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ARE CENTRAL AND EASTERN EUROPEAN COUNTRIES MANAGING TO DEVELOP THE INFORMATION SOCIETY?

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ABSTRACT. *Taking the advantage of the opportunities offered by the advent of the information society is more and more often acknowledged as a sure path for future economic development. Moreover, this could be the only way for those countries with narrow domestic markets or limited physical resources.*

Many of the CEECs started at an early time the design and progressive putting into practice of programmes intended to adapt their societies and economies to the information society. This article reviews the evolution of these public policies, assesses the impact of the plans (using the most solid indicators published on the development of the information society) and, based on the results obtained, presents some critical analysis.

KEYWORDS: Central and Eastern European countries, information society, public policies, ICTs.

JEL classification: O38, O52, H54, L98.

Introduction

In 2008, seventeen years have gone by since the page was definitively turned on a historical stage. In this short period, the Central and Eastern European countries¹ (CEECs) have dealt with the successive challenges of recovering their democratic institutions, transforming their economies and achieving the required social and economic balances. Some of them have achieved this with unquestionable success: on 1 May 2004, the European Union extended from fifteen to twenty five its member states, and eight Central and Eastern European countries had met all the conditions required to reach this historical milestone. On 1 January 2007, Romania and Bulgaria also joined the European Union. Croatia, the Former Yugoslav Republic of Macedonia and Turkey are now in the list of candidate countries.

However, the challenges have not disappeared even for those countries that have accessed the European club. Moving towards the development rates of the leading European countries is the unanimous objective, closer in some cases, more distant in others. What the capability of the CEECs will be for adapting to the new socioeconomic paradigm imposed by the so-called information society is undoubtedly one of the keys for achieving this.

Indeed, some of the CEECs have competitive advantages (particularly, lower labour costs) that they can use against their European partners in the short term. However, it is obvious that this short-sited strategy is not only condemned to failure in the long term but would also be incapable of generating the harmonic and sustainable progress that the citizens of these countries have a right to demand. An alternative path consists in choosing to take advantage of the opportunities that the knowledge society promises and currently already offers. Moreover, this could be the only way for those countries with narrow domestic markets or limited physical resources.

In part due to the belief in the above and in part due to the promotion of the institutions of the European Communities, many of the CEECs started at an early time their reflection on the evolution of the information society in general and, more specifically, on the role that the authorities were to play in the process. This reflection materialised with the

¹No agreement exists on which countries should be included in the list of CEECs. In this article, the “European” consideration is given to the members of the Council of Europe (in addition to Belarus, a country who has presented their candidature and whose geographical location defines clearly its position).

design and progressive putting into practice of programmes the objective of which was the adaptation of their societies and economies to the information society.

Once enough time has passed for evaluating these plans, what is their current outcome? Are the CEECs really managing to move forward towards the objective of full incorporation to (and making the most of) the information society? Is the path followed to date the correct one?

This article intends to answer these questions. However, these are difficult answers to find since measuring the progress achieved by the countries currently adapting their citizens and territories to the implications of a new socioeconomic paradigm is not an easy task. Many countries have faced this difficulty by updating their existing statistics and creating other *ad hoc* ones. But others still lack an advanced data collection system on the penetration or usage of information and communication technologies (ICT). This also allows for biased or weakly based assessments. Fortunately, several International organisations, both public and private, have been carrying out measurements and classifications (with a universal vocation) regarding the penetration of the information society in societies and economies. An unbiased image of the evolution followed by the CEECs can then be obtained by using these classifications.

The article is structured into four sections. The first part of this paper reviews the evolution of the public policies in favour of the information society implemented by the CEECs. With this objective, two time phases have been defined with the launch of the *eEurope+* programme as the point marking the separation between them. From that moment on, it is obvious that the path taken by the then group of candidate countries separates formally, having to follow strictly the actions proposed by the Union in this field. The central part of the article is dedicated to assessing the impact of these public plans; for this, the four most solid indicators published on the development of the information society are used. This section is preceded by a discussion on the limitations of the method and, generally, the measurement of the development of the information society. The final part of the article is dedicated to the conclusions and critical analysis.

1. Evolution of the Actions in Favour of the Information Society in the CEECs

1.1 First Stage: From the Fall of the Wall to the Launch of eEurope+

During the first years of the nineties, the information society was far from being a priority in the Central and Eastern European countries (CEECs), more worried about increasing unemployment rates, formerly unknown joblessness and a political scene that was busy explaining the new national conscience (Schneider, 2002).

Notwithstanding the above, the reform of the telecommunications sector did hold a prevailing position in the agendas of the governments of these countries: the privatisation and liberalisation of telecommunication services had almost become a prerequisite for “entering the new race” (Antonelli, 2003)².

Conceptually, the situation was not too different from the one existing in the rest of the continent: despite they were frequently “covered” with social considerations, European public policies for developing the information society during the whole last decade of the past century were based on (almost limited to) the liberalisation of the telecommunications sector (Gómez-Barroso *et al.*, 2008).

² Gómez-Barroso *et al.*, 2008.

“However, outstandingly different indeed were the initial conditions. Telecommunications organisations in pre-reform Central and Eastern Europe as well as in the former Soviet Union resembled those of the West: monopolistic control over all aspects, under the aegis of a state PTT. Technical capability, performance quality, and service availability, however, were far behind (Noam, 1992)”³. “The telecommunications sector had been penalised in centrally planned economies because of an ideological bias that gave predominance to material production and neglected services (Carbajo, Fries, 1997). The telecommunications network was considered primarily as a hierarchical communications tool and, as a result, the needs of private users were secondary” (Gruber, 2001). When the region was returning to democracy, the legacy in the telecommunications sector can be generally characterized as follows: much lower penetration ratio than the European average (typically 10-20 lines per 100 inhabitants versus about 40 in Community countries), long waiting list for telephone installation and a long waiting time (6-10 years for residential subscription), poor quality of service, physically degraded equipment and obsolete technologies, as well as a total lack of advanced telecommunication services (Sallai, 1992).

The process of liberalising telecommunication services that started following the political change was supported by the European Community, who also contributed to the reflection on the implications of the information society starting, at least theoretically, almost simultaneously than in the Community itself.

All of the above occurred, mostly, thanks to the meetings of the EU-CEEC Information Society Forum where Ministers and industrial leaders from the CEECs (specifically, those countries that had, or were negotiating, Association Agreements with the EU) met representatives from EU organisations to discuss the implications of the information society, raise awareness in CEECs on the movement towards the information society and transmit the existing EU experience to CEECs.

The EU-CEEC Information Society Forum held three meetings⁴:

- The first of these meetings took place in Brussels on 23 June 1995 and was attended by Bulgaria, Czech Republic, Estonia, Hungary, Latvia, Lithuania, Poland, Romania, Slovak Republic and Slovenia. The Community side particularly emphasised that common principles on regulatory and competition issues should be implemented across the whole of Europe. The conclusions state that liberalisation and harmonisation of the information infrastructure will boost the competitiveness of the CEECs.
- Prague hosted the second meeting of the forum in September 1996. The agenda was extended and an action plan that identified twenty themes where pilot projects would be particularly effective was prepared. Particularly interesting is the fact that the first of the eight final recommendations made to the Central and Eastern European governments was “to develop national strategies and action plans for the information society”.
- The third EU-CEEC Forum held again in Brussels on October 1997 represented a step forward, at least on the theoretical plane, in the definition of an information society policy in the region. The number of participating CEECs increased with Albania, Bosnia and Herzegovina and Macedonia joining the Forum. Each government was

³ Gómez-Barroso *et al.*, 2008.

⁴ Eight expert panels for preparing the Forums’ recommendations in different fields (policy development, regulation, education, etc.) were organized. Specialists of EU and CEECs worked jointly, although as leading and supporting partners.

“invited” to guarantee that their national information society strategy and related action plan established a national budgetary provision and included sections dedicated to regional development aspects and international statistical cooperation. Additionally, the creation of a PHARE multi country programme devoted to the information society was suggested.

The practical results of these forums were, however, scarce. Many of the region’s governments still avoided fully focusing on the issue of the information society, busy as they were with the job of creating a market economy and dismantling the legacy of the centralized economic system (Jakubowicz, 1999). In fact, during the 1996 meeting, it was stated that “in most cases, the governments of CEECs are not organized in such a way as to enable them to monitor the evolution of the information society as an economic sector [and] specific new responsibilities are needed”.

On the other hand, focusing exclusively on the telecommunications sector, the policies that were adopted were not completely effective either. The bet on opening markets was a shy one. Generally, privatisation was carried out, at least partially, in these countries much earlier than liberalisation. The first privatisations took place in 1993 and the sale of parts of the monopolistic operators continued throughout the nineties⁵. In most cases, the buyers had exclusive long-term licences guaranteed; the complete opening of the fixed telephony market did not occur in any case before 2001. Mostly as a consequence of these decisions, the evolution of the telecommunications industry during this period continued to be burdened in CEECs by important sector shortcomings: conflicting goals between modernization and expansion of telephone networks, lack of commercial focus, poor organizational structures and systems, inadequate return on capital due to extremely low tariff levels, and monopolistic behaviour reinforcing inertia and constraining the development and expansion of the range of services (Wylleman, 1992; Davies *et al.*, 1996).

The third EU-CEEC Forum was, to a certain extent, a sort of concluding event of the actions that had started in 1995. The recommendation was that continuing the previous style of work would not be effective. Therefore it was decided to continue work in common European bodies. Thus, a Joint High Level Committee comprised of EU and CEEC government representatives was created to regularly review the implementation of the conclusions and recommendations of the Forum (and quite particularly, to monitor the development and implementation of national strategies and action plans as well as to intercoordinate activities).

Applications for EU Membership have been carried out between 1994 and 1995. At its summit in Luxemburg in December 1997, the European Council decided the process that the enlargement should encompass and in March 1998 the EU formally launched the process that would make enlargement possible.

Almost immediately (in 1998), the Joint High Level Committee held its first two plenary meetings. They were dedicated to the development of national information strategies and the analysis of progress being made in CEECs⁶ on information society-related matters. Also during 1998, representatives of the CEECs joined the European Information Society Forum (ISF)⁷.

⁵ Refer to details in Oacă (2000).

⁶ Albania, Bosnia and Herzegovina, and Macedonia were still members of the Joint High Level Committee.

⁷ The Information Society Forum was an independent advisory body on strategic information society issues (vision of the information society, universal information service, sustainable development, job creation, lifelong education, convergence of services, etc.) for EU institutions, governments of Member and Associated States, groups of citizens and the society as a whole.

The Joint High Level Committee carried out intense activities since it met another three times until February 2000. The last of these sessions was preceded by a Ministerial Conference that took place in Warsaw on May 11th and 12th, 2000. This conference clearly marks the beginning of a new phase in EU-CEEC co-operation in information society policy (Schneider, 2002) since CEECs recognised there the strategic goal set out by the EU-15 in Lisbon and agreed to embrace the challenge defined by the EU member countries with *eEurope* by deciding to launch an “*eEurope-like*” action plan by and for the candidate countries.

1.2 Second Stage: from the Launch of eEurope+

1.2.1 Actions Restricted to Candidate Countries: eEurope+

In February 2001, the European Commission invited Cyprus, Malta and Turkey to join the CEECs in defining the common action plan to implement the information society. The *eEurope+* Action Plan [EU-2] was launched by the Prime Ministers of the candidate countries at the Gothenburg European Summit on 15-16 June 2001.

At the 2000 ministerial conference, it had been already agreed that the action plan that would be passed almost immediately for the EU-15 (*eEurope* 2002 Action Plan [EU-1]) should stand as the dominant reference document, although the plan for the candidate countries should build upon a fair assessment of what had been achieved up to that date in political, institutional and economic terms. As a consequence, *eEurope+* mirrored the priority objectives and targets of *eEurope* (a cheaper, faster, secure Internet; investing in people and skills; stimulating the use of the Internet) but provided for actions which tackled the specific situation of the candidate countries, a fact that translated into the introduction of an additional, new objective, not previously found in *eEurope*. Said additional objective, which aimed to put in place the fundamental building blocks of the information society, had in turn two subsections: a) accelerating the provision of affordable communication services for all; b) transposing and implementing the *acquis* relevant to the information society⁸.

The *eEurope+* actions were undertaken by the candidate countries on the basis of political commitments. It was underlined that *eEurope+* should in no way be perceived as a substitute for, or an interference of, the on-going *acquis communautaire* negotiating process.

A first picture of the target implementation status was subsequently provided with the presentation of the first *eEurope+* Progress Report [EU-4] in the European Ministerial Conference on the Information Society “Connecting Europe” (Ljubljana, 3-4 June 2002). The final Progress Report [EU-6] was presented in another European Ministerial Conference on the Information Society (“New opportunities for growth in an enlarged Europe”) that took place in Budapest on 26-27 February 2004.

As regards the telecommunications sector, the opening-up of the markets was extraordinarily accelerated during the first years of the new century. Liberalisation was not only the logical option, but, in the case of those admitted as accession countries, it had become a mid-term obligation.

⁸ On joining the Union, applicants were expected to accept the *acquis*, i.e. the detailed laws and rules adopted on the basis of the EU’s founding treaties.

1.2.2 Actions Restricted to the New Member States: in the Aftermath of the Accession to the European Union

Negotiations were concluded with applicant countries in December 2002. The Treaty of Accession was signed in Athens on April 16, 2003. The accession as full members of the European Union was carried out on May 1, 2004.

“The enlargement did not imply the introduction of additions or rectifications in the information society development programme that was in force at the time⁹ (*eEurope 2005* [EU-3]). The Final Report of *eEurope+* [EU-6] transferred the responsibility to the new members since it stated that the entry into the Union would be the appropriate moment to review national action plans for the information society so as to guarantee a closer alignment with the objectives within the framework of the *eEurope 2005 Action Plan*” (Gómez-Barroso *et al.*, 2008).

Beyond any eventual grandiloquent statements that the historical nature of the event may also have generated in this sphere, maybe the most important of the new elements introduced has been the fact that the new member states can take advantage of the financing possibilities offered by structural funds which, according to the *eEurope 2005 Action Plan*, can be dedicated to information society-related projects¹⁰. This is a very important factor in all the initiatives launched by the new member states, since most of their regions (in many cases, the whole country) meet the economic conditions required to receive structural funds. The Commission released a working paper with the guidelines for their usage in this field [EU-5].

Apart from this, there is indeed no difference whatsoever with the remaining member states. Following the conclusion of the *eEurope* programme, the later has given way to *i2010* [EU-9], a programme already negotiated by the then twenty five¹¹. The new programme marks three political priorities: first, promoting a borderless European information space with the aim of establishing an internal market for electronic communications and digital services; second, strengthening innovation and investment in ICT research to promote growth and more and better jobs; last, achieving a strategy of sustainable development that prioritises better public services and quality of life.

1.2.3 Shared Regional Actions: Preparing the WSIS Summits

From 7 through 9 November, 2002, Bucharest (Romania) hosted the preparatory Pan-European Regional Conference for the first phase of the World Summit on the Information Society (WSIS). The so-called Bucharest Statement¹² establishes a “European vision” of the information society as well as a series of general principles, but neither goes down to practical aspects nor does it characterise specific situations such as those that the CEECs could present.

On the other hand, from 9 through 12 September, 2002, in Bishkek (Kyrgyzstan), and on the 23rd and 24th of October, 2002, in Moscow (Russia), the Bishkek-Moscow Sub Regional Conference on the Information Society was held. Despite the initial objective was to

⁹ As regards the plans for developing the information society followed by the European Union, and specifically in order to be aware of the *eEurope* lines, refer to Gómez-Barroso *et al.* (2008).

¹⁰ There is a specific reference to the deployment of broadband accesses: “Member states, in co-operation with the Commission, should support, where necessary, deployment in less favoured areas, and where possible may use structural funds and/or financial incentives (without prejudice to competition rules)” [EU-3].

¹¹ The accession of Bulgaria and Rumania did not introduce any specific regulation or criteria in this field.

¹² The Bucharest Pan-European Conference in preparation of the World Summit on the Information Society: Towards an Information Society: principles, strategy and priorities for action - 9 November 2002. http://www.itu.int/dms_pub/itu-s/md/03/wsispc2/doc/S03-WSISPC2-DOC-0005!!PDF-E.pdf

prepare the countries of the Commonwealth of Independent States (CIS) for the WSIS, the truth is that countries such as Lithuania or Turkey also participated in the summit. In the final declaration¹³, a special programme of assistance to the less developed countries of the region is proposed and the “development of socially important information services, first of all telemedicine and distance learning” is opted for.

Quite surprisingly, the European preparatory meeting was not repeated for the second phase of the WSIS. Instead, and again in Bishkek, from 16 through 18 November, 2004, the Second Bishkek-Moscow Sub Regional Conference was held. In the consensus resolution¹⁴ an interesting analysis is made of the problems faced by the development of the information society in the region; however, no progress was made regarding specific actions.

2. How Can the Efficiency of the Information Society Development Policies be Measured?

The paradox is not a banal one: how can we inform ourselves on the progress of the information society? How can the degree of progress reached by those countries undergoing the process of adapting their citizens and territories to all that is implied by a new socioeconomic paradigm be measured?

There is one initial difficulty: there is no single and comprehensive vision on what the information society implies or on the transformations it brings now or in the future. On the contrary, the concept is complex and many-sided, and covers an infinity of elements and situations. Even if an agreement is reached on what the aspects that should be observed are, there is a second obstacle: the lack of available data, even in the case of parameters that are unanimously identified as determinant for the development of the information society. The “traditional” national statistics are clearly unsuitable.

The absence of precise definition and lack of sufficient data are two limitations that seriously condition the possibility of judging the evolution of the countries in their progress as knowledge societies and, quite particularly, the effectiveness of the policies undertaken for guiding this evolution. This situation is in process of being corrected (or at least attempts are being made for its correction). Recently, awareness has risen on the problem. The Plan of Action of the First phase of the WSIS stated the following request in its item 28: “All countries and regions should develop tools so as to provide statistical information on the information society, with basic indicators and analysis of its key dimensions. Priority should be given to setting up coherent and internationally comparable indicator systems” (WSIS, 2003).

In the case of the European Union, in April 2004, the European Parliament and the Council adopted a Regulation on information society statistics [EU-8]. It is producing a number of surveys mandatory within the European Union and is ensuring harmonized data for all Member States from 2006 onwards. In order to assist this process, Eurostat published, at the beginning of 2006, a “Methodological manual” [EU-11] for helping National Statistics Institutes with this task.

Does this situation imply that it is impossible to find ways of assessing previous stages or different countries? Not at all. On the contrary, it is something that must be done. However, the possible limitations of the analysis will have to be accepted. Lacking other more precise

¹³ Declaration of the Bishkek-Moscow Conference on the Information Society. http://www.itu.int/wsis/docs/src/bishkek_moscow/declaration.pdf

¹⁴ Resolution of the Second Bishkek-Moscow Conference on the Information Society. <http://www.rcc.org.ru/en/new/bishkekresol.doc>

tools, the available alternative is represented by the measurements and classifications (with an inclination towards universality) regarding the penetration of the information society in societies and economies that different International organisations, both public and private, have been preparing during recent years.

The challenge for these indexes is how can light be shed over the technological, social or cultural aspects and, when integrating them into a single value, how can weights be assigned to the importance of the various factors. In fact, the academic field, which has recently started to speculate on how the information society measurements should be carried out, has issued some criticism. Thus, Menou, Taylor (2006) state that “even though there has been a proliferation of e-society measures in recent years, analysis of the metrics of the ‘information society’ are still far from responsive to the needs of many stakeholders and continue to suffer from a number of limitations”. Albright (2005) declares that the data collected by the multilateral agencies are not completely accurate for measuring certain theoretical perspectives of the information society; and insists that the selected indicators answer to the predominant technological theory and that, as a consequence, cultural considerations are particularly limited. Oppositely, Barzilai-Nahon (2006) states that a unified index that reflects multivariate dimensions “may prove valuable for policy formation, may contribute to public discourse, may aid rational decision-making, and would of course be useful for research”.

It is our opinion that the combination of several of these classifications can provide a picture of the evolution followed by the CEECs, a picture which will surely not be complete nor perfectly focused, but that will indeed be unbiased and sufficiently significant. As a result, accepting all possible objections, this is the method through which their information society development policies are assessed.

3. Assessment of the Progress of the Information Society in the CEECs

Really laudatory was the assessment that commissioner Liikanen, responsible for Enterprise and the Information Society at the time, made of the programme targeted towards the new member states two months before their entry into the Union: “eEurope+ has put the Acceding and Candidate Countries in a good starting position for joining eEurope 2005; since the launch of eEurope+, these countries have made impressive progress in transforming their economies and their markets” [EU-7].

Was eEurope+ as successful as the official version states? What is the current adaptation to the information society in the rest of the CEECs?

3.1 Orbicom’s “Info-States” Index

Orbicom, the Network of UNESCO Chairs in Communications, released in 2003 the results of a project, in collaboration with the Canadian International Development Agency, the InfoDev Programme of the World Bank and UNESCO, where countries were classified according to their characteristics as “infostates”. This main index, “infostates”, was made up by two subindexes: “infodensity” and “info-use”. Infodensity refers to ICT capital (network infrastructure and ICT machinery and equipment) and ICT labour stocks (indicative of productive capacity). Info-use refers to the consumption flows of ICTs.

A second study published in 2005 (Orbicom, 2005) analyses in detail the situation in the year 2003; however, for the aggregate indexes infodensity and info-use, the evolution

between 1995 and 2003 is provided. *Appendix 1a* and *Appendix 2b* show the values of these indexes and the classification of the CEECs during these years¹⁵.

A first and interesting exercise consists in comparing both annexes, i.e., confronting the position of each country in each index. Focusing the attention on the initial and final moments of the period, the following results are obtained:

- In 1995, eight of the nineteen countries obtained better records in usage than in density (Estonia, Slovenia, Czech Republic, Slovak Republic, Poland, Romania, Russia, Georgia, in all cases with differences lower than ten positions, in addition to Serbia and Montenegro, where the difference was enormous). Of the eleven remaining states that showed the best info-density records, in three cases the difference was of at least ten positions (Latvia, Lithuania, Turkey).

- Eight years later, in 2003, there were only two countries better positioned in usage than in density (Armenia, two positions and Croatia, four positions). Turkey reaches the same position in both classifications. The remaining sixteen states held better positions in density; in no less than thirteen of these cases, the difference was of ten or more positions (with the exceptions of Latvia and Slovenia with differences of nine positions, in addition to Estonia, with three positions).

A second type of examination is the one restricted to each table included in the annex, analysing the progress of each of the indexes separately:

- The density had evolved as follows:

- During the 1995-2003 period, all the countries had improved their position in the classification except for Croatia and Turkey, who maintained it. In eleven cases, the improvement had been significant, of ten or more positions (Georgia, Latvia, Czech Republic, Poland, Bulgaria, Romania, Slovak Republic, Albania, Lithuania and, especially, Moldova and Serbia and Montenegro).

- The most significant part of these movements had occurred during the nineties. Focusing on the 2000-2003 period, most of the countries have improved positions but in fourteen of the twenty cases, the positive or negative movements were of less than five positions.

- In 1995, only three countries (Slovenia, Hungary and Estonia) were above the assumed “planetary average” as regards info-density. In 2003 ten countries met this requirement (the eight “2004 European Union members” in addition to Croatia and Bulgaria).

- As for the changes in the usage classification:

- From 1995 to 2003, only seven countries had improved (Croatia, Romania, Latvia, Lithuania and Moldova, with important improvements of more than ten positions, in addition to Armenia and Bulgaria). Of the twelve that had worsened, four of them (Czech Republic, Slovenia, Russia and Ukraine) had done so significantly, in more than ten positions.

- Considering the 2000-2003 period, thirteen countries had improved, three maintained their position in the classification and three had fallen (Ukraine, Russia and Slovak Republic).

- In 1995, four countries (Slovenia, Estonia, Czech Republic and Hungary) were above an assumed “planetary average” in info-use. In 2003, nine countries met this requirement (the eight “2004 European Union members” in addition to Croatia).

¹⁵Azerbaijan, Bosnia and Herzegovina, as well as the Former Yugoslav Republic of Macedonia are excluded from the study. Belarus only appears in the info-density classification. The remaining nineteen countries are included in both classifications.

The apparent conclusion is obvious: generally, the situation in 2003 was substantially better in the “density” aspects than in the “usage” ones. As regards density, the CEECs had undergone improvements without exceptions in the world order. Said improvements seemed to answer mostly to the policies carried out at the end of the past century which were focused on privatising the monopolistic operators; oddly, the subsequent advances in the liberalisation of the markets did not seem (at least, not in the first years of the century) to have given similar results. As regards usage, the non-existence or ineffectiveness of other policies of a more social nature that accompanied the transformation of the telecommunications sector caused the slowing down of a great deal of countries in the corresponding classification; the negative trend seemed to have been controlled or even corrected during the first years of this century.

3.2 ITU Indexes: Digital Access Index (2003) and ICT Opportunity Index (2007)

3.2.1 The Digital Access Index

The Digital Access Index (DAI) that the ITU prepared in 2003 (ITU, 2003) only provides a snapshot of the situation at a specific time although, on the other hand, it does so with a considerable degree of detail and includes without exception all the countries covered by our study.

The Digital Access Index was prepared using eight variables classified into five scopes: infrastructure, affordability, knowledge, quality and usage. The values allocated to the CEECs are included in *Appendix 2a*. Of the four groups in which the world classification is divided (high, DAI above 0.70; upper, DAI between 0.50 and 0.70; medium, DAI between 0.30 and 0.50; low, DAI below 0.30), Slovenia is included in the high segment, ten countries in the second subgroup (the other seven “2004 European Union ones” in addition to Croatia, Bulgaria and Russia), eleven in the medium DAI group (in this order: Belarus, Romania, Turkey, Macedonia, Bosnia and Herzegovina, Serbia and Montenegro, Ukraine, Albania, Georgia, Moldova and Armenia), while Azerbaijan is consigned to the last group.

Unsurprisingly, this index shows the important distances that separate the countries and particularly the backwardness of some states, even when using regional and not global standards. These differences are quite obvious in the infrastructure and usage sections, a little less in affordability and quality and much less in knowledge, where even the most backward states show good figures.

It can also be interesting to observe how, in addition to absolute differences, there are other significant differences regarding the subindexes with which the global one is prepared. Similar DAIs can hide disparate particular situations in each of the subsections (refer to Poland and Slovak Republic or Serbia and Montenegro and Ukraine). This proves that each country needs to emphasise different factors and that, as a consequence, “single-stringed” actions cannot always be the best “recipe”.

3.2.2 The ITU ICT Opportunity Index

In 2007 (although the data refers to 2005), the ITU presented a new inclusive index called ICT-Opportunity Index (ITU, 2007). Here, the number of variables considered for obtaining the general index increased from eight to ten although the number of categories in which they are grouped was reduced from five to four. The new naming of the subindexes is networks, skills, uptake and intensity of the use of ICT. It is difficult to establish parallelisms as regards the 2003 index: affordability disappears; skills matches knowledge and uptake is

usage extended with the study of two additional variables; networks is not equal to infrastructure (since it includes International Internet bandwidth which in 2003 was in quality) and intensity (broadband subscribers and international outgoing telephone traffic) cannot be assimilated to any of the subindexes in the 2003 classification.

Apart from cross-country comparisons, the relative movements between 2001-2005 are offered, allowing to know which countries are making progress and how fast. After incorporating this datum, which can be interesting, the relevant data are as follows (refer to *Appendix 2b*):

- The situation has not changed from the elaboration of the previous index. Differences between countries have become larger than before (considering the lowest value, 3 times range in the DAI; 3.4 in the ICT-Opportunity Index).
- Ten of the twenty three CEECs have higher values in the ICT-Opportunity Index than the “average country”. These are also the figures for the Network and Uptake subindexes (ten and eleven countries above average). However, only six countries are above average in the Intensity index. On the other hand, everyone of the twenty three CEECs shows values above the average in the Skills subindex (adult literacy rate and gross school enrolment rates).
- Latvia and Lithuania experienced the best growth rates in the period 2001-2005, followed by Romania. Paradoxically, the Romanian partner in the European adventure (Bulgaria) holds the first place among those countries which present the slowest growth rates, preceding Serbia and Montenegro and Georgia.

3.3 The Economist’s e-readiness Ranking

The Economist Intelligence Unit publishes an annual e-readiness ranking of the world’s largest economies (The Economist Intelligence Unit – IBM, 2002-2007). A country’s e-readiness is essentially a measure of its e-business environment, a collection of factors that indicate how amenable a market is to Internet-based opportunities: “the underlying principle behind the rankings is that digital business is at its heart business, and that for digital transactions to be widely adopted and efficient, they have to thrive in a holistically supportive environment”. The ranking is a weighted collection of nearly 100 quantitative and qualitative criteria, organised into six distinct categories measuring the various components of a country’s social, political, economic and technological development.

The trouble with this index is that it only includes thirteen of the twenty-three states we are studying. Nine of them (Czech Republic, Hungary, Poland, Slovak Republic, Bulgaria, Romania, Russia, Ukraine and Azerbaijan) have been included in all the editions; Estonia, Slovenia, Lithuania and Latvia were included in the 2004 edition.

Focusing on the 2004 (first year in which the thirteen countries are included) through 2007 indexes (refer to *Appendix III*), the evolution of the thirteen countries analysed has been as follows:

- As regards the absolute value of the index, eleven of the thirteen have improved their score. The highest improvement corresponds to Romania, with a growth of 1.09 point followed by Azerbaijan (0.83 points), Slovenia with an improvement of 0.6 points, Latvia and Russia (both 0.53 points better in 2007). Only the Czech Republic and Hungary, have worsen.
- Focusing on the positions, they have all fallen except Latvia (up one position) and Romania (that has improved 5 positions). The most important falls are those of Lithuania (seven positions) Bulgaria and Ukraine (six).

As a consequence, the conclusion resulting from the *e-readiness rankings* is that, while most countries of the CEECs had improved their capability of making the most of, using the

terminology of the report, the “opportunities offered by the Internet”, this improvement does not seem to be on a par with the faster pace of other geographic areas.

3.4 The World Economic Forum and INSEAD’s Networked Readiness Index

The Networked Readiness Index (NRI) is defined as a nation’s or community’s “degree of preparation to participate in and benefit from information and communication technology (ICT) developments”. It is prepared by the World Economic Forum in association with the INSEAD business school (World Economic Forum – INSEAD, 2003-2007).

This index intends to obtain a full measurement of the stage of development of the information society, since it uses a great deal of variables which cover all the appropriate aspects. The problem is that the model used to calculate the index has been frequently changed. Moreover, year after year new countries are included in the study. Since in general, these are economies which are below the levels of development of the countries already present in the classification, position-based comparisons are quite valid while value-based ones are not, since the indexes are redefined to accommodate them to the circumstances of poorer countries.

Thirteen CEECs (Estonia, Slovenia, Hungary, Czech Republic, Lithuania, Slovak Republic, Turkey, Romania, Latvia, Russia, Poland, Bulgaria and Ukraine) appear in the classification since the first edition. Croatia joined the next year, Serbia and Montenegro and the FYR of Macedonia did so for the 2003-2004 edition, Bosnia and Herzegovina and Georgia in the 2004-2005 one, and last, Azerbaijan, Armenia, Moldova and Albania were included in the 2005-2006 edition.

Assuming the limitations and inaccuracies stated, we can obtain the following (refer to *Appendix 4*):

- From 2001-2002 to 2002-2003, only Latvia improved its position (and only in one position). Hungary and Czech Republic maintained theirs. The remaining ten countries fell.
- From 2002-2003 to 2003-2004, six countries climbed positions (Romania, Russia, Lithuania, Slovenia, Latvia and Bulgaria), one maintains itself (Croatia) and seven fall.
- From 2003-2004 to 2004-2005, the report only included two new countries which leads us to considering position variations as highly significant. In view of this fact, except for Turkey, Romania and Russia (who climb positions) and Croatia (who maintains its position) the rest fall. The fall is of ten or more positions in the case of Croatia, Macedonia, Latvia and Poland.
- From 2004-2005 to 2005-2006, the trend seemed to be reversing with ten countries climbing positions, one maintaining its position and seven falling.
- From 2005-2006 to 2006-2007, thirteen countries climbed positions, eight slid down and one maintained its position.

Although we must insist on the fact that these data must be taken with certain care due to the variation in the index’s parameters, the overall sensation was really negative in the first four annual indexes, and much more optimistic in the last two editions.

However, it is to be noted that the improvement only affects the countries having entered the European Union in 2004. Actually, these eight countries improved their position when comparing the 2004-2005 and 2006-2007 indexes. However, in the same period, Romania and Bulgaria showed slight movements (Romania fell two positions and Bulgaria improved one position) and, from the other twelve CEECs considered in the Networked Readiness Index, only five improved their classification.

Conclusions

Each subsection of the previous section ends with a general assessment on the evolution of the CEECs in the respective indexes and classifications. The results are quite similar in all cases. This unanimity leads to a basic opinion: most CEECs are not moving forward on the right path or at least they are not doing so with the vitality of countries located in other geographic areas. Only those countries which joined the European Union in 2004 are showing a recent and gradual upward trend.

Apart from the general negative impression, the review we have made leaves no other specific noticeable image. That is, no country stands out by representing a repeated exception of the range of modes or insufficient results. Naturally, we are referring to the fact that no country has established any clearly differentiated guidelines as compared to their regional neighbours as regards their evolution in the global classifications.

Table 1. “Internal” classification of the CEECs in the different indexes

| | Info-density Index 2003) | Info-use Index (in 2003) | Digital Access Index | ICT- Opportunity Index | e-readiness Ranking 2007 | Networked readiness Index 2006-2007 |
|------------------------|--------------------------------|--------------------------------|----------------------------|------------------------------|--------------------------------|--|
| Albania | 20 | 19 | 19 | 23 | - | 22 |
| Armenia | 19 | 16 | 22 | 21 | - | 21 |
| Azerbaijan | - | - | 23 | 22 | 14 | 13 |
| Belarus | 17 | - | 12 | 15 | - | - |
| Bosnia and Herzegovina | - | - | 16 | 16 | - | 18 |
| Bulgaria | 10 | 11 | 10 | 13 | 11 | 14 |
| Croatia | 9 | 3 | 7 | 8 | - | 8 |
| Czech Republic | 2 | 4 | 3 | 4 | 3 | 4 |
| Estonia | 3 | 1 | 2 | 1 | 1 | 1 |
| Georgia | 18 | 17 | 20 | 20 | - | 20 |
| Hungary | 4 | 5 | 4 | 6 | 4 | 3 |
| Latvia | 6 | 6 | 9 | 3 | 5 | 7 |
| Lithuania | 8 | 9 | 8 | 5 | 8 | 5 |
| Macedonia, FYR | - | - | 15 | 14 | - | 17 |
| Moldova | 16 | 15 | 21 | 19 | - | 19 |
| Poland | 7 | 8 | 5 | 9 | 7 | 11 |
| Romania | 13 | 10 | 13 | 10 | 10 | 10 |
| Russia | 11 | 13 | 11 | 11 | 12 | 12 |
| Serbia and Montenegro | 14 | 14 | 17 | 17 | - | 15 |
| Slovak Republic | 5 | 7 | 6 | 7 | 6 | 6 |
| Slovenia | 1 | 2 | 1 | 2 | 2 | 2 |
| Turkey | 12 | 12 | 14 | 12 | 9 | 9 |
| Ukraine | 15 | 18 | 18 | 16 | 13 | 16 |

If what we want to analyse is not general evolution but absolute position within the area, there are a few recurrent parameters. In fact, based on *Table 1*, we can consider that Estonia and Slovenia are the regional leaders of a first group where we could include the Czech Republic and Hungary. The second pack would be made up by the other four countries

which joined the European Union in 2004 (Poland, Slovak Republic, Lithuania and Latvia) and Croatia. Behind them would be Bulgaria, Russia, Turkey and Romania. And last, the guard's van would be occupied by Serbia and Montenegro, Ukraine, Moldova, Georgia, Macedonia, Bosnia and Herzegovina, Belarus, Armenia, Azerbaijan and Albania¹⁶.

Going more deeply into the analysis of the results, we can produce more detailed conclusions:

- In the “access” section (existence of infrastructures), the situation has improved clearly and in general.

Oddly, the impact of the first policies focused on privatising the monopolistic operators seems to have yielded more positive effects than the subsequent liberalising measures. However, it would not be wise to come to hasty conclusions: the initial situation, at the start of the nineties, was sufficiently backward for any intervention to generate an immediate and obvious impact.

On the other hand, the market opening-up policies have had too little time to generate any results. In an industry like that of telecommunications, liberalisation is a process, not an action. Moving from a monopoly (be it legal, or *de facto*) to true, and not sharely nominal, competition, requires more support than the simple establishment of a favourable framework and must inevitably go through a series of stages that many of the CEECs have still to go through.

- The second factor for the “digital progress”, technology usage, is backward as regards the access or availability parameters.

Again, we must make a specification. It seems that in the latest classifications, the results have improved. This could suggest that the broad-mindedness present in the policies adopted in recent years (with actions targeted as well towards the demand side and not exclusively to that of the offer) would be starting to bear fruit.

In any case, it is obvious that this line must continue to be followed. Apart from the specific “digital literacy” campaigns for the groups that are removed from technology, the development of services and applications capturing the interest of the users is a priority. Many are the times when the promises connected to the launch of new *e*-services cannot be materialised due to their usefulness and user-friendliness not being obvious or their designs not taking into consideration local idiosyncrasies. We must not forget that in the expression information society, the qualifying element is “information” but the noun is still “society”.

- Despite the deficient results reached for usage, “preparation” is a factor that stands out in some classifications. Indeed, the human capital must be considered as the main asset that almost all the CEECs own to move forward in their integration in the information society.

Indeed, this is excellent news since, despite all the investments that can be made in physical elements, technology is not something that can be “injected” from the outside into societies that are not qualified to receive it. And vice versa, a “prepared” society can burn stages at a great speed.

- The divide as compared to the Western European countries is still notable. The most advanced among the CEECs catch up with (and sometimes get past) the Southern countries (Spain, Greece, Portugal) that are always falling behind, but they are far from the Central ones and at an enormous distance from the European leaders (the Scandinavian countries). Obviously, this divide increases significantly as we move down the internal classification of the CEECs.

¹⁶ Belarus, Bosnia and Herzegovina and Macedonia only appear in two of the classifications. As a consequence, the image perceived of them could not be absolutely precise.

This makes it clear that the path that lays ahead is a long one (and that the necessary actions are more complex) if the ultimate goal is to equal the standards of the most prosperous European regions.

References

- Albright, K.S. (2005), "Global measures of development and the information society", *New Library World*, Vol. 106, No 7/8, pp.320-331.
- Antonelli, C. (2003), "The digital divide: understanding the economics of new information and communication technology in the global economy", *Information Economics and Policy*, Vol. 15, No 2, pp.173-199.
- Barzilai-Nahon, K. (2006), "Gaps and bits: Conceptualizing measurements for digital divide/s", *The Information Society*, Vol. 22, No 5, pp.269-278.
- Carbajo, J., Fries, S. (1997), "Restructuring infrastructure in transition economies", *Working Paper*, European Bank for Reconstruction and Development, No 24, available at, <http://www.ebrd.com/pubs/econ/workingp/24.pdf>, referred on 2/10/2007.
- Davies, G., Carter, S., McIntosh, S., Stefanescu, D. (1996), "Technology and policy options for the telecommunications sector. The situation in Central and Eastern Europe and the former Soviet Union", *Telecommunications Policy*, Vol. 20, No 2, pp.101-123.
- Gómez-Barroso, J.L., Feijóo, C., Karnitis, E. (2008). "The European policy for the development of the information society: the right path?", *Journal of Common Market Studies*, Vol. 46, No 4, pp.787-825.
- Gómez-Barroso, J.L., Feijóo, C. (2006), "Public policies against the digital divide: a necessary adaptation to different degrees of development", *International Journal of Information Policy and Law*, Vol. 4, No 3, pp.257-268.
- Gruber, H. (2001), "Competition and innovation. The diffusion of mobile telecommunications in Central and Eastern Europe", *Information Economics and Policy*, Vol. 13, No 1, pp.19-34.
- ITU (2007), *Measuring the Information Society 2007: ICT Opportunity Index and World Telecommunication/ICT Indicators*, Geneva, International Telecommunication Union.
- ITU (2003), *World Telecommunication Development Report 2003: Access Indicators for the Information Society*, Geneva, International Telecommunication Union.
- Jakubowicz, K. (1999), "Eastern and Central Europe" *World Communication and Information Report 1999-2000*, pp.224-240. Paris, UNESCO, available at, <http://www.unesco.org/webworld/wcir/en/report.html>, referred on 21/9/2007.
- Menou, M.J., Taylor, R.D. (2006), "A grand challenge: Measuring information societies", *The Information Society*, Vol. 22, No 5, pp.261-267.
- Noam, E.M. (1992), *Telecommunications in Europe*, Oxford, Oxford University Press.
- Oacã, N. (2000), "Telecommunication in Eastern and Central Europe. Preparing for liberalization", *IEEE Communications Magazine*, Vol. 38, No 12, pp.118-122.
- Orbicom (2005), *From the digital divide to digital opportunities. Measuring infostates for development*, Montreal, NRC Press – Presses du CNRC, also available at, http://www.orbicom.uqam.ca/projects/ddi2002/2003_dd_pdf_en.pdf, referred on 6/2/2008.
- Resolution of the Second Bishkek-Moscow Conference on the Information Society.
<http://www.rcc.org.ru/en/new/bishkekresol.doc>
- Sallai, G. (1992), "Present state and future plans of telecommunications in Central and Eastern Europe", *Global Telecommunications Conference, 1992. Conference Record., GLOBECOM' 92*, Vol. 3, pp.1552-1556. Orlando, Institute of Electrical and Electronics Engineers.
- Schneider, M. (2002), "Implementing an Information Society in Central and Eastern Europe. The case of Hungary", *Working Paper*, Research Centre for East European Studies (Bremen), No 38, available at, <http://www.forschungsstelle-osteuropa.de/con/images/stories/pdf/ap/fsoap38.pdf>, referred on 25/9/2007.
- The Economist Intelligence Unit – IBM (2002–2007), *The 200(2-7) e-readiness rankings*, available at, <http://www.eiu.com>, referred on 6/2/2008.
- World Economic Forum – INSEAD (2003-2007), *Global information technology report 200(1-6)/(2-7)*, available at, <http://www.weforum.org>, referred on 5/2/2008.
- WSIS (2003), *First Phase of the World Summit on the Information Society. Geneva Plan of Action*, Document WSIS-03/GENEVA/DOC/5-E (12 December 2003), available at, http://www.itu.int/dms_pub/itu-s/md/03/wsis/doc/S03-WSIS-DOC-0005!!PDF-E.pdf, referred on 8/10/2007.
- Wylleman, E. (1992), "The financing of telecommunications infrastructure", *Telecommunications Policy*, Vol. 16, No 9, pp.744-748.

AR CENTRINĖS IR RYTŲ EUROPOS ŠALYS GEBA PUOSELĖTI INFORMACINĘ VISUOMENĘ?**José Luis Gómez-Barroso, Claudio Feijóo****SANTRAUKA**

Pasinaudoti teigiama galimybe sukurti informacinę visuomenę vis dažniau pripažįstama kaip geriausias kelias vystyti ateities ekonomiką. Be to, tai gali būti vienintelis būdas toms šalims, kurios turi siauras vidaus rinkas arba ribotus fizinius išteklius.

Daugelis Centrinės ir Rytų Europos šalių anksti pradėjo projektuoti ir palaipsniui diegti programas, skirtas visuomenės ir ekonomikos adaptacijai prie naujų informacinės visuomenės sąlygų bei kriterijų. Straipsnyje apžvelgiama šios viešosios politikos raida, įvertinant planus (naudojant patikimiausius informacinės visuomenės plėtros poveikio rodiklius), ir remiantis gautais rezultatais, pateikti tam tikrą kritinę analizę.

REIKŠMINIAI ŽODŽIAI: Centrinės ir Rytų Europos šalys, informacinė visuomenė, viešoji politika, informacinės ir komunikacinės technologijos.

Appendix 1a

| | 2003 | | 2002 | | 2001 | | 2000 | | 1999 | | 1998 | | 1997 | | 1996 | | 1995 | |
|-----------------------|------|-------|------|-------|------|-------|------|-------|------|-------|------|-------|------|-------|------|-------|------|-------|
| | Rank | Score | Rank | Score | Rank | Score | Rank | Score | Rank | Score | Rank | Score | Rank | Score | Rank | Score | Rank | Score |
| SLOVENIA | 24 | 165.7 | 25 | 155.8 | 24 | 148.3 | 23 | 140.0 | 24 | 124.7 | 28 | 100.8 | 28 | 88.1 | 28 | 73.3 | 27 | 61.0 |
| CZECH REPUBLIC | 25 | 160.2 | 26 | 154.6 | 26 | 144.2 | 29 | 128.0 | 31 | 108.6 | 32 | 92.9 | 31 | 79.4 | 33 | 64.7 | 38 | 47.7 |
| ESTONIA | 26 | 159.8 | 24 | 156.4 | 25 | 145.2 | 25 | 137.1 | 27 | 121.7 | 27 | 106.5 | 27 | 89.7 | 29 | 72.6 | 33 | 56.4 |
| HUNGARY | 27 | 159.3 | 31 | 140.8 | 32 | 134.6 | 32 | 123.7 | 30 | 108.9 | 30 | 97.2 | 29 | 87.2 | 30 | 71.6 | 32 | 57.4 |
| SLOVAK REPUBLIC | 32 | 142.4 | 33 | 134.6 | 33 | 127.9 | 37 | 106.9 | 35 | 95.6 | 34 | 86.5 | 34 | 72.0 | 46 | 50.3 | 48 | 38.3 |
| LATVIA | 34 | 136.0 | 34 | 128.4 | 35 | 119.7 | 38 | 104.7 | 37 | 93.1 | 35 | 81.2 | 37 | 65.1 | 42 | 54.3 | 45 | 40.3 |
| POLAND | 35 | 135.3 | 35 | 128.3 | 37 | 118.1 | 39 | 104.5 | 40 | 86.6 | 41 | 73.4 | 47 | 60 | 51 | 45.7 | 49 | 35.2 |
| LITHUANIA | 37 | 132.6 | 37 | 127.4 | 40 | 113.4 | 43 | 93.1 | 42 | 82.7 | 40 | 73.5 | 46 | 60.1 | 52 | 45.0 | 56 | 31.7 |
| CROATIA | 43 | 117.3 | 42 | 115.9 | 41 | 107.3 | 42 | 94.6 | 45 | 78.1 | 49 | 67.4 | 45 | 61.6 | 45 | 51.8 | 43 | 42.5 |
| BULGARIA | 44 | 112.0 | 46 | 101.3 | 46 | 93.0 | 47 | 81.9 | 51 | 70.6 | 55 | 56.3 | 55 | 48.2 | 57 | 38.4 | 58 | 31.1 |
| RUSSIA | 52 | 95.1 | 53 | 88.7 | 61 | 77.9 | 62 | 67.8 | 64 | 58.0 | 65 | 50.6 | 58 | 46.6 | 61 | 36.7 | 61 | 28.4 |
| TURKEY | 53 | 94.9 | 56 | 85.7 | 58 | 80.5 | 55 | 77.2 | 54 | 68.7 | 53 | 57.5 | 54 | 49.8 | 54 | 40.7 | 53 | 32.1 |
| ROMANIA | 55 | 91.5 | 55 | 86.1 | 57 | 80.8 | 56 | 75.5 | 56 | 67.8 | 54 | 57.0 | 60 | 44.9 | 71 | 29.5 | 70 | 21.6 |
| SERBIA AND MONTENEGRO | 59 | 87.0 | 62 | 83.0 | 62 | 77.7 | 59 | 74.0 | 59 | 62.8 | 64 | 50.7 | 70 | 39.6 | 73 | 29.0 | 128 | 4.3 |
| UKRAINE | 68 | 82.0 | 68 | 74.6 | 70 | 67.8 | 74 | 54.4 | 81 | 43.8 | 77 | 38.1 | 75 | 33.0 | 75 | 27.5 | 71 | 21.5 |
| MOLDOVA | 70 | 79.1 | 78 | 63.3 | 76 | 58.3 | 77 | 53.4 | 84 | 40.6 | 80 | 36.2 | 87 | 25.0 | 99 | 13.7 | 103 | 7.4 |
| BELARUS | 72 | 76.2 | 73 | 67.2 | 80 | 57.3 | 89 | 45.4 | 87 | 38.8 | 85 | 33.0 | 82 | 29.4 | 77 | 24.6 | 77 | 16.8 |
| GEORGIA | 78 | 67.2 | 79 | 62.5 | 84 | 56.4 | 79 | 51.5 | 79 | 44.4 | 76 | 39.5 | 76 | 32.5 | 85 | 21.2 | 88 | 12.7 |
| ARMENIA | 90 | 56.4 | 90 | 53.3 | 91 | 47.2 | 91 | 44.9 | 85 | 39.6 | 84 | 34.4 | 81 | 29.6 | 88 | 18.4 | 91 | 12.2 |
| ALBANIA | 92 | 54.3 | 92 | 51.6 | 93 | 46.7 | 103 | 30.9 | 103 | 25.7 | 104 | 21.1 | 100 | 17.9 | 96 | 14.6 | 108 | 6.3 |
| PLANETIA | | 110.3 | | 105.5 | | 100.0 | | 92.4 | | 83.4 | | 73.5 | | 65.5 | | 57.7 | | 49.0 |

Planetia represents the planet at large, as if it were one economy

Appendix 1b

| | 2003 | | 2002 | | 2001 | | 2000 | | 1999 | | 1998 | | 1997 | | 1996 | | 1995 | |
|-----------------------|------|-------|------|-------|------|-------|------|-------|------|-------|------|-------|------|-------|------|-------|------|-------|
| | Rank | Score | Rank | Score | Rank | Score | Rank | Score | Rank | Score | Rank | Score | Rank | Score | Rank | Score | Rank | Score |
| ESTONIA | 29 | 193.2 | 33 | 161.1 | 33 | 144.4 | 29 | 137.5 | 31 | 111.1 | 30 | 97.5 | 29 | 77.8 | 29 | 63.1 | 27 | 54.8 |
| SLOVENIA | 33 | 184.2 | 30 | 178.5 | 30 | 157.3 | 33 | 126.7 | 26 | 119.3 | 26 | 108.8 | 22 | 97.7 | 21 | 79.4 | 22 | 60.1 |
| CROATIA | 39 | 144.5 | 39 | 132.0 | 39 | 118.8 | 46 | 89.7 | 54 | 70.8 | 49 | 61.5 | 51 | 48.7 | 51 | 37.3 | 49 | 28.6 |
| CZECH REPUBLIC | 40 | 139.8 | 40 | 131.5 | 41 | 115.1 | 44 | 94.1 | 42 | 83.7 | 42 | 71.3 | 38 | 63.9 | 34 | 53.8 | 30 | 46.1 |
| HUNGARY | 42 | 135.9 | 44 | 123.7 | 43 | 112.4 | 52 | 85.1 | 46 | 78.8 | 44 | 68.5 | 43 | 56.0 | 44 | 43.7 | 35 | 38.7 |
| LATVIA | 43 | 135.7 | 50 | 114.9 | 55 | 99.1 | 47 | 88.9 | 52 | 71.0 | 50 | 61.4 | 50 | 49.0 | 55 | 32.5 | 61 | 20.4 |
| SLOVAK REPUBLIC | 48 | 129.0 | 48 | 117.5 | 44 | 110.7 | 39 | 96.5 | 45 | 79.6 | 47 | 63.5 | 45 | 54.2 | 48 | 40.8 | 41 | 33.7 |
| POLAND | 49 | 128.4 | 46 | 119.0 | 56 | 97.5 | 58 | 77.8 | 51 | 71.2 | 48 | 62.3 | 49 | 49.1 | 47 | 41.1 | 42 | 33.6 |
| LITHUANIA | 51 | 123.7 | 52 | 111.5 | 58 | 93.4 | 56 | 79.1 | 59 | 63.4 | 56 | 56.1 | 59 | 41.8 | 60 | 28.7 | 73 | 14.7 |
| ROMANIA | 55 | 112.5 | 58 | 101.7 | 66 | 74.8 | 64 | 63.3 | 64 | 51.7 | 64 | 45.6 | 73 | 29.0 | 72 | 23.5 | 68 | 17.1 |
| BULGARIA | 57 | 110.1 | 63 | 94.0 | 59 | 88.6 | 61 | 67.6 | 68 | 49.0 | 68 | 41.0 | 65 | 34.7 | 62 | 28.4 | 66 | 17.5 |
| TURKEY | 66 | 91.0 | 65 | 84.8 | 63 | 80.7 | 70 | 56.0 | 66 | 50.8 | 75 | 35.3 | 71 | 29.9 | 73 | 22.7 | 66 | 17.5 |
| RUSSIA | 72 | 85.6 | 70 | 79.6 | 68 | 71.5 | 69 | 56.3 | 76 | 41.9 | 70 | 39.4 | 66 | 33.1 | 63 | 27.1 | 57 | 21.6 |
| SERBIA AND MONTENEGRO | 75 | 80.3 | 73 | 76.3 | 67 | 73.2 | 75 | 53.1 | 86 | 34.0 | 79 | 31.2 | 75 | 28.2 | 74 | 22.0 | 70 | 15.5 |
| MOLDOVA | 84 | 68.3 | 87 | 59.3 | 89 | 49.1 | 90 | 39.3 | 93 | 27.9 | 90 | 21.5 | 110 | 10.9 | 114 | 6.2 | 108 | 5.1 |
| ARMENIA | 88 | 61.9 | 93 | 51.1 | 92 | 45.1 | 101 | 30.2 | 94 | 26.5 | 110 | 14.9 | 107 | 12.7 | 99 | 10.7 | 93 | 8.1 |
| GEORGIA | 90 | 60.0 | 91 | 52.2 | 91 | 46.6 | 98 | 31.9 | 92 | 29.0 | 98 | 19.9 | 93 | 16.6 | 83 | 14.5 | 86 | 10.4 |
| UKRAINE | 93 | 57.4 | 89 | 54.4 | 88 | 49.6 | 92 | 34.7 | 90 | 29.3 | 82 | 26.5 | 80 | 23.0 | 80 | 18.3 | 74 | 14.3 |
| ALBANIA | 112 | 39.7 | 114 | 32.3 | 114 | 28.0 | 125 | 16.0 | 123 | 13.6 | 117 | 11.6 | 118 | 9.5 | 112 | 7.1 | 111 | 4.5 |
| PLANETIA | | 116.6 | | 108.8 | | 100.0 | | 91.0 | | 80.0 | | 68.8 | | 58.2 | | 47.3 | | 38.3 |

Planetia represents the planet at large, as if it were one economy

Appendix 2 a

Digital Access Index (ITU, 2003)

| DAI | Subscriber lines per 100 inhab. | Mobile subscribers per 100 inhab. | Infrastructure | Internet tariff as % GNI | Affordability | Adult literacy | School enrolment | Knowledge | Internet bandwidth / 100 inhab. | Broadband subscribers per 100 inhab. | Quality | Internet users per 100 inhab. | Usage |
|-------------|---------------------------------|-----------------------------------|----------------|--------------------------|---------------|----------------|------------------|-----------|---------------------------------|--------------------------------------|---------|-------------------------------|-------|
| 0.72 | 44.0 | 83.5 | 0.78 | 3.1 | 0.97 | 99.6 | 83.0 | 0.94 | 539.7 | 2.8 | 0.44 | 37.6 | 0.44 |
| 0.67 | 35.1 | 65.0 | 0.62 | 3.9 | 0.96 | 99.8 | 89.0 | 0.96 | 409.6 | 3.4 | 0.44 | 32.8 | 0.39 |
| 0.66 | 33.4 | 84.9 | 0.70 | 4.5 | 0.96 | 98.5 | 76.0 | 0.91 | 2189.1 | 0.2 | 0.45 | 25.6 | 0.30 |
| 0.63 | 32.6 | 67.6 | 0.61 | 4.1 | 0.96 | 99.3 | 82.0 | 0.94 | 1048.3 | 1.1 | 0.44 | 15.8 | 0.19 |
| 0.59 | 29.5 | 36.3 | 0.43 | 4.1 | 0.96 | 99.7 | 89.0 | 0.96 | 163.6 | 0.0 | 0.35 | 23.0 | 0.27 |
| 0.59 | 26.8 | 54.4 | 0.50 | 6.3 | 0.94 | 100.0 | 73.0 | 0.91 | 1516.0 | 0.0 | 0.43 | 16.0 | 0.19 |
| 0.59 | 39.0 | 53.5 | 0.59 | 4.4 | 0.96 | 98.4 | 68.0 | 0.88 | 41.2 | 0.3 | 0.31 | 18.0 | 0.21 |
| 0.56 | 26.4 | 47.6 | 0.46 | 11.2 | 0.89 | 99.6 | 85.0 | 0.95 | 94.8 | 0.6 | 0.34 | 14.5 | 0.17 |
| 0.54 | 30.1 | 39.4 | 0.45 | 20.0 | 0.80 | 99.8 | 86.0 | 0.95 | 181.6 | 0.4 | 0.36 | 13.3 | 0.16 |
| 0.53 | 36.8 | 33.3 | 0.47 | 8.3 | 0.92 | 98.5 | 77.0 | 0.91 | 10.1 | 0.0 | 0.25 | 8.1 | 0.10 |
| 0.50 | 23.9 | 12.0 | 0.26 | 5.6 | 0.94 | 99.6 | 82.0 | 0.94 | 6.12 | 0.0 | 0.32 | 4.6 | 0.05 |
| 0.49 | 29.9 | 4.7 | 0.27 | 11.3 | 0.89 | 99.7 | 86.0 | 0.95 | 4.4 | 0.0 | 0.22 | 8.2 | 0.10 |
| 0.48 | 18.7 | 22.9 | 0.27 | 16.4 | 0.84 | 98.2 | 68.0 | 0.84 | 87.2 | 0.1 | 0.33 | 8.1 | 0.09 |
| 0.48 | 26.9 | 33.6 | 0.39 | 9.5 | 0.90 | 85.5 | 60.0 | 0.77 | 10.6 | 0.0 | 0.25 | 7.0 | 0.08 |
| 0.48 | 27.1 | 17.7 | 0.31 | 13.3 | 0.87 | 94.0 | 70.0 | 0.86 | 24.2 | 0.0 | 0.28 | 4.8 | 0.06 |
| 0.46 | 22.0 | 18.3 | 0.27 | 6.9 | 0.93 | 93.0 | 64.0 | 0.83 | 6.1 | 0.0 | 0.23 | 2.4 | 0.03 |
| 0.45 | 23.1 | 25.7 | 0.32 | 11.3 | 0.89 | 91.7 | 52.0 | 0.78 | 6.7 | 0.0 | 0.24 | 4.6 | 0.05 |
| 0.43 | 21.6 | 8.4 | 0.22 | 26.0 | 0.74 | 99.6 | 81.0 | 0.93 | 6.3 | 0.0 | 0.23 | 1.8 | 0.02 |
| 0.39 | 7.1 | 25.9 | 0.19 | 24.8 | 0.75 | 85.3 | 69.0 | 0.80 | 3.9 | 0.0 | 0.22 | 0.4 | 0.00 |
| 0.37 | 13.1 | 10.2 | 0.16 | 46.4 | 0.54 | 100.0 | 69.0 | 0.90 | 6.1 | 0.0 | 0.23 | 1.5 | 0.02 |
| 0.37 | 17.0 | 7.7 | 0.18 | 49.6 | 0.50 | 99.0 | 61.0 | 0.86 | 7.7 | 0.0 | 0.24 | 3.4 | 0.04 |
| 0.30 | 14.3 | 1.9 | 0.13 | 68.0 | 0.32 | 98.5 | 60.0 | 0.86 | 2.1 | 0.0 | 0.19 | 1.6 | 0.02 |
| 0.24 | 12.2 | 10.7 | 0.15 | 183.0 | 0.00 | 97.0 | 69.0 | 0.88 | 0.3 | 0.0 | 0.12 | 3.7 | 0.04 |

Appendix 2b

ICT-Opportunity Index (ITU, 2007)

| | ICT-OI Values | Network Index | Uptake Index | Skills Index | Intensity Index | Average annual Growth rate 2001-2005 |
|------------------------------------|---------------|---------------|--------------|--------------|-----------------|--------------------------------------|
| ESTONIA | 269.8 | 339.6 | 346.2 | 137.2 | 328.5 | 78.08 |
| SLOVENIA | 246.1 | 261.8 | 332.2 | 146.0 | 289.0 | 59.12 |
| LATVIA | 218.7 | 228.7 | 262.1 | 138.5 | 275.8 | 98.92 |
| CZECH REPUBLIC | 202.7 | 295.8 | 231.5 | 125.0 | 197.3 | 49.96 |
| LITHUANIA | 201.6 | 245.9 | 219.2 | 140.3 | 218.6 | 95.21 |
| HUNGARY | 192.4 | 232.6 | 192.4 | 133.7 | 229.0 | 59.16 |
| SLOVAK REPUBLIC | 188.9 | 249.2 | 274.6 | 122.4 | 152.0 | 53.42 |
| CROATIA | 176.4 | 241.5 | 217.8 | 121.3 | 151.7 | 49.25 |
| POLAND | 166.3 | 190.7 | 211.6 | 137.5 | 137.9 | 58.20 |
| ROMANIA | 150.4 | 158.3 | 165.1 | 120.8 | 162.3 | 86.33 |
| RUSSIA | 137.2 | 161.9 | 144.7 | 139.2 | 108.8 | 71.29 |
| TURKEY | 128.5 | 158.6 | 109.6 | 116.0 | 135.3 | 48.84 |
| BULGARIA | 123.4 | 185.5 | 128.7 | 127.8 | 76.1 | 30.11 |
| MACEDONIA, FYR | 120.3 | 137.6 | 140.6 | 115.3 | 94.1 | 52.27 |
| BELARUS | 120.0 | 133.5 | 148.9 | 133.5 | 77.8 | 75.83 |
| BOSNIA AND HERZEGOVINA | 113.4 | 118.3 | 117.9 | 121.3 | 97.9 | 57.72 |
| SERBIA AND MONTENEGRO | 111.2 | 165.1 | 95.9 | 121.3 | 79.7 | 36.54 |
| UKRAINE | 102.2 | 118.0 | 85.4 | 135.3 | 80.1 | 57.75 |
| MOLDOVA | 102.1 | 101.2 | 114.2 | 111.2 | 84.8 | 71.49 |
| GEORGIA | 90.2 | 93.3 | 75.4 | 121.3 | 77.8 | 44.61 |
| ARMENIA | 87.3 | 69.6 | 92.8 | 118.0 | 76.1 | 69.29 |
| AZERBAIJAN | 83.9 | 83.0 | 74.9 | 108.5 | 73.4 | 68.12 |
| ALBANIA | 79.2 | 91.8 | 53.9 | 108.9 | 73.2 | 57.49 |
| <i>Reference country (Average)</i> | 147.5 | 164.4 | 147.5 | 102.6 | 190.6 | - |

Appendix 3

e-readiness Rankings (The Economist Int. Unit – IBM, 2002–2007)

| | 2007 | | 2006 | | 2005 | | 2004 | | 2003 | | 2002 | |
|------------------------|-------------------------|-------------------|-------------------------|-------------------|-------------------------|-------------------|-------------------------|-------------------|-------------------------|-------------------|-------------------------|-------------------|
| | Overall ranking (of 69) | e-readiness score | Overall ranking (of 68) | e-readiness score | Overall ranking (of 65) | e-readiness score | Overall ranking (of 64) | e-readiness score | Overall ranking (of 60) | e-readiness score | Overall ranking (of 60) | e-readiness score |
| ESTONIA | 28 | 6.84 | 27 | 6.71 | 26 | 6.32 | 26 | 6.54 | 10 | 6.54 | 26 | 6.54 |
| SLOVENIA | 29 | 6.66 | 28 | 6.43 | 27 | 6.22 | 31 | 6.06 | 16 | 6.06 | 31 | 6.06 |
| CZECH REPUBLIC | 31 | 6.32 | 32 | 6.14 | 29 | 6.09 | 27 | 6.47 | 24 | 6.52 | 27 | 6.45 |
| HUNGARY | 34 | 6.16 | 32 | 6.14 | 30 | 6.07 | 30 | 6.22 | 22 | 6.23 | 29 | 6.05 |
| POLAND | 40 | 5.80 | 34 | 5.76 | 32 | 5.53 | 36 | 5.41 | - | 5.57 | 31 | 5.52 |
| SLOVAK REPUBLIC | 39 | 5.84 | 36 | 5.65 | 34 | 5.51 | 39 | 5.33 | 31 | 5.47 | 36 | 5.00 |
| LITHUANIA | 41 | 5.78 | 38 | 5.45 | 37 | 5.11 | 34 | 5.60 | 37 | 5.60 | 34 | 5.60 |
| LATVIA | 37 | 5.88 | 39 | 5.30 | 40 | 5.04 | 38 | 5.35 | 58 | 5.35 | 38 | 5.35 |
| BULGARIA | 48 | 5.01 | 44 | 4.86 | 42 | 4.68 | 42 | 4.71 | 42 | 4.55 | 42 | 4.25 |
| ROMANIA | 45 | 5.32 | 49 | 4.44 | 47 | 4.19 | 50 | 4.23 | 47 | 4.15 | 50 | 4.00 |
| RUSSIA | 57 | 4.27 | 52 | 4.14 | 52 | 3.98 | 55 | 3.74 | 52 | 3.88 | 55 | 3.93 |
| UKRAINE | 60 | 4.02 | 61 | 3.62 | 57 | 3.51 | 54 | 3.79 | 57 | 3.28 | 54 | 3.05 |
| AZERBAIJAN | 68 | 3.26 | 68 | 2.92 | 65 | 2.72 | 64 | 2.43 | 65 | 2.37 | 60 | 2.38 |

Appendix 4**Networked Readiness Index (World Economic Forum – INSEAD, 2003-2005)**

| | NRI 2006-2007 | NRI 2005-2006 | NRI 2004-2005 | NRI 2003-2004 | NRI 2002-2003 | NRI 2001-2002 |
|-------------------------------|----------------------|----------------------|----------------------|----------------------|----------------------|----------------------|
| | Rank (of 122) | Rank (of 116) | Rank (of 104) | Rank (of 102) | Rank (of 82) | Rank (of 75) |
| ESTONIA | 20 | 23 | 25 | 25 | 24 | 23 |
| CZECH REPUBLIC | 34 | 32 | 40 | 33 | 28 | 28 |
| SLOVENIA | 30 | 35 | 32 | 30 | 33 | 29 |
| HUNGARY | 33 | 38 | 38 | 36 | 30 | 30 |
| SLOVAK REPUBLIC | 41 | 41 | 48 | 41 | 40 | 33 |
| LITHUANIA | 39 | 44 | 43 | 42 | 46 | 42 |
| TURKEY | 52 | 48 | 52 | 56 | 50 | 41 |
| LATVIA | 42 | 51 | 56 | 35 | 38 | 39 |
| POLAND | 58 | 53 | 72 | 47 | 39 | 35 |
| CROATIA | 46 | 57 | 58 | 48 | 48 | 65 |
| ROMANIA | 55 | 58 | 53 | 61 | 72 | 53 |
| BULGARIA | 72 | 64 | 73 | 67 | 68 | 61 |
| RUSSIA | 70 | 72 | 62 | 63 | 69 | 66 |
| AZERBAIJAN | 71 | 73 | | | | |
| UKRAINE | 75 | 76 | 82 | 78 | 70 | |
| SERBIA AND MONTENEGRO | 74 | 80 | 79 | 77 | | |
| MACEDONIA, FYR | 81 | 82 | 85 | 75 | | |
| ARMENIA | 96 | 86 | | | | |
| MOLDOVA | 92 | 94 | | | | |
| GEORGIA | 93 | 96 | 91 | | | |
| BOSNIA AND HERZEGOVINA | 89 | 97 | 89 | | | |
| ALBANIA | 107 | 106 | | | | |

Appendix 5**Chronological list of European Union documents**

- [EU-1] Council of the European Union and European Commission (2000). *eEurope 2002. An Information Society for All. Action Plan prepared by the Council and the European Commission for the Feira European Council 19-20 June 2000*. Brussels, 14.6.2000.
- [EU-2] Candidate Countries (2001). *eEurope+ 2003. A co-operative effort to implement the Information Society in Europe. Action Plan prepared by the Candidate Countries with the assistance of the European Commission* // http://ec.europa.eu/information_society/eeurope/plus/doc/eEurope_june2001.pdf
- [EU-3] European Commission (2002). *eEurope 2005: An Information Society for all. An Action Plan to be presented in view of the Sevilla European Council, 21/22 June 2002*. COM(2002) 263 final. Brussels, 28.5.2002.
- [EU-4] Candidate Countries (2002). *eEurope+ 2003. Progress report – June 2002* // [http://emcis.gov.si/mid/emcis.nsf/V/K89BFB6D139731A05C1256BCA00444679/\\$file/Progress_report.pdf](http://emcis.gov.si/mid/emcis.nsf/V/K89BFB6D139731A05C1256BCA00444679/$file/Progress_report.pdf)
- [EU-5] European Commission (2003). *Guidelines on criteria and modalities of implementation of structural funds in support of electronic communications*. Commission Staff Working Paper. SEC (2003) 895. Brussels, 28.07.2003.
- [EU-6] Acceding and Candidate Countries (2004). *eEurope+ 2003. Progress report – February 2004* // http://ec.europa.eu/information_society/eeurope/plus/doc/progress_report.pdf
- [EU-7] Liikanen, E. (2004). *Information Society policy in an enlarged Europe*. Speech before the European Ministerial Conference on the Information Society. Budapest, 26.2.2004. SPEECH/04/100.
- [EU-8] European Parliament and Council of the European Union (2004). *Regulation (EC) No 808/2004, of 21 April, concerning Community statistics on the information society*.
- [EU-9] European Commission (2005). *i2010 – A European Information Society for growth and employment*. COM (2005) 229. Brussels, 1.6.2005.
- [EU-10] European Commission (2006). *European electronic communications regulation and markets 2005 (11th report)*. COM(2006) 68. Brussels, 20.2.2006.
- [EU-11] Eurostat (2006). *Methodological manual for statistics on the information society*. Office for Official Publications of the European Communities. Luxembourg // http://epp.eurostat.ec.europa.eu/cache/ITY_OFFPUB/KS-BG-06-004/EN/KS-BG-06-004-EN.PDF