E-Government in Transition Economies

Mario Spremić, Jurica Šimurina, Božidar Jaković, and Marijana Ivanov

Abstract—This paper deals with e-government issues at several levels. Initially we look at the concept of e-government itself in order to give it a sound framework. Than we look at the e-government issues at three levels, first we analyse it at the global level, second we analyse it at the level of transition economies, and finally we take a closer look on developments in Croatia. The analysis includes actual progress being made in selected transition economies given the Euro area averages, along with e-government potential in future demanding period.

Keywords—Central and Eastern Europe, Croatia, e-Government, ICT.

I. INTRODUCTION

THE government concept was virtually unknown a decade ago. This is not a surprising fact given available technology at the time. Now, however, information and communication technologies (ICTs) have gone forward giving the ability of e-government implementation. The term, as an identified activity and as a research topic has grown dramatically. Even though research on this topic has expanded considerably, Heeks and Bailur [1] point out to a poor state of the research: "…viewed as the offspring of information systems and public administration – accused at times of philosophical, theoretical, methodological, and practical shortcomings – and shows all signs of having inherited the expected 'generic' profile".

However, ICTs were recognized to have tremendous 'administrative' potential. For example, ICTs may help create a networked structure for interconnectivity [2], service delivery [3], efficiency and effectiveness [4], interactivity [5], decentralization, transparency [6], and accountability [7]. Electronic government (e-government) cover all these functions and, generally speaking, refers to the intensive use of ICT in providing the citizens an improved access to information related to public administrations as well as in providing them superb service quality.

E-government transformation is one of the biggest

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challenges within the IT-related sector from the perspective of scale and complexity. The main objective is to adapt existing e-government to new computing requirements based on the citizens' new service concept. [8]

In the following section we give a framework of e-government, and in subsequent sections we analyse world development, selected transition economies and finally Croatia.

II. BACKGROUND FRAMEWORK

Authors dealing with e-government issues have come up with several definitions and scopes for e-government. For the Gartner Group e-government encompasses the multi-dimensional nature of the concept, referring to "information and communication technologies to optimize government service delivery, constituency participation and internal government processes". Global consulting firm Booz Allen Hamilton cites that the term "e-government", like "e-commerce" or "e-learning", is associated with the dot-com revolution of the start of the decade and has historically focused on use of the Internet to conduct business between government and citizens, government and businesses or between different parts of government itself.

Basu [9] states that "e-government refers to the use by government agencies of information technologies … that have the ability to transform relations with citizens, businesses and other arms of government". In terms of actually using these technologies following are some ends, better delivery of government services to citizens, improved interactions with businesses and industries, citizen empowerment through access to information, or more efficient government management. Benefits resulting from these activities could be less corruption, increased transparency, greater convenience, revenue growth and cost reductions. Singla [10] also distinguishes imperatives of e-governance as being anticipation, transparency and accountability. It is further argued that the interaction among different players in society should not only be every four or five years when elections are held. Information and communication technologies (ICT) have a potential to shift command and control mechanisms both at the policy and implementation levels.

The Economist [11] predicted the next Internet revolution (after e-commerce and e-business) to be e-government revolution. Contrary to such optimistic expectations regarding e-government, a disappointment on how the situation evolved in following years followed. The Gartner Group [12] in 2004 brought analysis of e-government hype cycle in world (Fig.

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1.). After "peak of inflated expectations" in 2002 "trough of disillusionment" follows, and finally "slope of enlightenment" is coming.
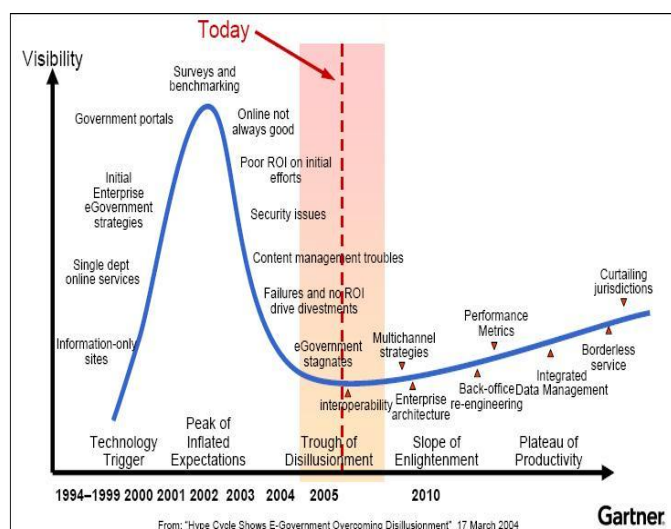

Fig. 1 Gartner analysis - Hype Cycle for e-Government

III. E-GOVERNMENT CONCEPT

E-government concept originated at the beginning of 21st century, mostly as a copy of e-commerce into public sector . All intentions were directed towards the presence of the public services on the Internet. In the early years of its development, e-government follows the evolutionary e-business evolving model, which in particular means that in the early days of e-government evolvement, primary focus of the e-services was simple appearance of graphic user interfaces with no possibilities of interactions. Early enthusiasm during the mean time weakened but such experiences brought crucial acknowledgments. Today, because of those acknowledgments, the focus is on coordination and effective assessment of the needs, efficiency and public benefits for such services. The development of electronic public services enters in the new phase, which is mostly determined by reengineering of existing processes of public government. Public sector by its nature (based on information and communications) is ideal for international increase of efficiency and quality. Public government disappointment is triggered by bureaucracy, information abuse for internal purposes, increasing cost of transactions and mostly because of lack of responsibility for the client. Especially in European countries the problem of ever-growing public sector is present, making the concept the efficient e-government even more important. Regarding the participants engaging in e-government activities, four models can be recognized:

- G2C (Government to Citizens),
- G2B (Government to Business),
- G2E (Government to Employees; which includes workflow management and knowledge management), and
- G2G (Government to Government; which includes Business Process Reengineering and ERP systems).

G2B initiatives and services attract the most attention, mostly because the wish and pressure by business sector for the improvement of speed of the services and possible the crease of overall cost (for example - public procurement). For well understanding of e-government concept it is important to explain differences with e-business, and the role of e-business within e-government. Despite previous believes that e-government services may be started as private sector businesses, the true nature of public government is very different form the way private sector function and significant differences were recognized.

Acording to Lam [13] here is a set of 17 barriers which were organised into one of four categories: strategy, technology, policy and organization. Strategy barriers include common e-government goals and objectives, delivery timeframes, and ownership and governance. Technology barriers include architecture interoperability, data standards and legacy systems. Policy barriers include citizen privacy, data ownership and policy implications. Organization barriers include pace of government reform, legacy government processes and management and technical skills. E-government is not simply a technical matter of getting IT systems to talk to each other, but something that requires strategic planning and considerable change management.

Acording to Ebrahim and Irani [14] the understanding of e-government architecture framework by public sector organisations is significance strategic phase toward reliable and effective e-government adoption. In their paper they describe how to use and manage information technologies to revitalise business processes, improve business decision-making, and gain competitive advantage from the adoption of e-government. The architecture framework defines standards, identifies the infrastructure components, applications and technologies that are the guidelines for e-government adoption have highlighted the importance of integrating the existing information systems and applications in public sector organisations in order to establish an efficient framework for e-government architecture. They suggest that the architecture of e-government can be divided into four layers: access layer, e-government layer, e-business layer; and infrastructure layer. The authors also analyse significant barriers to the adoption of e-government. They classify these barriers into dimensions with practical examples that include: IT infrastructure, security and privacy, IT skills, organisational issues and cost.

Belanger and Hiller [15] proposed a framework that explores the complexities of e-government by recognizing the various constituents and the different stages of implementation of e-government, incorporating both electronic government and electronic governance relationships. It highlights the complex relationships that exist in e-government between the constituents and the government as various stages of e-government are implemented.

As the Economist [16] reports, even though online services should allow governments to serve their citizens much more efficiently, despite all the heavy spending, progress has been patchy. Most countries have provision of information online

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not the full interaction, which is labeled i-government. The next stage to full implementation of e-government would be m-government. M-government encompasses provision of services as before but using a different method of delivery, e.g. printing out a visa form and downloading the information onto a smart card or a mobile phone. The same technology should make it easier for politicians to connect with their voters ("e-democracy").

Even though the steps of getting to the fully functional e-government solutions make a lot of sense, it should be noted that the dominant culture of respective countries may impede this process in a very peculiar way. Even though there may be a law on electronic signature and this method can be used safely and in the same manner as officially signed and stamped document, users of such document may still want physically "stamped and signed" document. Furthermore, it may be required in formal proceedings as credit application and alike, especially dealings with sensitive legal issues as ownership and registering ownership with respective institutions. Thus, it may be considered useless in formal proceeding even though electronic documents may be used.

Such a cultural impediment may exist not only in developing but in developed countries as well. Sometimes, technological gap is easier to close than the cultural gap.

Bertot and Jaeger [17] point out that in order to achieve cost savings in a citizen-centered government through e-government services, governments need to know expectations of e-Government services. In order to acquire the information the following should be implemented:
• Information and service needs assessment. There is a need to systematically ask citizens about their actual information and service needs.
• Technology needs assessment. Governments cannot assume that a computer and Internet access are sufficient to engage in e-government.
• Information and technology literacy. A key aspect of e-government service delivery and availability is the ability of citizens to successfully use e-government services.
• Government literacy. How users interact with e-government services will depend greatly on how well they understand the structure of the government.
• Usability and functionality. There is a need to engage in an iterative design process that encompasses user assessment throughout the service's development process.
• Accessibility. Increasingly aging populations and others in populations have a range of challenges tied to their abilities to use e-government services.
• Meeting user expectations. Consistency between sites and services has not been a high priority, nor has consistency of the materials provided.
• Understanding how citizens actually use e-government services.

Failure in any of the above areas could lead to diminished use of e-government services and loss of confidence among citizens which would seriously hamper future development.

Chan et. al. conducted a macro analysis of Singapore's e-government initiatives where they traced first initiatives back to 1980s [18]. First integrated e-government action plan was launched in 2000 and today a central web site exists, acting as a single gateway for accessing all governmental e-services. The anal sis discovered four key components that could encompass all initiatives in development of e-government in Singapore and these initiatives are shown in Fig. 2.
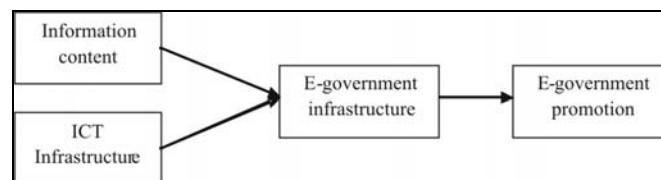

Fig. 2 E-Government implementation framework [18]

E-government can apply some elements of e-business concept very well. The reasons why public government should overtake ideas and concepts of e-business is advantages in such a way of making business: the delivery of better and faster services with decreased costs. E-government creation is not a process that can be achieved within one simple step or phase. By its nature that process has evolutional properties; the process is conducted in couple of steps or phases. Organization AOEMA (Asia Oceania E-Business Marketplace Alliance) gave comparison of three main models of phases in e-government development, which are the World Bank, United Nations and the Gartner Group [19]. All three models cover the same area with certain activities contained in later or earlier phases:

- First phase, Emerging (Presence, Publish) - An official government online presence is established. Content is predominately static and not necessarily in response to citizen expectations.

- Second phase, Enhanced - Government sites increase. Information becomes more dynamic and regularly updated. There are downloadable forms, documents and features like site search and e-mail on web sites.

- Third phase, Interactive (Interaction, Interact) - Users can download forms, e-mail officials and interact through web. Portal with links to related sites, specialized databases, online forms submission, user login.

- Transactional (Transaction, Transact) or fourth phase - Users can actually pay for services and other transactions online. Secure access for online payments, email confirmation and acknowledgement receipt.

- Fifth or Integrated phase (Seamless) - Full integration of e-services across administrative boundaries. All services and links accessed through single central portal, all transactional services offered through single integrated site, customizable user pages.

IV. ANALYSIS OF E-GOVERNMENT SUCCESSFULNESS IN THE WORLD

There are many efforts to approach the analysis of e-government successfulness in the world in form of rankings of

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the countries. Such research is conducted by international organizations (UN, European Commission), academic institutions (Waseda University Institute of E-Government), and different consultant companies (Accenture, Capgemini, and TNS). The majority of analysis is based on pages evaluation according of its content, according the evaluation of the availability of the services. Within last couple of years there are meaningful analysis of Accenture and Waseda Institute. Petricek, Escher, Cox and Margetts in their article "The Web Structure of E-Government - Developing a Methodology for Quantitative Evaluation" made a critical observation on the way of choosing of web metrics [20]. They stated that most analysis in the world during assessment do not consider the structure of the links on public government web pages. During analysis different methodologies are used, which leads to different rankings of countries from analysis to analysis. A brief description of a few analyses follows.

Accenture – 2005 research includes two main components: service maturity (which measures the level to which a government has developed an online presence) and customer service maturity (which measures the extent to which government agencies manage interactions with their customers) in 22 national public governments [21]. The overall average for service maturity breadth in 2005 is at 91 percent and 20 out of the 22 countries surveyed having at least 80 percent of the national services measured online. The overall average customer service maturity score in 2005 was a mere 39 percent. First ten countries ranked by service maturity for the year 2004 were: 1.) Canada (60%), 2.) USA (49%), 3.) Singapore (47%), 4.) Finland (46%), 5.) France (45%), 6.) Denmark (44%), 7.) Australia (43%), 8.) Netherlands (42%), 9.) Japan, Norway and Italy (41%). 2005 report [22] gives an assessment that the growth of electronic public services maturity is slowing down but that overall average customer service maturity has increased from 39 to solid 48 percent. The leaders are still Canada and USA.

Waseda University Institute of e-Government – from Japanese university - Graduate School of Global Information and Telecommunication Studies. These reports process six sectors through 26 indicators. Sectors are: Network Preparedness, Required Interface-Functioning Applications, Management Optimization, Homepage/Portal Situation, Chief Information Officer and Promotion of e-Government. Research"2007 World e-Government Ranking" [23] was published at the end of January 2007 in addition, analyses e-Government success results for the year 2006. Top ten countries are: 1.) USA, 2.) Singapore, 3.) Canada, 4.) Japan, 5.) South Korea, 6.) Australia, 7.) Finland, 8.) Taiwan, 9.) UK, and 10.) Sweden.

UN - publishes a capability estimate of e-governments all over the world for all of its member countries, 191 in total in the 2005 report [24]. UN in its yearly research calculates quantitative e-government Readiness Index for each country. E-government Readiness Index is a composite index comprising the Web measure index, the Telecommunication Infrastructure index and the Human Capital index. According

to global readiness of e-Governments for 2005 results the most successful country is USA followed by: Denmark, Sweden, UK, South Korea, Australia, Singapore, Canada, Finland, Norway etc. Croatia within this UN report takes 47th place behind Romania, Bulgaria and Thailand.

Economist Intelligence Unit – in cooperation with IBM Institute for Business Value publishes analysis of e-readiness of different world economies[25]. „The 2006 e-readiness rankings" report was made regarding analyzing condition in 68 different countries. The ranking by e-readiness criteria was made by combining around 100 quantitative and qualitative criteria, organized in six different categories.

Top ten countries for the year 2006 are (in parenthesis is the place within 2005 report): 1.) Denmark (1), 2.) USA (2), 3.) Switzerland (4), 4.) Sweden (3), 5.) UK (5), 6.) Netherlands (8), 7.) Finland (6), 8.) Australia (10), 9.) Canada (12) and 10.) Hong Kong (6).

Parallel display and comparison of top ten countries through four studies.

TABLE II
PARALLEL DISPLAY OF TOP TEN COUNTRIES OVER FOUR STUDIES FOR THE YEAR 2005

	Accenture	Waseda	UN	Economist	Compared sequence
1.	Canada	USA	USA	Denmark	USA (38)
2.	USA	Canada	Denmark	USA	Denmark (27)
3.	Denmark, Singapore	Singapore	Sweden	Sweden	Canada (22)
4.		Japan	UK	Switzerland	Singapore (20)
5.	Australia, France, Japan	South Korea	South Korea	UK	Sweden (16)
6.		Germany	Australia	Finland, Hong Kong	UK, Australia (15)
7.		Taiwan	Singapore		
8.	Norway, Finland	Australia	Canada	Netherlands	Japan (13)
9.		UK	Finland	Norway	South Korea (12)
10.	Netherlands	Finland	Norway	Australia	Finland (11)

Table II presents parallel display of top 10 e-Government implementation countries 2005 results. Through parallel display a scoring system is made (first place brings 10 points, and 10th place brings 1 point); the last column shows top 10 countries over four different reports (total number of points for each country in parenthesis). The assumption is that all four studies are equally valued by its applied methodologies making the scoring system linear, without special weight factor for individual categories.

The ranking after 10th place: 11.) Switzerland (7), 12.) Norway and France (6), 14.) Germany and Hong Kong (5), 16.) Taiwan and Netherlands (4). From individual studies and

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comparative ranking can be concluded that the most successful countries in e-readiness and e-Government implementation are at the same time the most developed countries in the world that realized the importance of creating an information society for its continuous growth.

The advancements of e-government are expected to grow over time due to technological developments and support from successive governments around the globe. [26]

Governmental agencies face several challenges in the transition towards e-government services. Some of the difficulties linked to the implementation of e-government involve lack of financial, technical and personnel resources, some issues involve security, accessibility, limited cross-agency collaboration and internal politics, and citizen awareness and confidence. [27].

V. STATE OF ECONOMIES AND ICT INFRASTRUCTURE IN CENTRAL AND EASTERN EUROPE

Commercial banks have spent a lot of resources to familiarize customers with the new ways of banking (e.g. ATMs, internet banking etc.). The same needs to be done for e-government solutions. If the system is implemented but there are no users, the whole system is useless. Tendency of public administrations to do useless things is always present but it should be curbed to a minimum. On the other hand, resistance by the public administration has always been strong. Such a resistance may impede implementation of new technologies, which was very apparent in CEE countries with introduction of computers. The same may be expected with e-government solutions. In the end, it is not only about computers, actual persons are at both ends of communication.

The question is what should come first? Physical infrastructure, computer and Internet literacy, regulation in the field, or full e-government solutions? Historically, development of technology was always ahead of infrastructure development or regulations. However, with this in mind, solutions should be implemented given the level of social capabilities, thus implementing the right combination of e-government solutions with acceptable level of social capabilities. Otherwise, public funds may be spent without any benefit, even though it may reflect best world practices. However, best practices used by businesses might not yield efficient results in the public sector. The use of outsourcing by businesses should yield better performance of companies by focusing on core business. These actions may yield security issues and distrust by the public in the case of implementation by governments [28].

ICTs certainly do their part in enlightening the citizens on governmental actions and entice them to get more engaged in influencing public policy.

The diffusion process with famous discoveries, e.g. steam engine, took some 100 year before large benefits were acquired through railroad. Even with computer technology diffusion took some time before gains in productivity could be clearly detected. By the end of 1980s, productivity gains could still not be detected as a consequence of computer technology

diffusion which was coined "Solow paradox". Even though computers were already very much present in economies, productivity gains could not be detected. Thus, again, diffusion process was long. However, productivity gains were clearly detected during the 1990s and later. The usual problems with new technology implementation are likely to be associated with implementation of e-government solutions as well. One should not be surprised if there is no immediate efficiency gain from e-government solutions since public administrations is much slower to change than businesses.

Historically, there are quite distinctive examples (e.g. Japan or UK) where countries had remarkable economic results but lacked the natural resources. However, knowledge was the resource they did not lack. E-government does not require natural resources, but requires knowledge on implementation, sequencing of implementation, and, naturally, education of users.

The acceptance of new technology goes with social capabilities, production and technology frontiers. In order to sustain and improve social capabilities, production and technology frontiers a country needs to be at the output level suitable for a certain technology. Thus, countries at very low levels of income do not have high tech in their priorities.
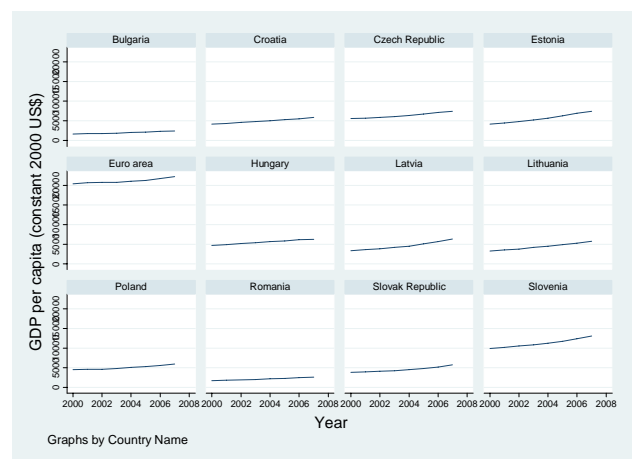

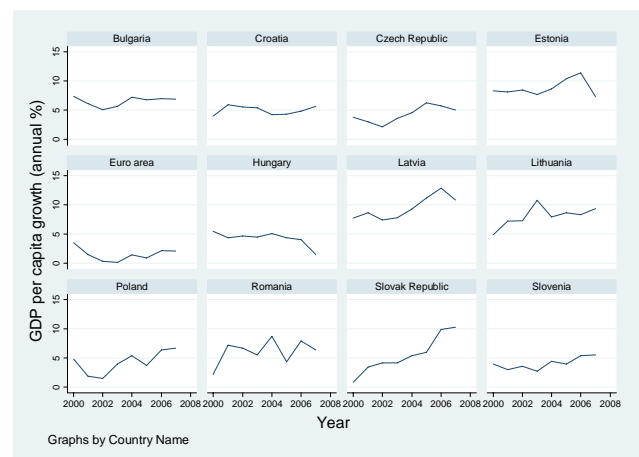Fig. 3 GDP per capita (2000-2007) [29]

Fig. 4 GDP per capita growth (2000-2007) [29]

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From Fig. 3 we can observe all countries to be lagging behind the Euro area (average). Even though some countries lag behind the Euro area considerably, they are still at relatively high levels of GDP in order to be capable to implement ICTs. Also, all countries exhibit an increasing trend of their GDP per capita levels. Furthermore, as can be seen from Fig. 4, all countries generally exhibit higher growth rates than the Euro area. This gives space for convergence in output to actually materialize. However, in the coming period all countries can hope for very modest or no growth at all. Does this imply a slowdown in implementation of ICT solutions? Businesses will certainly tend to cut costs, and one tool at their disposal is implementation of ICT solutions. On the other hand, governments will have declining tax revenues, also searching for ways to cut cost. However, governments are less like to respond to cost incentives as fast as businesses. Rigidities are very dominant in public administration given the implementation of ICT solutions in the first place. Nonetheless, the upcoming times might be an opportunity to push for efficiency through ICT solutions.

How committed countries are to improving ICT infrastructure can be observed from Fig. 5 and 6. In terms of shares in GDP ICT expenditures seem to have risen most dramatically in Bulgaria with already high levels in the Czech Republic, the Slovak Republic and Hungary with other countries pushing forward. Data for Croatia, Estonia Latvian and Lithuania is not available. Even though most countries exhibit higher shares in GDP we cannot conclude that in the absolute amounts Euro area is lagging behind. This is just evidence that convergence in ICT expenditures is taking place. If countries keep up with such high rates of ICT expenditures Euro area absolute averages could be attainable in relatively short amount of time. As we can see from Fig. 4, the Euro area is high above observed countries by a lot. So in terms of per capita expenditures on ICT are lagging far behind. This constraint comes from lower GDP levels altogether. With convergence in GDP per capita we can expect convergence in ICT expenditures as well.
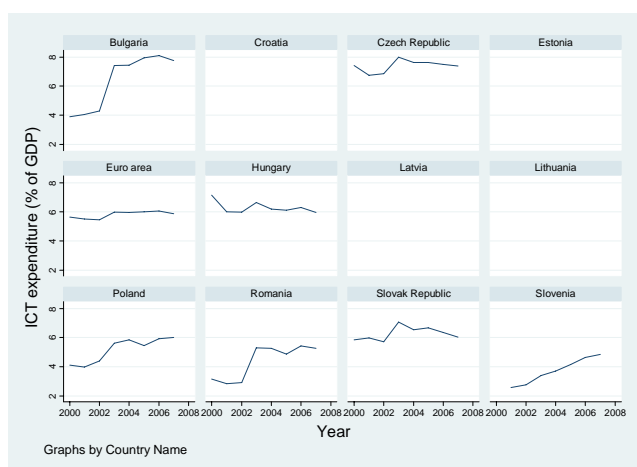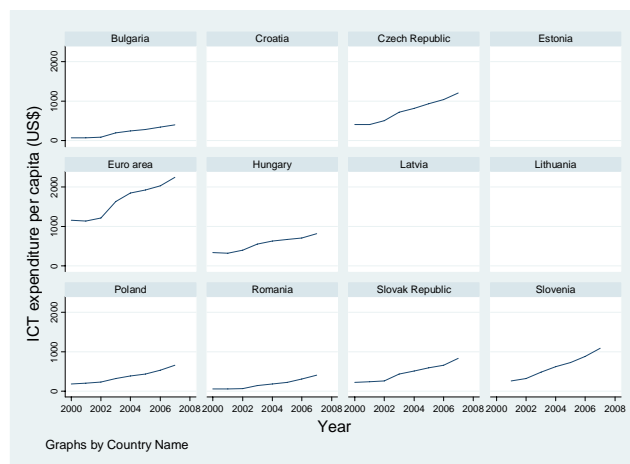

Fig. 6 [29]

Technology solutions enable government to service citizens in a more timely, efficient and cost effective way [30]. As a prerequisite for effective e-government, as well as other e-initiatives, broader issues regarding ICT usage such as number of computers per household, availability of broadband internet access at fair prices, computer literacy of citizens, secure data exchange and much more needs to be considered.

From Fig. 7 we can observe Estonia to be a frontrunner with a remarkable increase of personal computers number in the observed period. Behind Estonia are Slovak Republic and Slovenia with much more consistent development, and it seems much more sustainable development regarding the number of personal computers. Naturally, computers are the base for any development regarding e-government activities, but they need to be used in order to yield productivity increase. Other countries have a rather modest increase in numbers, but increase never the less. One should expect faster increase due to falling prices of computers and computer components, and improvement of computer literacy.

Croatia is lagging behind the frontrunners, even though improvement is visible. Croatia did not build up its ICT infrastructure and ICT literacy to its potential. Even though this gap can be overcome, for ICT literacy in particular, unlike physical infrastructure, some time will pass before full potential of e-government implementation is actually possible (social capabilities). If people are not ready to use new technologies, a question emerges: is it now the right time to improve ICT infrastructure of the government? The answer is yes. As ICT gets more user friendly and as new generations complete their formal education (all the school in Croatia have Internet access) along with knowledge upgrading of others, full potential of e-government can be obtained in fairly short time. As Croatia ranks first for schools connected to the Internet, it should be stressed that this is due to the government decision to do so since 99% of all schools are public. The quality of infrastructure and availability of computers to students in schools is another issue. This is largely school specific. However, this is an important step to full implementation of e-government. It should also be noted

Fig. 5 [29]

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that currently percentage of people with elementary school or less in Croatia is 40% which is a major obstacle to full implementation of e-government at the moment, and for any other e-activity for that matter.

Other countries in the sample are at the lower levels of schools connected to the Internet. However, this is not likely to be an issue in the future because this is in interest of both governments and businesses. For the governments it is important to have educated and computer (Internet) literate population in order to boost competitiveness. On the other hand, businesses want to have more customers who are computer (Internet) literate in order to use newly available services, distribution channels and products.
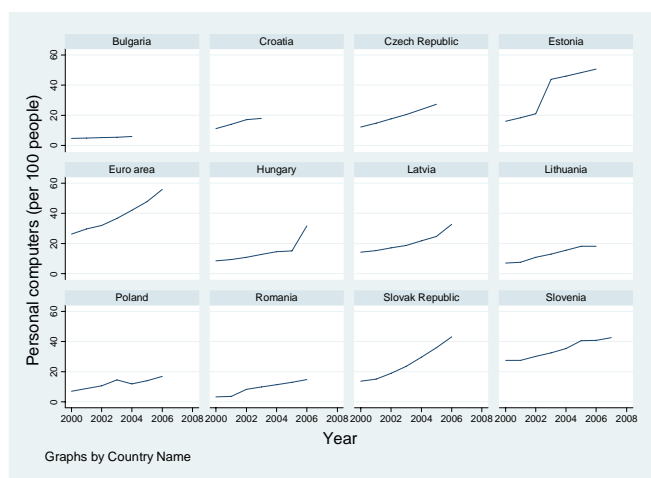

Fig. 7 Personal computers per 100 people (2000-2007) [29]

Despite being a member of the EU and despite the fact that in the Soviet dominated block Bulgaria specialized in hardware and software, it has the lowest number of personal computers per 100 people among the analyzed countries. Together with Romania it has the least developed IT infrastructure. Even though this is actually may be true, there may be an issue with the data collection which is considered to be poor for these two countries.

Data on ICT infrastructure for Czech Republic, Slovenia and other countries indicate overall favorable conditions for further development. Furthermore, Czech Republic spends more on ICT than was the average of (2004 data) EU 15 and is the leader with Slovenia in mobile telephony segment.

Estonia was the leader in Central and Eastern Europe in liberalizing fixed line telecommunication market which has certainly reflected on well developed IT infrastructure.

Hungary is well on the way to a fully developed IT market despite some minor difficulties in the process as well as Lithuania. [31].

However, these problems should be resolved in parallel with the actions of disclosure of government activities using the web as a dissemination tool. This view is somewhat analog to attitudes contained in the Council Resolution on the implementation of the e-Europe 2005 Action Plan [32] which

stresses e-business, e-health and e-learning besides e-government, as well as other key areas in strengthening e-economy and e-Europe altogether. Overview of Croatia's current position and further steps that should strengthen e-competitiveness and subsequently better utilization of e-government initiatives, are stipulated in the Operational Plan for Execution of e-Croatia Program with Overview of Activities in 2007 [33].

The numbers of the Internet users are the most promising of all (see Fig. 8). All countries are converging to the Euro area level. This is the most significant view in support of implementation of ICT and thus e-government solutions in selected countries. One of the major contributors to exponential growth of the Internet users is the broadbend (see Fig. 9) possibilities that lifted off around 2004. Even though there were other modes of internet connectivity before 2004 that stipulated rather high speeds, simplicity and availability along with the drop in price, fueled the boom.
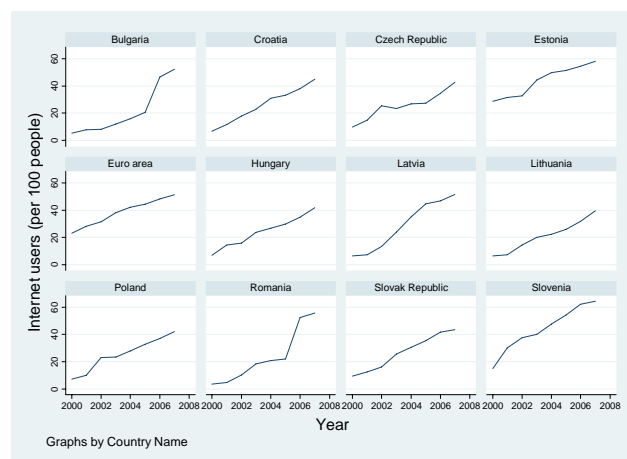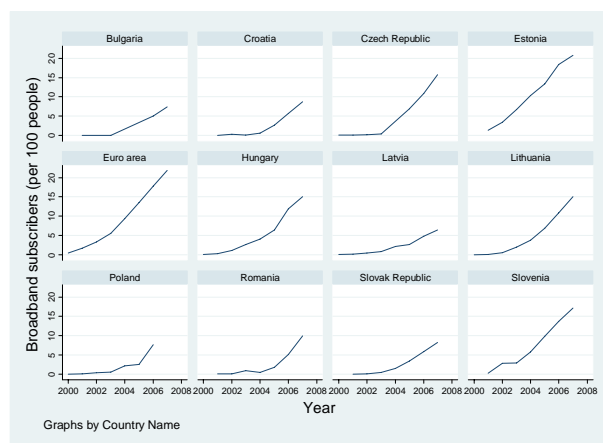

Fig. 8 Internet users per 100 people [29]

Fig. 9 Broadband subscribers per 100 people [29]

VI. E-GOVERNMENT ENVIRONMENT IN THE REPUBLIC OF CROATIA

By the end of 2003 Croatia began to take steps in forming foundations for development of e-government solutions. At

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the time Croatia was no different than any other transition country in Europe. It was characterized by low level of administrative transparency, lack of maturity for standardization and measurement, low income and the low Internet penetration rate.

However, awareness in Croatia is increasing with introduction of e-government solutions in different areas of public services. First attempts in that direction were done in April 2000 when Croatian Government ordered the study on National Strategy. In June 2000 work group was formed. After official procedures in January 2002 National Strategy of Development of ICT was adopted by the Croatian Government and the Parliament. After establishment of infrastructure for development of e-government solutions, actual implementation began. In December 2003 the Central Government Office for e-Croatia was established at a cabinet level responsible for implementation of the project e-Croatia 2007. Head of the Office was directly responsible to the Prime Minister [34].

In December 2003 the Government accepted the operational plan for implementation of e-Croatia 2007 program, proposed by the Central Government Office for e-Croatia. According to the plan, Croatia should emphasize modern online public services in the area of e-government, e-learning services, e-health services, e-business environment, widespread availability of broadband access at competitive rates and a secure information infrastructure.

The European Commission defined a set of services consisting of twelve basic sets of services for citizens and eight basic sets of services for businesses. They set the foundation for the development of services by e-Administration and the project HITRO.HR within the implementation of the e-Croatia initiative.

HITRO.HR was established to serve as a gateway for individuals and businesses in need of public administration services. Croatia has historically scored rather low regarding the number of days that it takes to open a firm in comparison to neighboring countries. In order to upgrade its position HITRO.HR was established as a one stop shop. The web site basically clusters together various steps in the procedure of opening a firm and combines various services that enable e-communication among the stakeholders and the government. Among others, web site includes: e-KUTAK (information on benefits of conducting business on-line), e-PENSION, e-PAYMENT and many others.

Certain progress was made in the area of most important public services for citizens, e.g. submission of income tax returns, employment office services, social benefits, issuing identification documents, vehicle registration, issuing construction permits, police contact, birth certificates, admissions to higher education facilities, change of address and health services information. Furthermore, some progress was made in the area of business services, primarily submission of business tax returns; value added tax, social insurance of employees, registration with the business subjects registry, submission of data to the Bureau of Statistics,

customs declarations, public procurement, and environment impact licenses.

Another important issue for development of e-governments solutions in Croatia is security. High security is vital precondition for e-government development. General public needs to have complete trust in the system in order to use it, and the public sector needs a high level of security to handle electronic contacts with citizens. In that sense, a digital signature for citizens, companies, and public institutions is a major component of an e-government strategy.

In January 2002 Croatian Parliament adopted the Digital Signature Act and implementation started in June 2002. National certification center was created at the Ministry of Commerce and an agency for e-signatures was certified. In this way Croatian infrastructure was harmonized with the EU Directive 1999/93/EC [34].

Ambitious goals were set in 2002 by creating the Program for Health Care computerization, which was by design divided into a project for primary health care computerization, and a project for hospital systems computerization. However, as the Government changed, many projects were put on hold due to the lack of funds, or waiting for evaluation.

In order to properly organize network infrastructure the process had to be run from the Government level. Thus, governmental communication network infrastructure was designed. Development of this network is a vital precondition for public on-line services in Croatia.

Regarding the internal structure of the Central Government Administrative Office for e-Croatia, the following departments were established: the Department of Rationalization of Investments in Information and Communication technologies, the Department of e-Croatia initiative Implementation Coordination, and the Department of International Cooperation

One of the recent initiatives was the digital register of voters. The register is available to citizens via the web service of the Central Government Administrative Office for Public Administration (SDDU). The Government Election Committee provides access to data on local and national elections (e-democracy in making).

VII. CONCLUSION

The Croatian electronic public government will have to realize the remaining e-services agreed at the level of EU member states and EU candidate states during the forthcoming period. The services for citizens are: income taxes, social security benefits, personal documents, building permit and health-related services. For the business subjects the following services have to be realized: public procurement, submission of data to the statistical office, and social contribution for employees. The new Government of the Republic of Croatia (as of January 2008) has in its program for the reform of public government and aligning with EU, anticipated the projects of introducing the e-passport and e-driving license based on the technology of smart cards and implementation of

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electronic signature. These projects can ameliorate the introducing of new electronic services for citizens. However, the best base for the implementation of remaining services would be the electronic personal smart card (e-ID) with digital certificates for identification and digital signature. Croatian personal card already has certain assumptions for the transition to the smart cards technology (smart card format, assumed place for chip). Similar to already used implementations in Europe (Belgium, Estonia), the smart card would have two digital certificates. The beneficiary could use card as visual and electronic identifications and could create electronic signatures with legal validity with PKI technology.

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