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National Dependability Policy Environments

HUNGARY

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Overview of the Country's Information Infrastructure

Similar to all Central and Eastern European Countries (CEECs) under communist regime, Hungary neglected its national network for decades. In the beginning of the 1980s Hungary had the third lowest tele-density (telephone lines per 100 inhabitants) of CEECs, with less than one line every ten inhabitants.[1] However, since the mid-1980s, the Hungarian government identified in the modernisation of its communications' infrastructure the prerequisite for economic development. This relatively early commitment put the Hungarian telecommunications system in an advantageous position after 1989. Today, the improvement of the country's telecommunications infrastructure is a major priority. The results have been rapid. Hungary now has the highest telecommunications penetration rate in Eastern Europe, after Slovenia.[2] Meanwhile, call-completion rates have improved, and digitalisation has proceeded rapidly. Matáv, Hungary's main telecommunications provider, had replaced 64 percent of analog lines with digital ones by 1996, while during the three previous years the Hungarian Digital Backbone Network had been installed.[3]

As far as the Internet is concerned, Hungary has a large number of commercial on-line providers and use of the Internet is relatively high. At the end of 1999 the Council of Internet Service Providers in Hungary had 33 member Internet Service Providers.[4] All of them were commercial, except for two (Hungarnet and the Soros Foundation Hungary).[5] The efforts of the Hungarian government in this area have brought visible results. Internet diffusion and people's availability of PCs have grown in recent years. Between 1998 and 2000, the number of Internet hosts per 10,000 inhabitants rose from 94.12 to 102.09. The number of Internet users has increased from 392.46 per 10,000 inhabitants to 699.06. The number of PCs per 100 inhabitants rose from 6.48 to 8.51.

The Worldbank's Information Age Factsheet supports these data, suggesting a number of 129.30 Internet hosts per 10,000 inhabitants in 2000[6], while E-Marketer (a provider of eBusiness statistics world-wide) suggests that the number of active (i.e. one hour or more of surfing per week) 18 and older Internet users in Hungary will reach nearly 1.3 million by 2003.[7] According to a Carnation Internet Consulting survey held at the end of 1999, Internet access locations are mainly educational centres (where 360,000 people gain access), followed by governmental institutions and private homes. However, despite the fact that the

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[1] Tim Kelly, Michael Minges, Lara Srivastava, Jozsefne Pergel, Internet in a Transition Economy. Hungary Case Study, ITU/Hungarian Communication Authority, April 2001, p.5, available at http://www.itu.int/ITU-D/ict/cs/hungary/material/hungary.pdf (visited on 3 December 2001)

[2] At a national level tele-density was 9.6% in 1990 and 37.1 in 1999. However this meant an increase from 22.8% to 54.2% in Budapest against an increase from 6.4% to 32.9% in the province, see Hungarian Telecommunications Regulatory Environment and Authority, Blue Book, May 2000, p.30

[3] Centre for Democracy and Technology, Bridging the Digital divide. Internet Access in Central and Eastern Europe, available at http://www.cdt.org/international/ceeaccess/countrydetail.shtml#119 (visited on 14 November 2001)

[4] Bridging the Digital Divide. Internet in Central and Eastern Europe.

[5] Telecommunications in Hungary at the Millennium, pp. 6 ff.

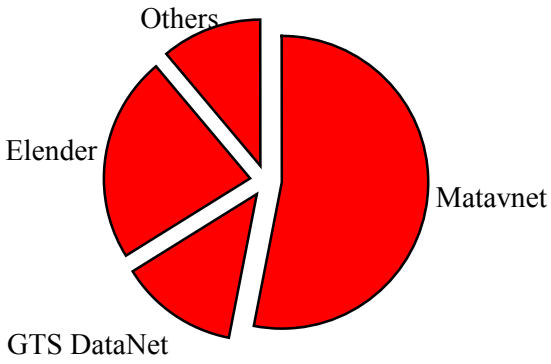
[6] Worldbank, Information Age Factsheet, available at http://www.worldbank.org/data/wdi2001/pdfs/tab5_10.pdf, (visited on 6 November 2001)

[7] eMarketer, Hungary's Healthy eOutlook, available at http://www.emarketer.com/analysis/eeurope/20010213_europe.html (visited on 14 November 2001)

number of private Internet subscribers is growing in 2000 only 25% of Hungarian computer-equipped households had an Internet connection.

About thirty ISPs provide access services to the approximately 120,000 dial-up subscribers and to corporate accounts through VSAT, ISDN or managed leased lines. Three major ISPs (MATAVNet, PSINet Elender, and GTS Datanet) cover 85% of the market. Two of these have US interest. PSINet acquired Elender (30 % market share) in September 1999. GTS, a US based alternative telecommunications service provider owns Datanet (15 percent market share). A new entrant into the Hungarian ISP market is UUNet (member of the WorldCom Group), which has been providing Internet services since early August 2000.[8]

Distribution of Dial-up Subscribers in Hungary 2000
(Source ITU 2001)



On the other hand, due to its price, home-based access seldom occurs. Cost can therefore be considered a strong factor undermining Hungary's Internet usage. Polish Market Review's latest report on e-Commerce in Hungary, published in August 2001 underlines the rarity of home Internet access. It states that "According to TNS Modus (2000), 85% of Hungarian Internet users have free access to the Internet through schools and other public institutions. Very similar data are provided by NetSurvey: the most common locations of Internet access are the workplace or school and friends' homes. The rarity of home-based access is confirmed by the fact that only about 2% (estimates vary between 0.7% and 3.5%) of Hungarian households have Internet access."[9]

Prices for services, including the use of telephones began to rise dramatically in the early nineties. Between 1992 and 1999 price increase for services connected to the telephone each year exceeded the rate of the annual change in consumer prices, with the consequence that telecommunication related expenditures have been an increasingly heavy burden in recent years.[10] OECD data for 2000 and 2001 confirm that the cost of Internet access is the highest in Hungary. A survey made on OECD's request concludes that a boom in the use of the Internet in Hungary is hindered by unfavourable telephone rates.[11]

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[8] CEEBICnet Market Research, 2000, Guide to Internet Security Markets in Europe, available at http://www.sce.doc.gov/documents/market_briefs/telecommunications/pdf/Internet%20Security%20Market%20Briefs.pdf (visited on 14 November 2001)

[9] Polish Market Review, E-commerce in Hungary, August 2001, available at http://www.polishmarket.com/ehungary.php (visited on 14 November 2001)

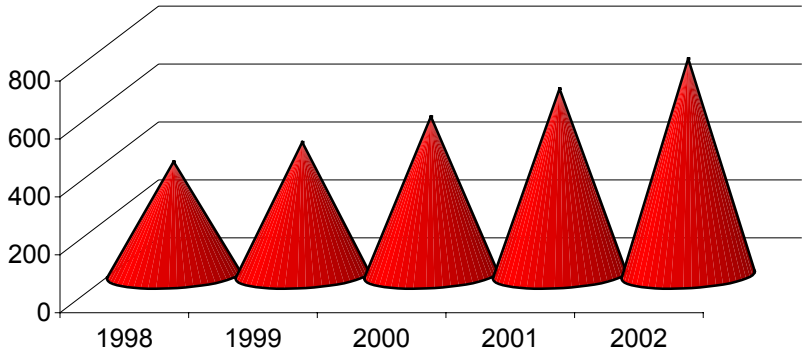
[10] Telecommunication in Hungary at the Millennium, p.7

[11] Bridging the Digital Divide. Internet Access in Central and Eastern Europe

The issue emerging, then, is the relation between access and dependability and the impact of low access on the level of public awareness in the country. The Internet Rights report states that awareness of security issues in this country is low, with important implications on dependability: "The awareness about the need of security (e.g. Firewalls) is not so high in Hungary. Mostly advanced users (especially system operators and linux gurus) use firewall programs. PGP or other encoding is very rare used in Hungary. Since there were some famous cracker attacks on some big ISP servers in early 2000, the police set up a new department for Internet crime".

Work-based Internet access appears to be more satisfactory. Nevertheless, although the availability of free Internet access from work or from school may facilitate growth of Internet use in general, the rarity of home-based access may hamper the growth of B2C e-Commerce in Hungary. The expectations concerning B2C e-Commerce in Hungary for the forthcoming years are not the best. Up to the year 2000 there were 548 Hungarian companies selling their products over the Internet or providing telecommunication and Internet services. In 1999, the estimated size of this sort of commerce amounted to less than 1% of total retail sales[12] (773,300 Euro), while for the future years B2C transactions were estimated to reach 3,700,000 EURO in 2000 and just over 2 billion in 2010. According to the Guide to Internet Security Markets in Europe, this situation is due to three factors: low Internet penetration; few opportunities of on-line banking; and the lack of efficiently organised home delivery.[13]

Internet and Telecommunication Services in Hungary
(Source EITO 2001)



In an article on 9 May 2001 on 'Country Commerce' (a publication of the *Economist Intelligence Unit*) it was stated that "E-commerce in Hungary is nascent. […] Though strong growth is expected in the coming years, B2C e-commerce in Hungary is still in an embryonic stage. The barriers to take-off include low Internet penetration, lack of online payment possibilities and a paucity of reliable delivery services. Transactions are dominated by information technology products, home appliances, music and books."[14]

Concerning B2B e-Commerce, this was, until 2000, transacted almost exclusively through Electronic Data Interchange (EDI) systems. EDI was introduced in Hungary in 1996 and by the end of 1999 there were 400 users, mainly in the retail, automotive, and Fast Moving Consumer Goods sectors. According to Carnation Consulting estimates this figure could reach 1,500 by 2002. Internet based solutions (WEB-EDI

[12] European Information Technology Observatory (EITO) 2001, p.478

[13] Guide to Internet Security Markets in Europe, p. 48.

[14] "Hungary: B2C e-Commerce just getting started", in EIU ebusiness forum, May 9, 2001 available at http://www.ebusinessforum.com (visited on 14 November 2001) Source: Country Commerce

and Internet/EDI systems) are expected to obtain a larger share of B2B transactions.[15] During 2000, B2B e-commerce turnover totalled 499,500,000 Euro.[16] The lack of sophisticated internal information systems hinders the spread of integrated B2B e-commerce.

Main ICT Regulatory and Legal Developments

The Hungarian government has been active in recent years in tackling these issues through policy-making and legislative action. Between 1989 and 1993 the Hungarian government focused on the establishment of a digital network for basic communications, drawing upon loans from the World Bank and the EIB. Until 2001, the national regulatory framework was essentially based on the 1992 Act LXII concerning competition of the telecommunications' market. However, in 2001, after two years of consultations, a new *Communications Act* came into force, with the major aim of unifying the regulation of postal and communications services and frequencies, and providing the legal basis for opening up Hungary's telecoms market to liberalisation, while, at the same time, regulating the activities of dominant communications operators according to EU trends.

In fact, in view of its accession, Hungary engaged itself in policies of privatisation/deregulation, promotion of infrastructure development and universal access. In 1989, the old state-owned Post, Telegraph & Telephone (PTT), responsible for the provision of all telecom, broadcasting and postal services in Hungary, was split up into three new companies: Matáv (telecom), the Hungarian Broadcasting Co. (or Antenna Hungaria) and the Hungarian Post Office.

In 1991, Matáv was transformed into a shareholding company, and between 1993 and 1997 93.5% of its shares were offered for sale. Although Matáv is predominately privately owned, its infrastructure improvement efforts have largely been dictated by government conditions suggesting an enhancement of public access to basic telephony services and the establishment of the country as a regional telecommunications hub. Nonetheless, as the network modernisation program neared completion, Matáv shifted the focus of its investment program away from public infrastructure to business communications and internal restructuring, which may bode ill for the development of affordable Internet and other services.[17]

Finally, universal service obligations are defined in the concession agreements and the Act on Telecommunications allocates several obligations of this kind to the PSTN operator. While Hungary has had some proposals for expanding and clarifying its universal access policies, by mid-1999 they were not in place yet.

Another important initiative began in the early 1990s, when the government launched a program to bring Internet access to all institutes of higher education. In the mid-1990s, the program, known as *Sulinet* (Schoolnet), was extended to the nation's high schools, with the goal of connecting all high schools to the Internet by the end of 1998. In 1999, the program was extended also to elementary schools.

A third essential regulatory initiative, along with the creation of an Inter-ministerial Committee for Information Technology, has been the adoption, in 1998, of the NPAA (National Programme for the Adoption of the Acquis), as a consequence of the governments' efforts to bring Hungarian levels of

[15] Guide to Internet Security Markets in Europe, p. 49.

[16] Hungary: B2C e-Commerce just getting started

[17] Bridging the Digital Divide. Internet Access in Central and Eastern Europe

service and legal framework in line with EU standards. In 1999 a comprehensive revision of the Programme was compiled, in consideration of progress achieved during the *acquis* screening process and preparatory measures taken in Hungary. The revision of 2000 covered only the necessary modifications arising from developments in the accession negotiations, changes in the *acquis* and the inclusion of year 2002 into the Programme as a consequence of the modification of the Hungarian working hypothesis for the date of accession from January 1st, 2002 to January 1st, 2003.

The Programme considers the main issues which the government ought to tackle in view of accession to the EU, devoting in particular a significant increase in expenditure for law approximation in IS fields. These include Telecommunications (from 3 million EURO in 2000 to 10.82 million EURO planned for 2002), Information technologies (from 436,600 EURO to 5 million EURO during the same period) and R&D (12.62 million EURO in 2000 against 24.58 million EURO in 2002).[18]

On 17 May 2001 the Minister Heading the Prime Minister's Office launched the NITS (National Information Society Strategy) to promote the development of the information society and avoid any related intensification of the digital divide.[19] Moreover, during the same month, the parliament adopted the Act on Electronic Signature, complying with the EC Directive 1999/93 on a Community framework for electronic signatures.[20]

Finally, the Inter-ministerial Committee is also engaged in other activities, not directly linked to spending plans. These include centralised government procurement to ensure quality, transparency of spending of public funds and affordable pricing for longer periods of time; and government demonstration and development projects, in consideration of the great increase of monthly electronic traffic (150,000 electronic documents and 600,000 E-mail circulated in Hungary following the introduction of electronic inter-governmental communication in 1994). The Committee is also involved in the adoption of standards - groundwork has started to complete the IT Act regulatory mechanism and so far 14 normative recommendations have been issued, which correspond to EC directives, to provide government organisations and suppliers with information and methodology.

Other such activities include R&D programmes[21]; technology diffusion, through dissemination programmes/project, such as, *Sulinet* or the *Telecottage project*, (aimed at disseminating information technology in small villages); and International co-operation[22] in multi-lateral and bilateral relations[23] and co-ordination of international aid (PHARE etc.).

Lastly in this sphere comes assessment: to ensure transparency of public expenditures, feedback to programmes (institutional learning) and assistance to policy formulation, a systematic evaluation activity was introduced, reviewing national programmes every three to five years on the grounds of their

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[18] Ministry of Foreign Affairs Hungary, State Secretariat for Integration, National Programme for the Adoption of the Acquis, Revision of June 2001, p. 10, available at http://www.mfa.gov.hu/euanyag/NPAA/Cover.htm (visited on 14 November 2001)

[19] Ibid.

[20] Ibid.

[21] See also below

[22] Source: OECD national surveys in Science and technology, available at www1.oecd.org/dsti/sti/it-out2000profiles/hungary.htm3 (visited on 30 November 2001

[23] Through GIP, G7, ICA, EEMA, IDA and the European and the Euro-Atlantic integration process, as well as CCTA and GSA with Finland, Germany, Malaysia and South Africa

economic impact, externalities and additionality. The cost of an evaluation should be limited to 1% of the money spent on the programme.

Assessment of Phenomena Undermining Dependability

The 'Convention on Cybercrime' by the Council of Europe (issued on November 23, 2001) lists a number of "cyber-offences", among which are illegal access, illegal interception, data interference, system interference, but also computer-related fraud and child pornography etc.[24]

According to Cole Durham, unauthorised access is emerging in many jurisdictions as the threshold offence in the field of computer crime. This is not surprising since access is the fundamental factual predicate for anything else that can be done with a computer. In any event, unauthorised access appears to be the basic building block of most other computer crimes. It is the "least included offence" in a hierarchical series of crimes that become progressively more serious as aggravating harms and culpability states are added to the base offence.[25]

This is also true for Hungary, where the government, at times in partnership with the private sector, is engaged in fighting any form of crime, thus also computer-related crime. The Hungarian Constitution itself is devoted to ensuring the right to privacy and security for all, therefore implicitly covering the case of cyber-threats. The constitution states that "Everyone in the Republic of Hungary shall have the right to good reputation, the inviolability of the privacy of his home and correspondence, and the protection of his personal data."[26]

At the same time, an important feature is also software piracy and infringement of IPR statuses.

The Protection of Trademarks and Geographical Service Marks (Trademark Act) is a statute that was passed by the Hungarian Parliament and took effect on 1 July 1997. When passing the Trademark Act, Parliament considered the old Hungarian trademark laws of 1969 as well as the respective laws of the European Union. In addition, in September 1993, Hungary signed a comprehensive intellectual property rights agreement with the United States. The agreement addresses such issues as copyright, trademarks, and patent protection. The US Government was to track the Hungarian government's enforcement of this agreement to ensure that protections are duly enforced.

Copyright protection was extended to literary, scientific, and artistic creations, including software. A major complaint over IPR protection in Hungary has been the lack of enforcement especially in the area of software, sound recordings, videotapes, movies, and cable TV.

For the year 1994, data shows that Hungary, with a rate of 76% (a retail avenue of $101,902), was ranked the third highest amongst the Eastern European Countries for software piracy, after Russia and Poland. By 1996 the situation had improved. The rate had fallen to 69% (a retail avenue of $42,987), placing Hungary fifth, behind Russia, Poland, Czechoslovakia and the CIS - less Russia, respectively.

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[24] Council of Europe, Convention Cybercrime, Budapest 23 November 2001, available at http://conventions.coe.int/Treaty/EN/projets/FinalCyberCrime.htm (visited on 29 November 2001)

[25] Stein Schjolberg, Chief Judge Moss byrett, Norway, The legal framework - unauthorised access to computer systems penal legislation in 41 countries, October 1, 2001, available at http://www.mossbyrett.of.no/info/legal.html (visited on 13 November 2001)

[26] Constitution of the Republic of Hungary, art. 59, 23 October 1989, available at http://www.lectlaw.com/files/int05.htm (visited on 13 November 2001)

Software piracy has been declining over the years. Some of this may be attributed to enforcement of trademark laws over the years. However, it is also believed that when the market is completely open and competition is fully integrated, piracy rates will decline substantially as prices become cheaper.[27] Governmental regulatory activities are, of course, concerned with cyber-crime and manage areas such as integrity of telecommunications networks, quality assurance, standardisation, frequency management, numbering and addressing and info-communications security.[28]

Private-public partnership also plays a role in the struggle against cyber-crime and the development of the information society in Hungary, as is shown below.

Public-Private Partnerships

The most important plan involving partnerships between the government and the private sector is the *Széchenyi Plan*. This is a middle term economic development plan for 2001-2006 in harmony with the planning and programming practice of the European Union and fitting to the timetable of the current programming period in the Union. According to its planners, the planning practice rests on three aspects, i.e. PPP, government co-financing and programme financing. Since the main aim of the plan is to help an effective accession of Hungary to the EU, it is not concerned solely with information security, but is divided in programmes and "sub-programmes" touching different issues. In April 2000 the draft of the Plan was opened for public discussion, and about 80% of the businesses that participated in the debate expressed the development of the information society as a priority. Therefore, this theme was dealt with by a specific programme. Each program and sub-program of the Széchenyi Plan intends to address challenges originating from the given situation and sets its targets on this basis.

The information society and economic development programme of the Széchenyi Plan concentrates significant sources for the improvement of preparation for the information society in order to mitigate Hungary's lagging behind other developed countries.

There are five sub-programs of this program. Firstly, the governmental sub-program guarantees resources for the elaboration, maintenance and development of information strategy and for the control of its implementation. Its aim is to increase effectiveness of public administration and to establish a service providing public administration. It intends to create a transparent legal background that serves the realisation of the digital legal environment of information society.

Secondly, the program, aims to improve supply and accessibility, intending to make it possible for each Hungarian family to have access to private or communal Internet by the end of the development cycle, supporting the spread of the tele-house movement.

Thirdly, the sub-program assisting the foundation of the e-economy, endeavours to develop an economic and employment environment where Hungarian enterprises and employees will be successful actors in the emerging "New Economy". In this interest, it promotes a wide-scale spread of electronic business and electronic commerce and the involvement of foreign operating capital in the e-sector.

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[27] Jennifer L. Houley, Information Technology in Hungary, available at http://www.american.edu/initeb/jh2944a/ind.htm#legal (visited on 4 November, 2001)

[28] Blue Book, pp. 18 ff.

The fourth sub-program, of information culture and content industry, serves to provide the social adaptation of new processes and the expansion of the information culture. It intends to realise this by establishing training and re-training programs, subsidies and the enrichment of quantity and choice of information in the Hungarian language accessible in electronic form.

The fifth sub-program, of increasing quality of life and awareness, provides for the engagement and support of civil social organisations and spheres not affected by market conditions in parallel with the development of information utility network and IT industry development.

As is apparent, PPPs are not strongly developed in Hungary, and in particular there is no explicit commitment to dependability issues or the prevention of cyber-crime by public-private partnerships. Notwithstanding the current situation, it is likely that Hungary will strengthen its engagement to tackle such issues through PPPs in the future, since, as has been seen, these matters are on the governmental agenda.

Research and Development

Evaluating OECD countries as a whole, it is possible to conclude that business represents the main source of financing of Gross Domestic Expenditure on Research and Development (GERD), whilst the role of government has been declining during the nineties. However, when breaking down the analysis to a country level, this general picture shows some discrepancies, a major one being represented by Hungary. Here, in fact, the business sector's share in financing R&D declined over the years (although 1999 witnessed an unexpected increase), whereas the government's role has remained basically stable at above-average levels, often growing.[29]

The OECD *Main Science and Technology Indicators 2001* confirms the previous considerations. While the industry-financed percentage of the GERD tends to decrease in the years throughout 1994 and 1999, the government's contribution goes in a different direction. Of course it must be stressed that these are no more than trends, and, on the whole, Hungary is rather stable in this respect. However, the striking factor is the diverse and indeed opposite path followed by Hungary compared to the OECD countries in general. Indeed, Hungarian trends and general OECD trends have never faced a convergence point.[30]

1998 witnessed the strongest increase in government expenditure on R&D. With the 1998 Budget Act, the Hungarian Parliament allocated about 2.96 million EUROs to 25-30 ICT R&D projects in government offices.[31] The Government assists leading-edge technology development activities, including video teleconferencing, "telecottages" and telework. Since 1997, the government has also financed the *National Information Infrastructure Development Programme* which provides free computer network services, including Internet services, for higher education institutions, research institutes of the Hungarian Academy of Sciences, libraries, museums and other public collections, and the central government offices.

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[29] OECD, Directorate for Science, Technology and Industry, Science, technology and Industry scoreboard. Towards a knowledge-based economy, 2001 edition, p.18

[30] Source: OECD, Directorate for Science, Technology and Industry, Main Science and Technology Indicators 2001, p.20.

[31] Source: OECD national surveys in Science and technology

On the other hand, between 1994 and 1999 the contribution of industry to the Hungarian GERD never breaks through the threshold of 40%, against an OECD average which has never gone below 60% since 1995.[32]

These trends suggest a research and development policy in Hungary strongly in the hands of government, counterweighted by a poor industrial performance. This could mean, on the one hand, a strong effort in the direction of innovation for the country as a whole but, on the other hand, a standstill concerning the innovation of products and production techniques. Moreover, the strong role played by the government against a poorer industrial contribution to R&D, may have implications on the level of Hungary's telecommunication infrastructure's dependability and the relative level of awareness of the private sector to these themes.

Notwithstanding these elements, there are some small dependability related R&D developments especially in the private sector. Particular emphasis is given to the areas of authentication, authorisation and public key infrastructure. Concerning authentication, it is interesting to emphasise that in the Hungary 95% of authentication is based on a password. The rest of the market uses token card solutions such as Secure ID and Crypto Card. The uses of smart-cards in authentication is still in the initial phase. There are some efforts to introduce finger print recognition in authentication by Guardware Systems LTD, a company established in 1999 by a group of international investors. In the area of authentication and public key infrastructure, a primary role is played by NETLOCK Co.LTD, the first and only public Hungarian certification authority. Its certificates are accepted by the Hungarian Chamber of Public Notaries and conform to both EU and national e-signature legislation.

[32] OECD, Science, technology and Industry scoreboard