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National Dependability Policy Environments

CZECH REPUBLIC

Report Version: Final
Report Preparation Date: 1 November 2002
Classification: Public
Preparation led by: IABG (D)

Contract Start Date: 1 June 2001 Duration: 18 months
Project Co-ordinator: RAND Europe (NL)

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IST-2000-29202

Project funded by the European Community
under the “Information Society Technology”
Programme (1998-2002)

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Overview of the Country's Information Infrastructure

The ICT environment in the Czech Republic is rapidly changing. In 1999, public investment in telecommunications was 816 million EUROS¹ down from 1031 million EUROS in 1997.² Telecommunications investment per capita was 84.4 EUROS, down from 89.1 EUROS in 1997.³ However, ICT spending levels as a percentage of the Czech Republic's GDP are comparable to those of most Western European countries. The Czech Republic retains the highest ratio of IT spending to GDP in the CEE region.⁴ This is evident in the data concerning ICT intensity. Between 1992 – 1997⁵ and 1992-1999⁶, there was an overall ICT intensity (expenditure as a percentage of GDP) of 2.1 and 6.6. Overall expenditures for telecommunication services increased by 2% of GDP from 1992 to 1999 while hardware expenditures increased by only 0.1% and expenditures for software and other ICT services (as a percentage of GDP) did not change significantly in that period.⁷ With respect to telecommunications, the rapid growth in cellular services over the past years is projected to continue. In 1999, the IT/GDP ratio was 3.1%, with 171 EUROS spent on IT per capita.⁸ Expenditures for IT hardware contributed 1.4% (1.5% in 1997) to the GDP, IT services and software 2.8% (2.6 %), and telecommunications 3.8% (2.6 %).⁹

The Czech IT market, at the same time, is currently in a state of recovery and expansion after several years of stagnation. This new phase is driven in part by higher spending on communications technology. In 2000, it represented the third largest IT market in Central and Eastern Europe (CEE) after Poland and Russia.¹⁰ The per-capita IT-spending in 1999 was 171 EUROS and 198 EUROS in 2000. In 1998, the trade in computer and communications services included 55 million EUROS in communications services exports and 35 million EUROS in computer and information services exports. The corresponding import values were 49 and 35 million EUROS.¹¹ Overall, the IT market in the Czech Republic increased from 1,645 million EUROS in 1998 to 1,954 million EUROS in 2000. Meanwhile, the telecommunications market increased from 2,130 million EUROS to 3,769 million EUROS during the same period. Hence the total ICT market increased from 3,775 million EUROS to 5,724 million EUROS.¹²

¹ Exchange rates for 1997 – 1999 given in European Information Technology Observatory 2001 – EITO p. 523 are applied

² OECD Communications Outlook 2001, p. 91, table 4.10

³ *ibid.*, p. 96, table 4.16

⁴ EITO pp. 147 and 160

⁵ OECD STI Scoreboard 1999, p. 21

⁶ STI Working Papers 2001/4 “Productivity Growth in ICT-Producing and ICT-Using Industries: A Source of Growth Differentials in the OECD?” p. 30 (furtheron referred to as STI Working Papers 2001/4), [http://www.oilis.oecd.org/olis/2001doc.nsf/c5ce8ffa41835d64c125685d005300b0/c1256985004c66e3c1256a6f003a7bb5/\\$FILE/JT00109724.PDF](http://www.oilis.oecd.org/olis/2001doc.nsf/c5ce8ffa41835d64c125685d005300b0/c1256985004c66e3c1256a6f003a7bb5/$FILE/JT00109724.PDF) (visited on 26 Jan 2002)

⁷ OECD STI Scoreboard 2001 p. 67

⁸ EITO p. 148 Table A1

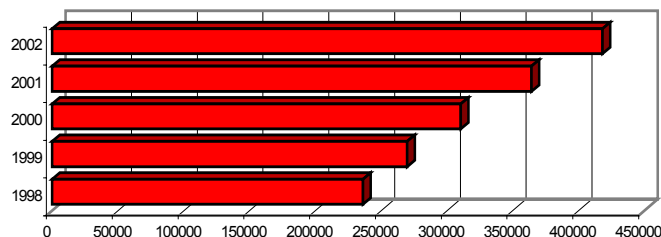
⁹ OECD STI Scoreboard 2001 p.67 and OECD, STI Scoreboard 1999 p. 21

¹⁰ EITO

¹¹ OECD, Information Technology Outlook, 2000

¹² Data taken from EITO, p.484, table 37 for the Czech Republic, pp 457 – 458, tables 9 – 11 for Western Europe.

Number of PCs-1998-2002
(Source: EITO Report)



Internet penetration in the Czech republic is also increasing. Fixed line penetration went from 31.8% of inhabitants in 1997 to 37.5% in 2000.¹³ Mobile penetration grew from 5.1% to 40.9%.¹⁴ PC penetration rose from 7.1% to 13.1%, and internet usage penetration went from 0% to 12.3%.¹⁵ Finally, the Czech Internet market witnessed a dramatic growth in 2000 in terms of total users, network infrastructure and local-language content on the World Wide Web. The number of users rose by 60% in 2000 to reach 960,000.¹⁶ This success has been supported by an increase in household telecommunication access, which was 75% in 1998. In 1998, 11% of Czech internet users accessed the internet at home. The percentage increased to 15% in 1999 and to 24% in 2000.¹⁷

Another interesting set of data refers to the number of hosts. The Czech Republic had 45,700 hosts in July 1997 and 190,386 in September 2001. Meanwhile, the number of hosts per 1,000 inhabitants rose from 4.4 to 18.5. Similar trends apply to the number of web-sites and domain registration.¹⁸ According to one source, there were 200 ISPs in mid 2001, of which 15 were of significant size.¹⁹ However, Internet access is still expensive. The total cost for 40 hours of internet access, calculated at discounted PSTN rates (including VAT), is 189.57 EUROS at peak times and 84.51 EUROS at off-peak times. The EU average is 65.52 at peak times and 44.15 at off-peak times.²⁰ Finally, local language software, which may be considered to be a "soft" aspect of internet infrastructure, extends the reach of information access to overcome language barriers. There are Czech versions of Windows and Internet Explorer, and a Czech language modification for Netscape's Communicator, providing Czech language support for Netscape's Web browser, e-mail client, and news reader.

Similar trends are developing in the business sector. Most of the 25,000 Czech large and medium-sized businesses now use the Internet. Only 1% of large companies and 4 percent of medium-sized companies did not use the internet in 2000. The estimated number of users in the commercial sectors reached

¹³ "eCommerce in the Czech Republic", *Polish Market Review*, July 2001, page 16, more information enc excerpts available on <http://www.polishmarket.com/eczech.php>, visited 2 Feb 2002, free copy downloaded after registration on 2 Feb 2002 from www.polishmarket.com

¹⁴ OECD Communications Outlook 2001 p. 85 Table 4.5 (subscriber numbers) and p. 286 Table A3 (population numbers); the value for 2000 is from "eCommerce in the Czech Republic" page 18

¹⁵ "eCommerce in the Czech Republic", op. cit., page 19

¹⁶ EITO p.160; "eCommerce in the Czech Republic", op.cit., gives 1.24 million users for 2000.

¹⁷ *ibid.* p. 26

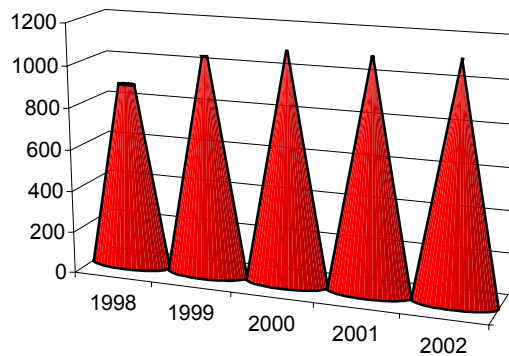
¹⁸ <http://www.nic.cz> -> statistics -> annual statistics -> actual number of domains (visited on 12 Feb 2002)

¹⁹ "eCommerce in the Czech Republic" p. 19

²⁰ OECD, *STI Scoreboard* 2001 pp 191f and "The World Fact Book 2001"

135,000 in December of 1999.²¹ E-commerce is interesting in this context. In 2000, the Czech Republic had 1050 on-line retail sites, including 9 on-line banks. 205,000 Czechs shopped on-line. B2C revenues were 9 million EUROS and B2B revenues were 45 million EUROS.²² Revenues are projected to reach 1000 million EUROS by 2004 and 6000 EUROS by 2005.²³ Still, a July 2000 survey found that 29 percent of Czech Internet users said that the fear of information abuse within transmission is a barrier to on-line shopping.²⁴ The low number of secure servers does not bode well for the future. In October 2000, there were only about 2 secure servers per 100 000 inhabitants in the Czech Republic, up from 0.18 in July 1998.²⁵

Telephone/Internet Service in the Czech Republic (1998-2002)
(Source EITO Report, 2001)



Main ICT. Regulatory and Legal Developments

Although the current government considers the development of the Czech information society as a priority, the implementation is still very slow. The Governmental Council for State Information Policy was established in December 1998. Moreover, in May 1999, the government approved the document “The State Information Policy – The Road to the Information Society”.²⁶ It calls for a series of Action Plan Projects.²⁷ These initiatives are headed by Karel Brezina, Minister and Head of the Office of the CR Government. He also chairs the Governmental Council for State Information Policy and supervises the Office for Public Information Systems.²⁸

²¹ Internet Infrastructure Database <http://www.cceenet.org/database/country/czech.htm> (visited on November 2001)

²² “eCommerce in the Czech Republic”, op.cit., pp. 32 and 49

²³ “eCommerce in the Czech Republic”, op.cit., p 31, referencing estimates of CS Boston (1999) and IDC (2001)

²⁴ <http://www.park.cz/pruzkum/e/round5.htm>, visited on 10 January 2002

²⁵ OECD, *Communications Outlook* 2001, pp. 17, fig. 1.5 and 114, table 5.4

²⁶ <http://www.vlada.cz/1250/eng/vrk/rady/sip/dokumenty/sipcesta/sip.eng.html>, (visited on 4 February 2002)

²⁷ <http://www.info-forum.cz/ceske/projekty/akcp/indexe.html>, (visited on 4 Feb 2002)

²⁸ “ESIS knowledge base”, *IS Promotional Activities Czech Republic Summary Report* (1999 – 2000) February 2001, European Survey of the Information Society (ESIS) knowledge base, <http://europa.eu.int/ISPO/esis/default.htm> (visited 4 February 2002), Information on the Czech Republic to be obtained by selection “Czech Republic” as Area/Country and by ticking “reports”

The Czech approach to the information society is based on 8 priorities. Firstly, it wants to foster information literacy for all citizens; secondly, it wants to foster digital access. Third, it wants to improve the delivery of services of public administration. The establishment of a solid communication infrastructure is the fourth pre-requisite. Data privacy and electronic identifiers are also on the agenda in addition to the need to create a legal framework matching the overall international norms in this area. Security and stability of information infrastructures were mentioned as other objectives.

In terms of legislation, the Telecommunications Act, enacted on 1 July 2000 (Act 151/2000 Coll.), allows the telecommunications operator Cesky Telecom to avoid providing their customers with the option of call-by-call selection of operator. This act runs counter to the liberalisation of the Czech telecommunications market as of January 1, 2001, and the relevant EU Directive No. 98/61/EC forbids such a postponement.²⁹ In June, the following dependability-related acts were approved: Act on Protection of Personal Data (Act 101/2000 Coll.), Act on Auctions (Act 26/2000 Sb.) Act on Consumer Protection (Act 64/2000 Sb.). In October 2000, the Act on Electronic Signatures (Act 227/2000 Coll., enacted 1 Oct 2000) and the Act on information systems and public authorities (Act 365/2000 Coll., enacted 23 Oct 2000) followed.³⁰ All of these acts are fully compliant with the related EU directives.

In terms of access, on 24 April 2000, the Czech Government approved the Concept of the State Information Policy in Education³¹, which called for the wiring of every single school in the Czech Republic to the Internet by the end of 2001. In December 1999, the estimated number of users in the educational sectors was 142,000.³² These initiatives parallel the push for more efficient e-government initiatives. Presently, the Czech government is establishing a State Information System to integrate national, regional, and local government and administration information and to facilitate electronic communications.³³

Since 1999 the Czech cabinet has focused on devising e-commerce policy strategies. In January 2000, the cabinet approved draft basic measures for the support of e-Commerce. The cabinet also assigned the area of electronic commerce to the competencies of the Governmental committee for State information policy. It ordered the production of a plan of activities to develop e-commerce in the Czech Republic by the end of March 2000. The Action Plan³⁴ features two e-commerce priority areas: the first is the Green book on electronic trade, which will identify the conditions and prerequisites for the development of electronic trade in the Czech Republic. The second is an accreditation infrastructure, which aims to improve the credibility of providers of certification services. Finally, in 1999, the on-line Trade Register was launched while the Ministry of Finance created an on-line version of their meta-register.³⁵

In addition to these initiatives, the Czech Republic has also put together a solid legal and regulatory legal framework. Intellectual property rights were addressed by amendments to the trademark law, which the Parliament adopted in June 1995. On 14 March 1996, the Czech Parliament passed a long awaited

²⁹ Ibid

³⁰ Ibid.

³¹ www.msmt.cz/pdf/kestazeni/SIPveVZ.doc, only Czech, (visited on 4 February 2002)

³² Internet Infrastructure Database, <http://www.cceenet.org/database/country/czech.htm>, last update 15 Jan 2000, (visited on 4 February 2002).

³³ "ESIS knowledge base"

³⁴ <http://www.info-forum.cz/ceske/projekty/akcp/indexe.html>, (visited on 4 February 2002)

³⁵ ESIS knowledge base, op. cit.

amendment to the Copyright Law.³⁶ Finally, the Czech Republic ratified the Convention for the Protection of Individuals with Regard to Automatic Processing of Personal Data in July of 2001. It came into effect on 1st November 2001.³⁷

In terms of telecommunications, on 1 May 1999, the Czech government approved a new strategic document in the area of telecommunications – the National Telecommunications Policy (NTP). This document confirmed the liberalisation of voice services by 1 January 2001. Moreover, it established conditions for creating and operating telecommunication and network equipment. It provided instructions on the execution of regulation and other matters of state administration.³⁸

Assessment of Phenomena Undermining Dependability

According to the Ministry of Interior of the Czech Republic, computer crime, including information technology and Internet crime, may create serious damages to the country's information society.³⁹ Presently, the risk is perceived to be concentrated in the area of privacy and pornography. In June 2001, the Czech Interior Minister approved a "Strategy for the Fight against Information Technology Crime"⁴⁰. Although it refers to cyber-crime, the "Report on the Security Situation in the Czech Republic in 1999"⁴¹, it does not provide any statistical information. More data is provided by the "Czech Information Security Survey"⁴² prepared by PricewaterhouseCoopers in 2001. According to this report, over 40% of companies suffered during the last two years from security incidents with real and direct financial impact. The average value of direct financial impact was 10,000 EUROS. The most frequent incidents were power failure, hardware failure, viruses, user mistakes and software failure. Unauthorised external access had tripled in 1999.

Notwithstanding these statistics, low security awareness continues to be the largest obstacle to faster information security enforcement in the Czech Republic. Contrary to the situation in 1999, financial resource needs are not considered an important obstacle. Information security is important or very important for the achievement of company objectives for 97% of organisations. Only 54% of organisations believe that sufficient attention is devoted to information security.

It is also interesting to point out that consumer concerns over security have inhibited the growth of on-line shopping. One survey found that 29.7% of consumers were worried by the possibility of information

³⁶ ESIS knowledge base, op. cit.,

³⁷ Office for Personal Data Protection <http://www.uoou.cz/eng/legisl.php3>, (visited on 4 February 2002)

³⁸ ESIS knowledge base, op. cit.,

³⁹ "Report on the Security Situation in the Czech Republic in 1999" posted by the Ministry of the Interior of the Czech Republic at http://www.mvcr.cz/dokumenty/bezp_si99/angl/index.html, (visited on 4 February 2002)

⁴⁰ http://www.mvcr.cz/odbor/bezp_pol/english/dokument/inf_tech.html (visited on 5 February 2002)

⁴¹ "Report on the Security Situation in the Czech Republic in 1999"

⁴² "Czech Republic – Information Security Survey 2001" PricewaterhouseCoopers, DSM, NBU; information <http://www.pwcglobal.com/cz/eng/ins-sol/survey-rep/surveyrep21.html>; the report (in Czech with an English executive summary on p 18) may be obtained from jiri.halouzka@cz.pwcglobal.com. All of these PWC surveys were targeted on mid and large companies with 100 and more employees. Both public sector and private companies including multinational organisations operating in the Czech Republic are covered.

abuse on the merchant's side, and 29% fear information abuse during transmission. These were the top two reasons why consumers avoided shopping on-line.⁴³

Government Initiatives Aimed at Tackling Cyber-Security

Most governmental initiatives aimed at fostering cyber-security have top-down implementation mechanisms. However, some efforts have been made by the Czech government to allow the public to take an active part in the implementation of the State Information Policy.⁴⁴ In this context, the Ministry of the Interior and the Ministry of Education are playing a leading role.⁴⁵

In this context, one of the Information Society Action Plan Projects⁴⁶ aims to secure the Public Administration Information Systems (PAIS). This project's goals include obtaining security for the PAIS communication system and many other on-line service delivery systems and points of sale. In addition, the Czech Cabinet⁴⁷ is expected to adopt an update of the Action Plan of State Information Policy which will better reflect the priorities of the eEurope+ Action Plan of June 2001.⁴⁸

Industry and Other Non-Government Activities Related to Dependability

The Technology Centre of the Academy of Sciences of the Czech Republic⁴⁹ seems to play a major role in issues related to the information society, dependability, and information assurance. It has, for example, been contributing to international activities (such as IST conferences) that deal with cyber security. In 1996, together with all universities in the Czech Republic, it joined the CESNET Association of Legal Entities. Among its declared goals, CESNET is aiming to devise a gigabit network with a secure backbone interconnecting both its national member networks and international ones.

Legislation has provided positive contributions to industry awareness for information security. Particular attention has been given to Protection of Classified Information Act and the Data Protection Act.⁵⁰ At the same time, many security consulting companies have entered the Czech IT services market.

Public-Private Partnerships

The mission of the Czech Forum on Information Society (CFIS)⁵¹ is to support private-public dialogue concerning the various aspects of the country's effort to undertake information society. The activities of CFIS allow the public to take an active part in the implementation of the state information policy and the resolution of problems related to the origin of an information society. At the same time, it enables the

⁴³ Virtual Information park, <http://www.park.cz/pruzkum/e/round5.htm> (visited on 20 January, 2002); respondents could mark a maximum of five possibilities

⁴⁴ <http://www.vlada.cz/1250/eng/vrk/rady/sip/dokumenty/sipcesta/sip.eng.html> (visited on 4 Feb 2002)

⁴⁵ <http://www.msmt.cz> (visited on 4 Feb 2002)

⁴⁶ <http://www.info-forum.cz/ceske/projekty/akcp/indexe.html> (visited on 4 Feb 2002)

⁴⁷ Private communication from the Czech Office for Public Information Systems

⁴⁸ http://europa.eu.int/information_society/international/candidate_countries/doc/eeurope_june2001.pdf (visited on 4 Feb 2002)

⁴⁹ <http://www.tc.cas.cz/content/> (visited on 4 Feb 2002)

⁵⁰ ESIS knowledge base, op. cit.,

⁵¹ <http://www.info-forum.cz/ceske/projekty/akcp/indexe.html> visited on 4 Feb 2002

public to communicate with the government of the Czech Republic and its institutions and thus to influence the decisions adopted at all levels.

The national Information Society (IS) strategy puts relatively strong emphasis on providing citizens with access to information services through information booths and other types of terminals located in public places. The recently started PPP (Private-Public Partnership) initiative emphasises this type of access to an even greater extent. Several projects have been focused on building such public terminals.⁵²

Research and Development

In 1998, R&D investment amounted to 3.5% of the GDP.⁵³ Expenditure on ICT-related R&D was approximately 0.3% in 1995 and 1999. The ICT percentage of business-enterprise-sector R&D, instead, was 3.9% in 1995 and 4.0% in 1999. Both statistics are very low in comparison with other EU countries.⁵⁴

Research on dependability and information security issues is conducted by researchers of various departments at several universities as well as by government offices such as the Ministry of the Interior and the Ministry of Education. Most of the security development work seems to be performed by the private sector.⁵⁵ The main institutions involved in this research area are the Brno University of Technology,⁵⁶ the Technical University Ostrava faculty of Mechanical Engineering⁵⁷, Czech Technical University of Prague⁵⁸ and CESNET. A review of their activities seem to indicate that the country is acquiring technical expertise in the areas of secure user configuration of industrial systems, security of magnetic measurements and sensors and biometrics.

⁵² ESIS knowledge bas, op. cit.,

⁵³ OECD STI Scoreboard 2001 p. 146

⁵⁴ OECD STI Scoreboard 2001 p. 156

⁵⁵ A list of contacts is given at <http://www.utia.cas.cz/idealist-east/ISTcontacts> (visited on 4 February, 2002)

⁵⁶ <http://www.vutbr.cz> (visited on 4 February, 2002)

⁵⁷ <http://www.muni.cz> (visited on 4 February, 2002)

⁵⁸ <http://cyber.felk.cvut.cz/> (visited on 4 February, 2002)