BG, RO, HU and LV not included)	1	1 (PL, LT)		3 (EE)
13. Percentage of population that used e-banking (December 2003, eEurope+)	2.8	0.2 (BG)	4.0	40.1 (EE)
14. Percentage of enterprises that purchased online (December 2003, eEurope+)	21.3	4.4 (BG)	14.9	29.8 (CZ)

## Background

Poland, together with Hungary, was a pioneer in economic reforms and opening up to the West already before transition started. In addition, Poland remained at the forefront of economic reform after communism was abolished (1989). Much foreign direct investment flowed in.

The development of the Information Society started in the scientific community. The first Internet provider was the Scientific and Academic Computer Network (NASK), founded in 1993. NASK has at its disposal the biggest backbone network in Poland. Initially, all the commercial Internet providers had to buy Internet access services from NASK, as it was the only institution with links to the world-wide Internet system.

Initially, the national telecommunication company (TPSA) acted as an aggressive monopolist that, with support of government officials, competed with unfair methods with alternative providers of Internet services (see van Zon et al, 2000, p. 49).

## ICT infrastructure

TPSA was only recently privatised (2002) and in many respects it is still a monopoly. TPSA only lost its monopoly over international communications in January 2003. This largely explains the initially slow progress towards an information society (until the mid 1990s the fixed telephone penetration ratios remained extremely low). TPSA had about 99% of the local call market and 85% of international outgoing calls and 75% of international incoming calls in mid 2003 (IBM 2003A, p. 99) The State has a minority share while France Telecom has 34% of TPSA.

TPSA started to offer broadband access in mid 2002. Dial up is still the major means of connection to the Internet (IBM 2003A, 102).

Poland performed badly with respect to telecommunications investments and ICT expenditures (compared to other CEE 10 countries, see eEurope+ report 'An Assessment of Available Data and Indicators, November 2003, pp 25, 26) (Telecommunications share in GDP: 2.5% in 1996 and 4.4% in 2000 - SIBIS 2003J, p. 8). This might be related to the late privatisation of telecommunications services. TPSA does not intend to invest in the expansion of the fixed line network.

Fixed tariffs are not rebalanced but international tariffs for a number of destinations were lowered during 2002. Monthly rental charges are slightly above the CEE 10 and the EU 15 average (IBM 2003B, p. 108).

Fifty five percent of Polish households are connected to the cable TV network. According to SIBIS (2003J), '*Internet services through cable are very popular and competitive*'. However, only 2.2% of households use the cable TV for Internet access (eEurope+, December 2003).

There are statistical puzzles around fixed household penetration ratios. If we compare the SIBIS Household Survey of January 2003 (SIBIS, 2003I, p. 15) with the eEurope+ household survey of December 2003, we can see a decrease in the percentage of respondents that have a fixed telephone line from 80% to 74.6%. The IBM surveys (based on information from national regulatory authorities) show a decline in the number of fixed lines per 100 households from 65.6 in December 2001 to 62.1 in December 2002 but an increase to 72.4 in June 2003. The telecommunications operator survey of eEurope+ gave a household penetration ratio of 57 for 30 June 2003. This all points to a declining household penetration ratio.

To what extent can mobile telephony be considered as an opportunity in the spread of the Information Society? According to Goodman (April 2003) mobile networks cover 94% of the geographical area and 98% of the population while in some areas fixed line penetration dips below 16%.

In December 2002 the mobile telephone penetration ratio was rather low at 35%, related to mobile phone fees that were among the highest in the CEE 10 (IBM 2003A, p.45; SIBIS, 2003J, p.14). However, according to the eEurope+ survey, 42.5% of respondents had a mobile phone (December 2003; the mobile penetration ratio was 60% in June 2003- eEurope+!). The three mobile operators provide GPRS services.

Thirty percent of respondents who live in Polish rural areas (less than 2,000 inhabitants) do not have a fixed telephone at home and 12.4% have no telephone at all (December 2003, eEurope+). Forty five percent of Poles have at least one mobile in the household, 38% in rural areas. 41% of metropolitan households have a computer at home, 22% of households in rural areas, and 31% of households in urban areas (eEurope+, December 2003).

### **Computer usage**

Computer possession is on a level with the CEE 10 average while 39% of households with a computer have no Internet connection (eEurope+, December 2003).

Poland is leading (with the Czech Republic) for the share of employees using a computer during their normal working routine (56%, December 2003, eEurope+). Polish employees perform above the CEE 10 average with respect to basic ICT skills but perform below average for specific ICT applications (word processing and spreadsheet programmes) and above average for the share of employees not being able to use common computer programmes (December 2003, eEurope+).



## **Internet usage**

Internet usage in Poland is still slightly below the CEE 10 average. Comparative data from the ITU show a decline of Internet usage since 2002.

Of all Poles having accessed the Internet during the past three months, 57.5% accessed it from home (CEE 10 average: 50%), 33% from work (CEE 10 average: 43.5%), 39.5% from a place of education (CEE 10 average: 27%), 29% from an Internet café (CEE 10 average: 19%) and 29% from friends and relatives houses (CEE 10 average: 17%) (eEurope+, December 2003). Nowhere else in the CEE 10 have so many Internet users (as a share of total Internet users) accessed Internet from home, Internet cafes, place of education and friends and relatives.

A very pronounced trend between June 2003 and December 2003 is the decline in the usage of Internet for various purposes, like e-commerce and e-government, above all related to a decline in male usage of various Internet activities. For example, during June-December 2003 the percentage of Polish men that used Internet for e-banking decreased from 6% to 2.7% while the percentage of Polish women doing so increased from 2.0% to 2.3% (eEurope+).

## **e-education**

The number of computers with Internet access in secondary education is below the CEE 10 average. The number of students for each computer in primary and grammar schools is 44 and in secondary schools 22 (the EU 15 averages are 13 and 8 respectively) (SIBIS 2003J, p.30).

Digital literacy is among the lowest in the CEE 10 (SIBIS, 2003A). This may be related to the late introduction of Internet.

Poland scores low in the percentage of students in ICT related education (5.3%; against 6.4% in Slovakia and 10.8% in the Czech Republic (eEurope+, June 2003).

Only 12% of Poles have tertiary education. This is low by CEE 10 standards (Eurostat, 2002).

## **e-government**

2.8% of Poles downloaded official forms and 1.4% sent in completed forms (eEurope+, December 2003). 4.5% of Poles used the Internet for services offered by local or state organisations (December 2003). Among 52 respondents the services most frequently used (more than two respondents) were: 'used catalogues in public libraries (22), 'used search tools provided in public libraries'(14), 'used job search offered by labour office'(9) and 'applied for higher education' (6) (June 2003, eEurope+).



35.8% of enterprises use the Internet for interacting with public authorities (only Estonia, Slovakia, and the Czech Republic had a higher percentage). This is mainly related to the function of administering social contributions for employees (eEurope+, December 2003).

The percentage of Polish respondents that used the Internet for downloading official forms declined between June and December 2003 from 7.0% to 2.8%, the percentage that sent filled in forms from 3.4% to 1.4% (eEurope+). The sharp decline in the usage of e-government services during the second half of 2003 can be exclusively attributed to the decline of male usage.

### **e-health**

The percentage of GPs with access to the Internet in the consulting room went down from 25% in June 2003 to 19% in December 2003 (eEurope+). The percentage of GPs that have access to the Internet and exchange patient records online is very small and went down from 7.5% in June 2003 to 1% in December 2003, the lowest score in CEE 10. However, 48.5% of GPs use electronic patient records (eEurope+, December 2003). Thirty percent of GPs have computers in their consulting room (eEurope+, December 2003).

### **Enterprises, IT usage, and e-commerce**

Although Internet usage and computer penetration is approximately at the CEE 10 average, in e-commerce and IT usage in enterprises many indicators are better than the CEE 10 average. However, only 3.2% of Poles have bought online which is just below the CEE 10 average.

The decline in Internet banking and e-buying among the general population during the second half of 2003 (June-December) can be exclusively attributed to the sharp decline of male usage (eEurope+).

6.4% of Polish enterprises have received online payments (CEE 10 average: 3%). Fifty six percent of Polish enterprises have websites (CEE 10 average is 36%; eEurope+, December 2003). Twenty percent of enterprises have broadband (CEE 10 average: 33%; eEurope+, December 2003).

Poland is in first place in the CEE 10 with respect to the number of enterprises that had more than 1% of turnover from e-commerce (21.4%) (eEurope+, December 2003). In addition, 19.5% of all Polish enterprises have received orders online (CEE 10 average 9%) (eEurope+, December 2003). A recent boom in e-commerce has been confirmed by a report for Rzeczpospolitica that found that turnover from e-commerce has doubled between end 2002 and end 2003, reaching 3 billion PLN ([www.polishmarket.com](http://www.polishmarket.com)).

Only 18% of Polish enterprises that offered or sold goods online had received online payments in 2003 (eEurope+, December 2003). This points to underdeveloped e-banking, despite the fact that most Polish enterprises use e-banking services.

## ***Inhibitors***

Average spending on Internet access is € 15 per month in Poland (December 2003, eEurope+). These low access costs might partly explain the spread of Internet usage since 2001. The main reasons for not using Internet are 'I don't want Internet' (54%), 'I have no access device at home' (37%) and 'I don't know how to use a computer' (30%) (eEurope+, December 2003).

## ***IS policy***

E-commerce legislation has only been transposed since 2001 (SIBIS, 2003J, p. 33).

Given its reputation as a fast reformer in the CEE 10, the meagre performance of Poland on most IS indicators is striking. With respect to the digital literacy index and digital skills Polish scores are among the lowest in the CEE 10 (on many indicators, Poland scores worse than Romania and Bulgaria, see SIBIS surveys 2003). According to OECD figures, very few people in Poland study informatics/computing (see eEurope+ report 'Assessment of Available Data and Indicators, November 2003, p. 19). According to the Global IT report 2001-2002, with respect to Information Society development the greatest need for improvement lies in its schools. In Polish universities, no modern Internet skills are taught.

However, good progress has been made recently in e-commerce.

The SWOT of Information Society Performance in Poland	
<p><i>Strengths</i>  Dynamic e-commerce development</p>	<p><i>Weaknesses</i>  Lack of competition in IT market  Low level of ICT usage in schools  Few ICT specialists  Many live in rural areas with low level of ICT infrastructure  Low levels of computer and internet usage  Stagnating Internet penetration levels  Low levels of digital literacy  Low share of population with tertiary education  Stagnating regular Internet usage by the population and declining intensity of Internet usage</p>
<p><i>Opportunities</i>  EU integration  Large internal market</p>	<p><i>Threats</i>  Relatively low level of ICT investments  Few study ICT related studies in Universities</p>

## Romania

ROMANIA	Some basic indicators about Internet usage in a comparative perspective			
		CEE 10 lowest	CEE 10 average	CEE 10 highest
1. Population (in millions, 2004)	21.7	1.4 (EE)		38.2 (PL)
2. GDP in Purchasing Power Parity per capita (as percentage of EU 15, 2003)	26	26 (BG ,RO)		76(SI)
3. Fixed telephony household penetration, December 2001 (IBM 2003A)	49.9	49.9 (RO)		85.3 (SI)
4. Fixed telephony household penetration, June 2003 (IBM 2003B)	52.7	50.2 (LT)		96.2 (SI)
5. Percentage of households with a PC (December 2003, eEurope+)	22.5	16.7 (BG)	32.6	64.3(SI)
6. Internet usage 2001, ITU	4.5	4.5 (RO)	10.1	30 (EE, SI)
7. Internet usage, at least once a week (December 2003 ,eEurope+)	12.7	12.7 (RO)	20.5	42 (EE)
8. Number of computers in secondary education per 100 students connected to Internet (December 2003, eEurope+)	9.6	2.1 (LT)		10.7 (HU)
9. Percentage of GPs with Internet access in the consulting room (December 2003, eEurope+)	15.6	12.3(LV)	23	92 (EE)
10. Percentage of population using the Internet for interacting with public authorities (send in filled in forms)(Dec. 2003, eEurope+)	0.7	0.5 (LT)	2.3	14.4(EE)
11. Percentage of population that has bought online (Dec. 2003, eEurope+)	0.9	0.8 (LT)	3.4	12.3 (CZ)
12. Percentage of population that has bought online (TNS 2002)(BG, RO, HU and LV not included)	n.a.	1 (PL, LT)		3 (EE)
13. Percentage of population that used e-banking (Dec. 2003, eEurope+)	0.7	0.2 (BG)	4.0	40.1 (EE)
14. Percentage of enterprises that purchased online (Dec. 2003, eEurope+)	4.6	4.4 (BG)	14.9	29.8(CZ)

## **Background**

Romania has known several decades of relatively isolated development under the rule of Dictator Ceausescu. Transition proved to be a difficult task, more than for most other CEE 10 countries, and Romania was plunged into a deep transitional recession. Romania is, with Bulgaria, the poorest CEE 10 country (EU membership is foreseen in 2007) and Information Society development has not been seen, until recently, as a priority task. In 2001, 44.4% of the population was working in agriculture and forestry (Eurostat).

## **IT infrastructure**

Full liberalisation of the telecommunications market took place in 2003. The Greek operator OTE took a majority stake in Romtelecom and raised its ownership from 35% to 54% (2002).

According to the eEurope+ survey the fixed line penetration rate is 19.6 for 100 inhabitants (June 2003), exactly the same as the IBM survey gave for December 2002. Apparently, there has not been any progress. However, according to the National Regulatory Authority, the fixed line network is still expanding.

Thirty nine percent of urban households (settlements between 2,000 and 100,000 inhabitants) have a fixed telephone line and 29% in rural households (settlements with less than 2,000 inhabitants). While 17% of rural households has access to cable TV, it is 78.5% for urban households (2003, NRA). Although, in 2003, there were 6.2 million mobile lines in Romania, 3.8 million cable TV subscriptions and 4.3 million fixed lines, only 53% of the Romanian population had a fixed telephone line (eEurope+, December 2003). The quality of service of fixed lines is low. This raises the question of using the cable TV network for Internet service provision. Broadband Internet provision through the cable TV network is already possible and increasingly popular. In December 2003, 7.4% of households with Internet access at home accessed it using a cable modem.

The cable TV network (five major players with 80% of the market- 2003) was preparing for liberalisation in 2003 and preparing the network for fixed telephony (costs approximately US\$ 200 a line). UPC experimented in Plusti with the provision of Internet over cable. It is estimated that 0.7-1 billion US dollars is needed for turning the cable networks into modern, two-way, star-shaped ones. Only strategic investors can afford this (Oaca, 2003).

Investments in the telecom infrastructure are still very low (among the lowest in the CEE 10). Big investments are not foreseen and not deemed necessary because it is believed that with new technologies, especially wireless solutions, cost saving improvements in the telecommunications networks might be possible. Universal service is not seen as a priority. From a commercial point of view, expansion of the fixed line network is not seen as lucrative.

Fourteen percent of households with Internet at home accessed it using a mobile telephone (eEurope+, December 2003). There are four mobile operators. The mobile penetration rate was 28.5% in February 2004 (eEurope+; 31.7% in October 2003) while it was 24% in December 2002 (IBM 2003A, p. 45)<sup>20</sup>. IBM (2003B, p. 46) gives a mobile penetration rate of 26% in June 2003. Two operators offer GPRS services that cover about 95% of the population (IBM 2003B, p. 112). In addition, there is a G3 mobile network covering the whole country.

The fixed incumbent's tariffs have not been rebalanced yet (IBM 2003B, p. 111).

Romtelecom is obliged to provide cost oriented interconnection charges. These charges for termination in the fixed network are higher but comparable to the EU average (mid 2002, IBM 2003A, p. 105). Fixed to mobile charges are the lowest in the CEE 10 and about half of the EU 15 average charge (IBM 2003B, p. 112).

### **Computer usage**

The number of households with a computer has increased dramatically. While according to the NRA and ITU 6% of households had a computer in 2002, it was 21.2% in December 2003 (eEurope+). However, 65% of the computers are not connected to the Internet (December 2003, eEurope+)

### **Internet usage**

With respect to Internet usage there has been a big step forward (4.5% in 2001, 12.7% in December 2003; eEurope+). However, Internet usage stagnated during the year 2003. The expansion of public Internet access points may have contributed to the expansion since 2001 (from 0.050 per 1,000 inhabitants in 2001 to 0.231 per 1,000 in June 2003; the biggest increase in CEE 10 in terms of percentages).

Of all Internet users, 34% accessed the Internet from home (CEE 10 average 50%), 33% from work (CEE 10 average 43.5%), 41% from an Internet café (CEE 10 average 19%) and 16% from neighbours, friends or relatives houses (CEE 10 average 17%) (eEurope+, December 2003)<sup>21</sup>.

Another remarkable outcome of the eEurope+ survey is that 23% of Romanian regular Internet users made phone calls through the web (December 2003).

Above all, lower income groups in Romania use the postal office, place of work and Internet café to access the Internet. In Romania, there is no clear pattern as to the frequency of Internet usage and household income categories. Above all employees and students are using the Internet. They

<sup>20</sup> According to IBM (2003B, p. 46), the mobile penetration rate was June 2003 26%.

<sup>21</sup> Of all those who accessed the Internet during the past three months, 26 accessed the Internet from an Internet café in June 2003, but 41% in December 2003 (eEurope+).

represent 44% of all respondents but 68% of those who used the Internet did so in the last three months (June 2003, eEurope+).

Many in the age category 16-20 years old use the Internet.

### **e-education**

Very few are accessing the Internet in schools and universities. However, according to the Romanian ministry of education, 57% of schools have Internet access (2003).

The Global IT report mentions the IT brain drain as one of the big problems in Information Society development.

Romania has only 9.6% of the population with tertiary education (2002) (European Innovation Scoreboard, 2003). Digital literacy is very low (SIBIS 2003A).

### **e-government**

Only 12.4% of Romanian enterprises use the Internet for communication with public authorities, the second lowest percentage in the CEE 10 (CEE 10 average: 34.5%; eEurope+, December 2003).

### **e-health**

Romania has the lowest percentage of GPs that have Internet access in their consulting rooms in the CEE 10. However, 43% of hospitals have Internet access and 33% of health clinics (2002, NRA and ITU)

### **Enterprises, IT usage, and e-commerce**

The share of survey respondents (1,650) that purchased goods online decreased from 1.3% in June 2003 to 0.9% in December 2003 (eEurope+). The percentage of respondents that used Internet banking increased from 0.4% to 0.7% of the population. These are very low percentages in a CEE 10 perspective. 1.2% of males use Internet banking but only 0.2% of females (December 2003).

It appears that 25% of the Romanian workforce makes use of a computer (eEurope+, December 2003)<sup>22</sup>. But 58% of Romanian employees do not know how to use any programme (CEE 10 average: 41%) and 27% can use with Internet (CEE 10 average: 37%) (eEurope+, June 2003). However, 36% of the workforce received basic IT training (eEurope+, household survey, December 2003).

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<sup>22</sup> According to the NRA (and ITU) 39% of employees use computers in their normal working routine (2002).

The Romanian eEurope+ enterprise survey showed that 79% of enterprises use computers (June 2003). However, 58% of the enterprises with a computer are in wholesale and retail trade. Ninety percent of these enterprises with a computer have 1 to 5 computers and 49% of computers are connected to Internet. Twenty five percent of firms have Internet access. Forty one percent of enterprises with computers have 1-20% of their workforce using computers regularly (June 2003).

Sixteen percent of Romanian companies have their own web page (December 2003). Only 5% of companies use e-banking (December 2003).

### ***Inhibitors***

Telephone tariffs are not re-balanced yet. The level of both rentals and price of national calls is very low in comparison to other CEE 10 countries and to the EU 15 average as well (IBM2003A, p.104). However, prices of international calls are among the highest in the CEE 10. Romtelecom claims that telephone tariffs have decreased by approximately 20% in real terms during 2000-03.

Internet costs are very low with an average of € 10 a month (the lowest in the CEE 10 according to IBM 2003 and eEurope+ 2003).

### ***IS policy***

Romania has a problem with implementing intellectual property rights regulations<sup>23</sup>. There is a high piracy rate (70% in 2002; the highest in the CEE 10, see 2002 BSA piracy study results, International Planning and Research Corporation).

There is also a problem with under-utilization of human capital. Only one quarter of IT specialists are working in their field, half are working in another field while one quarter emigrated.

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<sup>23</sup> The International AntiCounterfeiting Coalition recommended in 2003 to the US government that Romania, and also, among others, Turkey and Bulgaria, be placed on the Watch List, identifying specific problems and deficiencies in obtaining adequate intellectual property protection.



The SWOT of Information Society Performance in Romania	
<p><i>Strengths</i>  ICT specialists  ICT use in enterprises  High cable TV penetration  Consolidation of telecommunications operator market  ICT usage in schools</p>	<p><i>Weaknesses</i>  Low per capita GDP  Low fixed line penetration rate  Low share of population having tertiary education  Low PC and Internet penetration at schools  Deep rural-urban divide  Low level of Internet usage among youth</p>
<p><i>Opportunities</i>  Multi channel access policy  Leapfrogging with help of new technologies  EU integration</p>	<p><i>Threats</i>  Lack of ICT infrastructure in rural areas  Lack of IT specialists due to emigration  Implementation of intellectual property rights regulations</p>

## Slovenia

SLOVENIA	Some basic indicators about Internet usage in a comparative perspective			
		CEE 10 lowest	CEE 10 average	CEE 10 highest
1. Population (in millions, 2004)	2.0	1.4 (EE)		38.2 (PL)
2. GDP in Purchasing Power Parity per capita (as percentage of EU 15, 2003)	76	26 (BG, RO)		76(SI)
3. Fixed telephony household penetration, December 2001 (IBM 2003A)	85.3	49.9 (RO)		85.3 (SI)
4. Fixed telephony household penetration, June 2003 (IBM 2003B)	96.2	50.2 (LT)		96.2(SI)
5. Percentage of households with a PC (December 2003, eEurope+)	64.3	16.7 (BG)	32.6	64.3(SI)
6. Internet usage 2001, ITU	30	4.5 (RO)	10.1	30 (EE, SI)
7. Internet usage, at least once a week (December 2003, eEurope+)	40.3	12.7 (RO)	20.5	42.0 (EE)
8. Number of computers in secondary education per 100 students connected to Internet (December 2003, eEurope+)	3.6	2.1 (LT)		10.7 (HU)
9. Percentage of GPs with Internet access in the consulting room (December 2003, eEurope+)	48.3	12.3 (LV)	23	92 (EE)
10. Percentage of population using the Internet for interacting with public authorities (send in filled in forms)(December 2003, eEurope+)	5.1	0.5 (LT)	2.3	14.4 (EE)
11. Percentage of population that has bought online (December 2003, eEurope+)	9.8	0.8 (LT)	3.4	12.3 (CZ)
12. Percentage of population that has bought online (TNS 2002)(BG, RO, HU and LV not included)	n.a.	1 (PL, LT)		3 (EE)
13. Percentage of population that used e-banking (December 2003, eEurope+)	12.5	0.2 (BG)	4.0	40.1 (EE)
14. Percentage of enterprises that purchased online (December 2003, eEurope+)	21.5	4.4 (BG)	14.9	29.8 (CZ)

## **Background**

In socialist times, Slovenia was one of the most Westernised and richest regions (it was part of the former Yugoslavia) in the CEE 10. Its social and economic development was hardly interrupted by the conflict in the former Yugoslavia to which it was to a high extent shielded.

## **IT infrastructure**

Telekom Slovenije was sold off in 2003 and lost its status of being a public company although a majority of its shares (67%) are state-owned<sup>24</sup>.

The telecommunications markets in Slovenia has been liberalised since mid-2001 but by June 2003, no alternative fixed operators were operating in the country. Competition has only been introduced in the market for international calls.

Twenty percent of residential lines are ISDN, which is by far the highest ratio in the CEE 10 (IBM 2003B, p. 117).

The biggest mobile operator (Mobitel) is a fully owned subsidiary of Telekom Slovenije. Mobile services are one of the most developed in the CEE 10. The penetration rate is the second highest in the CEE 10. The two biggest operators are providing GPRS services (4.67% of mobile subscribers use GPRS). UMTS services were been launched at the end of 2003.

Local loops are not yet unbundled.

The fixed-to-fixed and mobile-to-fixed interconnection charges are equal. The charges were decreased in August 2003 and are at the EU 15 average (IBM 2003B, p. 119). Fixed-to-mobile charge is almost at the level of the EU average. The tariffs are reported as not rebalanced yet but the price level of monthly rentals are very similar to EU 15 comparative figures (IBM 2003B, p.118).

The maintenance of the de-facto state monopoly is blamed in SIBIS (2003M) for the slow down in the advance of the Information Society in Slovenia. During the mid-1990s Slovenia was on a par with the EU 15 average (and better with respect to PC and Internet usage, SIBIS 2003M, p. 10) while it is now clearly below the EU 15 average for a range of Information Society indicators.

Analogue networks were fully replaced by digital switches and fibre optic cables by the end of 2000. Slovenia has great prospects for wireless access.

Liberalisation of the Internet Service Provider market in January 2001 led to competition and there are now more than 40 ISPs.

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<sup>24</sup> According to the SIBIS (2003M) report there was (per June 2003) no clearly defined deadline for privatisation.

## **Computer usage**

Slovenia exceeds the average PC penetration rate for EU 15 countries.

## **Internet usage**

Relatively low telephone call tariffs have led the Internet to spread quickly and 40% of the population are regular Internet users (at least once a week), just below the CEE 10 leader Estonia. 73.6% of Internet users are accessing Internet from home (CEE 10 average 50%, December 2003, eEurope+) pointing at affordable access costs. In addition, access from the workplace is relatively high (47.8%) while the use of Internet cafés is less important (3.5%).

5.6% of Slovenians that access the Internet from home use mobile telephone as a device to access Internet (eEurope+, December 2003). It is not clear what it means: just using e-mail or more advanced Internet usage. However, with respect to the connection mode for accessing Internet at home, it appears that the mobile is only used by 0.7% of Internet users while cable modem by 8.1% (December 2003; eEurope+)<sup>25</sup>.

The fact that all public libraries offer free Internet access helped to spread Internet usage. Six percent of Internet users accessed the Internet in a public library (eEurope+, December 2003).

The eEurope+ survey showed that only 33% of women are regularly using Internet, against 48% of men (December 2003).

## **e-education**

Slovenia stands out for its widespread use of online education. Eight percent of those having used the Internet had used online courses while 12.3% had followed online lectures (eEurope+, December 2003).

Among respondents with primary and lower secondary education the percentage was 19.4% and among respondents with tertiary education 12%. In online courses that are not directly related to work, again respondents (that are Internet users) and have only primary and lower secondary education participated more (7.5%) than respondents with upper secondary education (6.2%) and tertiary education (7.2%) (June 2003).

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<sup>25</sup> At the end of 2003 the Research on Internet (RIS) survey found that 14% of Internet access was with cable modem, and 2% by mobile phone.

## **e-government**

One of Slovenia's assets is the extremely high interest of the population in e-government services. According to SIBIS (2003M, p. 39) there is no other European country where the discrepancy between interest in IS services and actual usage is so large. eEurope+ data shows Slovenia having a high level of online interaction between citizens and government. However, e-government services for enterprises seem to be less developed. Thirty one percent of all enterprises use Internet for interacting with public authorities (CEE 10 average is 35% (eEurope+, December 2003).

## **e-health**

Forty eight percent of Slovenian GPs has Internet access, 76% used electronic patient records, and 4% of those GPs having Internet exchanged these patient records (eEurope+, December 2003). Fifty six percent of Slovenian GPs had a computer in the consulting room (December 2003).

## **Enterprises, IT usage, and e-commerce**

Ten percent of the Slovenian population has bought online (February 2004) but this is still only half of the EU average (20% of the EU population, January 2003, SIBIS 2003A).

21.5% of Slovenian enterprises have bought online (CEE 10 average is 15%; December 2003). Only 6% have received orders online (CEE 10 average is 9%). It seems that e-commerce is underdeveloped compared to the relatively high level of Internet usage. However, 94% of Slovenian enterprises have access to the Internet (highest percentage in CEE 10). But only 44% of enterprises have their own website (close to the CEE 10 average of 36%; December 2003). Seventy six percent of the enterprises that use Internet use it for banking and financial services.

The question can be raised whether the proximity of business partners and government institutions in Slovenia reduces the need for online interactions.

A remarkable finding of the eEurope+ survey is that 57% of Slovenian enterprises have LANs (1<sup>st</sup> place in the CEE 10, Lithuania is in 2<sup>nd</sup> place with 16%) while 23% of enterprises use Intranet (1<sup>st</sup> place in the CEE 10) (December 2003).

The business sectors with the highest percentages with LAN are hotels/restaurants (77%), real estate/renting (50%) and wholesale and retail trade (48%). 26% of Slovenian companies offer goods or services on the net, above all hotels and restaurants (44%) and real estate/renting/business services (29%).

## **Inhibitors**

Only 5% of respondents who do not use the Internet cited 'the content is not useful' as a reason (CEE 10 average: 5%; eEurope+, December 2003). The three most frequently quoted reasons were 'I have no access device at home' (25%), 'I don't need Internet' (23%) and 'I do not know how to use a computer' (30%) (eEurope+, December 2003).

Dial-up Internet access costs for residential users are high due to high ISP charges (above the EU maximum) but xDSL technology is used (2.6% of households) and relatively cheap (eEurope+, June 2003)

## **IS policy**

In the mid 1990s, Slovenia was above the EU 15 average in the majority of ICT indicators. In the late 1990s, a slow down appeared and a two-year lag manifested. However, the lag in ICT development is still much smaller than the general development lag in GDP (around 10 years) (SIBIS, 2003M).

In 2001 a Ministry for Information Society was established which started numerous activities.

<b>The SWOT of Information Society Performance in Slovenia</b>	
<p><i>Strengths</i>                      High levels of Internet and computer usage                      Widespread online education                      ICT usage in enterprises</p>	<p><i>Weaknesses</i>                      Relatively low number of computers in schools with Internet access                      Low level of e-commerce</p>
<p><i>Opportunities</i>                      Potential of e-commerce is hardly used                      EU integration</p>	<p><i>Threats</i>                      Digital divide with EU grows</p>

## Slovak Republic

SLOVAK REPUBLIC	Some basic indicators about Internet usage in a comparative perspective			
		CEE 10 lowest	CEE 10 average	CEE 10 highest
1. Population (in millions, 2004)	5.4	1.4 (EE)		38.2 (PL)
2. GDP in Purchasing Power Parity per capita (as percentage of EU 15, 2003)	49	26 (BG, RO)		76(SI)
3. Fixed telephony household penetration, December 2001 (IBM 2003A)	69.5	49.9 (RO)		85.3 (SI)
4. Fixed telephony household penetration, June 2003 (IBM 2003B)	58.2	50.2 (LT)		96.2(SI)
5. Percentage of households with a PC (Dec. 2003, eEurope+)	45.7	16.7 (BG)	32.6	64.3(SI)
6. Internet usage 2001, ITU	12.5	4.5 (RO)	10.1	30 (EE, SI)
7. Internet usage, at least once a week (Dec. 2003, eEurope+)	26.8	12.7 (RO)	20.5	42.0 (EE)
8. Number of computers in secondary education per 100 students connected to Internet (December 2003, eEurope+)	3.5	2.1 (LT)		10.7 (HU)
9. Percentage of GPs with Internet access in the consulting room (December 2003, eEurope+)	18.3	12.3 (LV)	23	92 (EE)
10. Percentage of population using the Internet for interacting with public authorities (send in filled in forms)(Dec. 2003, eEurope+)	1.9	0.5 (LT)	2.3	14.4 (EE)
11. Percentage of population that has bought online (Dec. 2003, eEurope+)	3.5	0.8 (LT)	3.4	12.3 (CZ)
12. Percentage of population that has bought online (TNS 2002)(BG, RO, HU and LV not included)	2.	1 (PL, LT)		3 (EE)
13. Percentage of population that used e-banking (Dec. 2003, eEurope+)	8.2	0.2 (BG)	4.0	40.1 (EE)
14. Percentage of enterprises that purchased online (December 2003, eEurope+)	15.1	4.4 (BG)	14.9	29.8 (CZ)

## **Background**

In 1993, Slovakia became independent after a peaceful process of separation. Before World War II Slovakia was a largely agricultural country. After 1945, a heavy industrial base has been built up. In many respects, the economic gravity point of Czechoslovakia was in the Czech lands. The GDP per capita in PPP was in 2003 just above the average level of the 10 countries that acceded to the EU in 2004.

## **IT infrastructure**

Since 1999, Slovakia had extremely high telecommunications investments (236 dollars per capita during 1999-2001, against 183 dollars for the OECD area, 90 dollars for the Czech Republic and 54 dollars for Poland, OECD). At the same time the number of fixed lines has decreased drastically since 2000: 1.74 million lines at the end of 2001 and only 1.46 million lines at the end of 2002 (16% decrease) (IBM 2003A, p. 106).

The fixed telecommunications market has been liberalised since 2003 but this has had no practical effect (IBM 2003B, p. 113). In 2002, Slovenske Telekomunikacie had a 100% market share for voice telephony through fixed lines (IBM 2003A, p. 106) but is facing competition in the market for international calls. As of July 2000 Deutsche Telekom acquired a 51% interest in the fixed incumbent. The rest (49%) is owned by the State.

Slovakia is leading in cable TV penetration (SIBIS 2003L, p. 6). 125 Cable TV operators have reached more than 60% of households (IBM 2003B, p. 115). However, there are very few Internet customers with cable TV connection (1.4% of Internet users, December 2003). Most of the cable TV network is not fit for Internet communication.

There has been a big increase in mobile telephony (68% of respondents in the eEurope+ survey in December 2003, 63% of respondents in the SIBIS survey, January 2003). The two mobile operators offer GPRS services (more than 30,000 users as of June 2003) (IBM 2003B, p. 115).

Telephone tariffs were raised in the middle of 2003 but the price of standard charges after changes (even without free credit) is still below the EU minimum charge (IBM 2003, p. 107). The tariffs of the fixed incumbent operator are still not rebalanced; price cap is used for regulation of these tariffs (IBM 2003B, p. 115). These are based on current costs from May 2004 onward (IBM 2003A, p. 108).

The mobile market has two operators with GSM/DCS licenses and UMTS licenses.

Local loop unbundling has taken place from January 2004 onwards.



## Computer usage

There has been an enormous increase in PC ownership and by December 2003, the computer penetration in Slovakia was significantly above the CEE 10 average. However, 50% of these computers are not connected to the Internet (eEurope+, December 2003).

According to the SIBIS survey (2003A, January 2003), 42% of Slovaks have used a computer over the past 4 weeks, but only 24% has accessed the Internet during the past 4 weeks. This is a big discrepancy. For example, the corresponding figures for Bulgaria are 23% and 21% (SIBIS).

## Internet usage

Internet usage in June 2003 was just above the CEE 10 average with 22% of the population using the Internet at least once a week. It increased to 27% in December 2003, 7% above the CEE 10 average.

### **Slovakia, regular Internet usage (at least once a week) according to rural/urban/metropolitan stratification**

	Metropolitan	Urban	Rural
December 2003	47.4%	26.8%	16.8%
June 2003	48%	22.0%	13.8%

*Source: eEurope+, household survey, February 2004*

The increase in regular Internet usage can be attributed, above all, to an increase in regular Internet usage in urban and rural settlements. We can see this in other countries as well. It may point to saturation levels in metropolitan areas at, for European standards, rather low levels.

Relatively (compared to other CEE 10 countries) many 16-20 years old are using the Internet.

Only 36% of Slovak Internet users are accessing the Internet from home (CEE 10 average: 50%). This may be related to the fact that dial up Internet access costs are rather high. A relatively large proportion is accessing Internet in Internet cafés: 27% of the Internet users against 19% on average in CEE 10 (eEurope+, December 2003).

2.7% of Slovaks that are using the Internet and have a computer at home are connecting to Internet from the mobile phone (eEurope+, December 2003). However, 6.8% of Slovaks that are accessing Internet at home use the mobile phone as an access device (eEurope+, December 2003).

A remarkable finding is that in December 2003 there are 55% more men that are regularly using the Internet (at least once a week) than women.

### **e-education**

Digital literacy of the Slovaks is slightly better than the CEE 10 average (0.4 against 0.3) but far below the EU 15 average of 0.8 (SIBIS, 2003A). The eEurope+ survey showed a digital literacy level that is clearly above the CEE 10 average. IT teachers are in short supply because they can earn much more outside education (SIBIS 2003L, p. 7). In Slovakia, there are many respondents who can use a word processing program (59%) but who do not know how to use the Internet (eEurope+).

### **e-government**

From a CEE 10 perspective, the interaction of Slovak Internet users with public authorities is slightly above average. However, 45% of Slovak enterprises interacted with public authorities (eEurope+, December 2003; CEE 10 average: 35%).

### **e-health**

Only 18% of Slovak GPs has a computer with Internet access in the consulting room, much below the CEE 10 average (eEurope+, December 2003). However, 87% have a computer in the consulting room, 85% use electronic patient records and only 3% of GPs with Internet access exchange these (eEurope+, December 2003).

### **Enterprises, IT usage, and e-commerce**

Fifteen percent of Slovak enterprises have received orders online in 2002 (the CEE 10 average is 9%; 60% of these Slovak enterprises are in wholesale/retail trade and real estate/renting/other business) while 15% of Slovak enterprises had purchased online in 2003 (5<sup>th</sup> place; CEE 10 average: 15%; EU 15 average 23%) (eEurope+). However, only 7.5% of Slovak enterprises that sell or offer services via the Internet received online payments for goods and services offered online (CEE 10 average: 15%-eEurope+, December 2003). This points to the underdevelopment of e-banking. However, 57% of Slovak enterprises use banking and financial services online. In addition, Slovak enterprises score very low (7<sup>th</sup> place in CEE 10) for the use of broadband (16%; CEE 10 average 33%, eEurope+, December 2003).

E-commerce is mostly limited to business-to-business commerce. The final trading phase, i.e. invoicing and payment, is mostly performed in a traditional way (SIBIS 2003L, p. 41).

Only 3.5% of Slovaks bought goods online and was just on the CEE 10 average (CEE 10 average: 3.4%, eEurope+, December 2003)<sup>26</sup>.

Out of eight enterprises that have received payments for Internet sales, three were manufacturing firms, one from the transport/communication branch and three from the real estate/renting/business activities sector (June 2003). However, 58 enterprises from the sample had received online orders in 2002, 14 among them were manufacturing firms, 18 real estate/renting/business activities and 17 wholesale/retail trade firms.

### ***Inhibitors***

For those who do not use Internet, 25% cite as a reason 'computers are too expensive' (CEE 10 average: 18%), while 28% say 'the Internet connection is too expensive' (CEE 10 average: 13%) (eEurope+, December 2003). However, 49.5% do not have an access device at home. With an average monthly salary of 350 euro (but two thirds of the population earns less than that) and high costs of Internet access and computers, economic barriers are very prominent.

Dial up access costs are relatively high in peak and off-peak time, especially for residential users (IBM 2003, p. 108). However, average spending for Internet access per month is at the CEE 10 average (€ 23). Digital literacy and computer penetration suggest that Internet usage could be much higher if made more affordable.

### ***IS policies***

The Slovak government wants to concentrate all coordinating responsibilities in the Information Society are into one central government agency by 2006. Although the Act on Electronic Signature was approved in 2002, advanced electronic signatures are not yet used.

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<sup>26</sup> According to the SIBIS survey Slovakia is doing relatively well (compared to other IS indicators) with respect to e-commerce. Forty% of Internet users use e-banking and 31% of them buy online. Slovakia is only after Estonia, Slovenia, and the Czech Republic with respect to the part of the population that buys online (January 2003, SIBIS 2003M, p. 31). The SIBIS survey of January 2003 revealed that 3% of Slovaks regularly bought on Internet against a CEE 10 average of 2%. Both in Slovakia and CEE 10 2% occasionally bought on Internet (SIBIS, 2003A, p. 45).

The SWOT of Information Society Performance in Slovakia	
<p><i>Strengths</i>  High cable TV penetration  Many students in computer related sciences  Relatively high PC ownership  Business-to-business e-commerce</p>	<p><i>Weaknesses</i>  Declining fixed telephone line penetration  Low Internet usage, especially from home  IS policies are incoherent and often not implemented  Slow implementation of IS policies</p>
<p><i>Opportunities</i>  High investments in telecommunications  EU integration</p>	<p><i>Threats</i></p>