A review of some basic prerequisites for information society: Croatia in comparison to EU countries and the countries of Central and Eastern European region

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Abstract. *Information society in general and creating prerequisites for its existence and development in particular are some of the determinants in the development strategy of Croatia. To measure and compare the readiness for and the degree of evolvement of information society in the EU member states, the European Commission has accepted a list of benchmarking indicators in line with eEurope 2005 program which offers a comparable insight in the development toward information society. Croatia has accepted this list of benchmarking indicators within the development strategy of Croatia in the field of information and communication technology (ICT), which includes directions and activities for transition into information society, and within the Operational Plan for the implementation of e-Croatia 2007 program for 2006. Since in Croatia there is still no publicly accessible systematic monitoring of these indicators, in this paper we want to explore the current position of Croatia in relation to EU and the countries of Central and Eastern Europe using information society indicators: Citizens' Internet access and usage, together with Broadband penetration. The analysis was performed on a dataset of currently available researches periodically done by market research companies and the International Telecommunication Union, as well as the data derived from Eurostat. Those data show the Internet users' growth trends in Croatia compared to EU.*

Keywords. information society, Croatia's Internet usage and penetration, broadband penetration, information society benchmarking indicators.

1 Introduction

The most comprehensive definition of information society describes this omnipresent phenomenon as a society in which economic and cultural life is critically dependent on information and communication technologies whereas the creation and exchange of information is the predominant social and economic activity [11] [1].

The environment that defines information society includes but is not limited to institutional capacities to collect, organise, store and share information and knowledge; stimulate the creation, processing, dissemination to all people and conserve local content; enable access by all people to information through use of ICTs; create, receive, share and utilise information in any media regardless of frontiers; develop high-quality ICT networks; and facilitate free flow of information and ideas from diversity of sources [16, 218]. Information society's impact can be seen in many areas of everyday life, particularly in the access to training and knowledge (distance learning, e-learning related services), work organization and mobilization of skills (teleworking, virtual companies), practical life (e-health services) and leisure [5]. In the light of these challenges, Croatia also needs to develop its information society. The Government of the Republic of Croatia has therefore adopted the Development Strategy of Croatia in the field of ICT, which includes all the required directives and activities for transition to information society. Section 4.4 of the Operational Plan for the implementation of e-Croatia 2007 program for 2006 focuses on the relevance of tracking

of information society development indicators in Croatia. Croatia accepted key information society development indicators emphasized by the European Commission in its "eEurope 2005: Benchmarking Indicators" document. Under that operational plan to become effective in 2006, the Central Bureau of Statistics of Republic of Croatia (DZS) is to monitor those indicators and ensure that adequate studies on Information Society Developments are made. Since then, there has been one systematic study monitoring these indicators – the Study on Information Society Developments in Croatia in 2005, made by IDC Adriatic [13]. In Croatia there has been no publicly accessible continuous systematic monitoring of these indicators. The aim of this paper is to explore the current position of Croatia in relation to EU and the countries of Central and Eastern Europe against information society indicators: Citizens' Internet access and usage, together with Broadband penetration. The Internet users' growth trends in Croatia compared to those in the European Union will also be presented.

2 Information society indicators

The European Commission has accepted a list of benchmarking indicators in line with eEurope 2005 program, also accepted by the Croatian Government in the Development Strategy of Croatia in the field of ICT. The list of eEurope 2005 Benchmarking Indicators [6, 4] includes:

1. **Internet indicators**
   A. Citizens' access to and use of the Internet.
   B. Enterprises' access to and use of ICTs
   C. Internet access costs
2. **Modern online public services**
   D. e-government
   E. e-learning
   F. e-health
3. **A dynamic e-business environment**
   G. Buying and selling on-line
   H. e-business readiness
4. **A secure information infrastructure**
   I. Internet users' experience and usage regarding ICT-security
5. **Broadband**
   J. Broadband penetration

There are some other groups of information society indicators, like OECD Key ICT Indicators [4]. The 15 ICT OECD indicators are taken from various publications and databases produced by the OECD's Directorate for Science Technology and Industry (DSTI). These indicators are mostly similar to the indicators comprised by the European Commission, for example: Access lines and access paths, Mobile subscribers, Internet subscribers, Broadband subscribers, etc. However, Croatia adopted the European Commission indicators and they will be used in this paper to compare Croatia to other EU countries and those of the Central and Eastern European region in particular.

3 Current research and monitoring in Croatia

The existing literature shows that this type of research and data collection is only starting to evolve. Systematic collection of data using indicators of information society has not been fully established yet. Consulting companies, like IDC and GfK, have conducted some individual studies for the Central State Administrative Office for e-Croatia. IDC is the premier global market intelligence and advisory firm in the information technology and telecommunications industry, whereas GfK is a market research centre.

The first research that included these indicators – Study on Information Society Developments in Croatia in 2005 [13, 3] – was done in 2006 by IDC Adriatic. Since then, the Central Bureau of Statistics of Republic of Croatia (DZS) has started 3 pilot research projects in information society under PHARE Multi-Beneficiary Statistical Cooperation Programme 2005 [2, 25]. Results concerning these indicators are still not available but we obtained some preliminary results from DZS that we compared with other studies and used them in our research as control data for Croatia. The only publicly available data were those from the market research done by GfK Center for Market Research published in the Study of Internet usage in 13 countries of Central and Eastern Europe [9]. This study, conducted under the direction of the European Commission, comments users' habits concerning the use of the Internet and Internet availability in households in these countries. The study does not contain data for EU and broadband penetration.

4 Research questions and data collection

In this paper we will focus on two questions relevant for this topic. Firstly, is the average penetration and usage of the Internet in Croatian households better than the average of the region, which includes Central and Eastern European countries? Secondly, is the number of broadband users greater than the average of the region, which includes Central and Eastern European countries? In our research we collected and analyzed all the known data from publicly available sources to establish the position of Croatia in

comparison to other countries of the Central and Eastern Europe and the average of the European Union (27 countries). The data for EU countries were collected from EuroSTAT Europe statistical database [7] and the Internet World Stats global statistical database [12]. The data for Croatia and non-EU member states in the region (the data for which and are not available on EuroSTAT) were collected from the GfK Adriatic research "Internet in 13 countries of Central and Eastern Europe" conducted in autumn 2007 [9] and from preliminary data collected through our correspondence with the Central Bureau of Statistics of Republic of Croatia. Furthermore, to show the Internet users' growth trends in Croatia, compared to the EU average (27 countries), historical data from EuroSTAT and the GfK article, *View on Citizens and Internet*, from July 2007, were used [10].

In this paper we present only three indicators for which we collected available data from various sources: Citizens' access to and use of the Internet as well as Broadband penetration. Indicators are measured by a) *Households or individuals using the Internet from their homes*, *percentage of households accessing the Internet in 2007*, b) *Individuals, users of the Internet: overall Internet users' penetration in 2007* and c) *Broadband Internet access (Broadband penetration) in 2007.*

Information and communication infrastructure provides an essential foundation for information society. Infrastructure is central in achieving the goal of digital inclusion, enabling universal, sustainable, ubiquitous and affordable access to ICTs by all, taking into account relevant solutions already in place in developing countries and countries with economies in transition, to provide sustainable connectivity and access to remote and marginalized areas at national and regional levels [14].

5 Survey results

The indicators in analyzed surveys were measured on a sample of 1000 individuals aged 16 to 74 accessing the Internet at least once a week within the last three months before the survey. Broadband penetration was presented as the number of broadband connections related to population. This indicator shows how much broadband access to the Internet has spread in different countries in general, without specifying user groups.

5.1 Internet usage in Croatia and Central and Eastern European countries

Based on the data obtained from the Croatian Centre for Market Research (GfK) that tested 1000 examinees from every country, indicators for Central and Eastern Europe [9] are shown in Fig 1, along with the data from EuroSTAT for EU countries in dependency upon EU expansion [7]. Data are presented in an integrated graphic chart to show comparison. The average was calculated from the Central and Eastern European countries including Croatia. The data for EU are in the graph merely for comparison's sake.

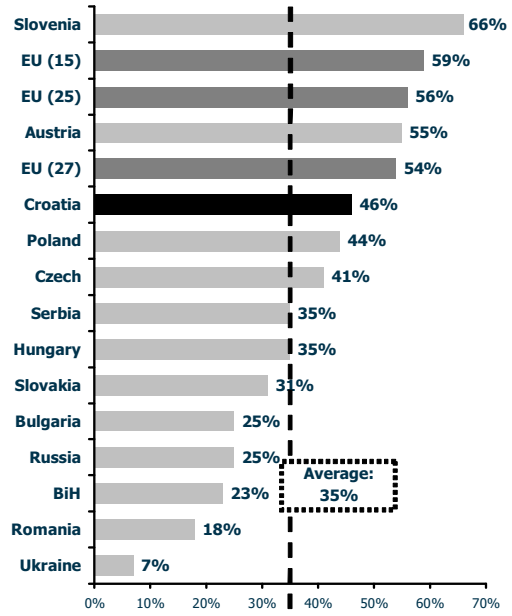

Figure 1. Accessibility to Internet from home EU average and Central and Eastern European Countries in 2007 [7, 9]

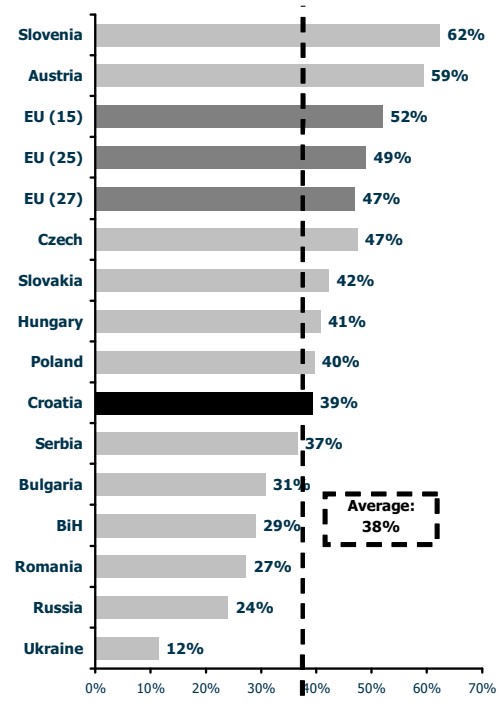

Figure 2. Users' penetration in Croatia, EU average and Central and Eastern European countries in 2007 [7, 9]

Fig 1 shows indicator a) Households or individuals using Internet from their homes, percentage of households accessing the Internet in 2007. Fig 2 shows indicator b) Individuals, users of the Internet: overall Internet users' penetration in 2007.

These indicators show that Croatia is ranked above the average of the region, that is, the number of Internet users is greater than the average in both indicators: a) Households or individuals using the Internet from their homes, percentage of households accessing the Internet and b) Individuals, users of the Internet: overall Internet users' penetration. Indicator a) shows that Croatia, with 46% of households accessing the Internet, is ranked above the average, which amounts to 35%. Indicator b) shows that Croatia, with 39% of the Internet users is ranked better than the average, which amounts to 38%.

5.2 Broadband Internet access in Croatia and Central and Eastern European countries

Broadband Internet provides connection to the Internet at a high data transfer speed. Technologies available to private users, like cable modem and ADSL, provide a speed higher than 144 kbps, which is considered to be the lowest broadband speed. Private users can also use DSL, optical lines and new wireless technologies (Wi-Fi, WiMAX and UMTS) [15].

A basic infrastructure of information society and knowledge-based economy as its economical counterpart is high-speed Internet access. It must be available, affordable and useful to every citizen, household, school, company and public administration [17, 369].

Croatia has an average of 5.6% (251.800) [12] broadband users in relation to its population, which is below the average of the Central and Eastern European region (Fig 3). A particularly large difference can be seen in comparison with the neighbouring Slovenia with 14.8%, which is about two and a half times more than in Croatian case.

The graphically presented data (Fig 3) show that Croatia is way behind the EU-member states. In spite of the number of its Internet users being above the average in the region, the number of broadband users in Croatia is considerably lower than the average in the region, which clearly represents Croatia's lag in that area. Adequate steps therefore have to be made to ensure affordable and available broadband in Croatia.

In 2005 the lag was 9% [3, 12] and now it is even more severe, about 12%. Following the analysis of broadband in Croatia in 2005, the Ministry of Sea, Tourism, Transport and Development adopted the Development Strategy of Broadband in Croatia in 2006, stating the following as its objective: by the end of 2008 broadband penetration will have reached minimally 12%, amounting to 500.000 broadband connections.

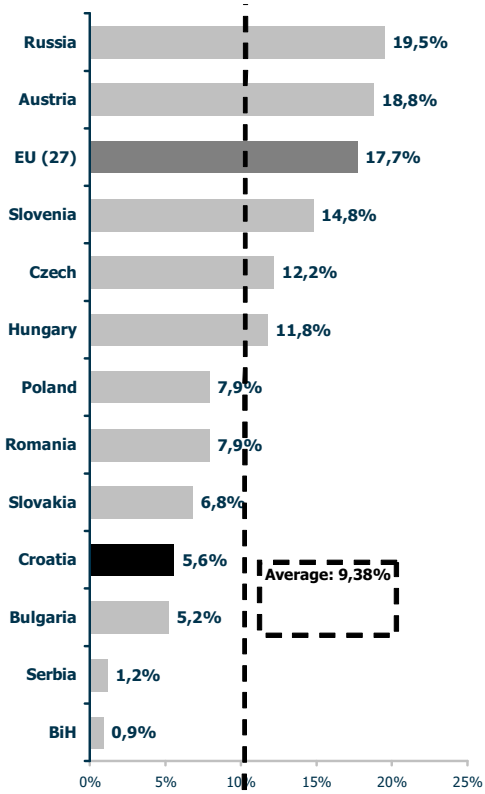

Figure 3. Number of broadband users in the region and EU (27) average in 2007 [12]

However, the 2007 figures of 5.6% do not speak in favour of that goal. There were 2.5% broadband users in Croatia in 2005, 3.92% in 2006 and 5.6% in 2007. On the other hand, EU countries increased their broadband connections by 4%, and new EU-member states by approximately 2% [3, 8].

According to the broadband users' growth trends in Croatia, the Croatian annual growth amounts to 1.55%, so it can be estimated that by the end of 2008 there will be 7.12% broadband users.

5.3 Internet users' growth trends in Croatia compared to the European Union average

The number of Internet users in Croatia, in consideration of two afore mentioned indicators (number of households having access to the Internet and number of individuals using the Internet) positions Croatia above the average of Central and Eastern Europe. There are no available historical data on Internet users in countries that are not EU members so it is not possible to make comparisons in that respect. The following figure presents historical data collected from EuroSTAT [8] and the GfK article [10]. In Fig. 5 these data are presented as Internet

users' growth trend in EU (average) versus Croatia, with absolute growth shown in percentage.

	2003	2004	2005	2006	2007
EU (27 countries)	:	36%	43%	45%	51%
EU (25 countries)	:	38%	43%	47%	53%
EU (15 countries)	38%	41%	46%	49%	53%
Croatia	25%	33%	34%	36%	39%

Figure 4. Historical data for the Usage of Internet (Internet penetration) indicator from 2003 to 2007. [8, 10]

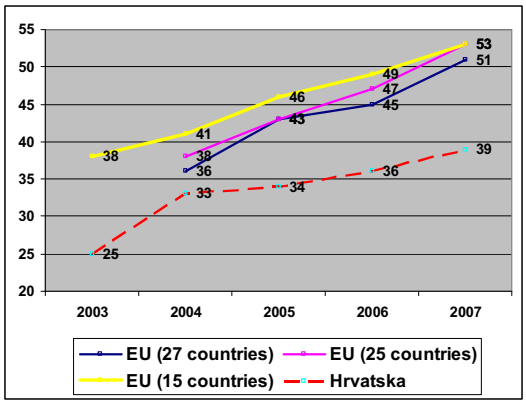

Figure 5. Internet users' growth trend in EU and Croatia from 2003 to 2007. [8, 10]

The annual growth of Internet users in EU member states from 2004 to 2007 (27 states) is approximately 5%, while in Croatia it is only 2%. If the growth continues at the same rate, the gap between Croatia and EU will become even bigger in the future.

6 Conclusion

Considering the Citizens' Internet access indicator, Croatia is ranked above the average of the region. In comparison with the European Union (27) the gap between Croatia and the EU27 average in accessing the Internet was 8% in 2007 (EU27 54% and Croatia 46%). In 2005 the gap was only 4% [13, 10].

When it comes to the Citizens' regular use of the Internet indicator, Croatia is ranked slightly above the region's average, but still lags behind the EU27's average by 8% in 2007 (EU27 47% and Croatia 39%).

On the other hand, considering the Broadband connections indicator in the region, Croatia is ranked fairly low on the scale (Fig 3), considerably below the average. The gap between the Croatian and EU27 average was 12% in 2007 (EU27 17.7% and Croatia 5.6%). In 2005 the gap was 17%, which, according to IDC, could have been caused by the late introduction of broadband technologies into the Croatian market, their relatively high prices, as well as the lack of localized broadband content [13, 10].

Despite the Development Strategy of Broadband in Croatia for 2008 no data obtained from systematic tracking of information society indicators [7, 27] are publicly available yet. On the other hand, European Union members track these indicators continuously and publish them on EuroSTAT. In order to improve the current position of Croatia, priority must be set on continuous monitoring and assurance of publicly available data for mentioned indicators. Further research into trends in information society and continuous monitoring of indicators are indispensable for improving the present state and moving Croatia towards EU.

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