Methodologies for Measuring E-Government Development: The Croatian Case

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Abstract. Development of various *e-services and e-government solutions has become a global trend in recent years. Since this field is rapidly growing and developing in many countries which vary in their strategies, goals, ways of implementation and funds invested in such services, a few different methodologies have been developed to measure their results and compare them. Since they represent the key factor for measurement and comparison of countries, some of them are mainly focusing on economical and financial factors, while neglecting strategic goals set by country government. Most countries have different e-government related policies and strategies, and they vary even more when we take into consideration European countries. The Union does not have firm federal government and strategies and the progress is mainly coordinated according to commonly accepted guidelines. In this case we are focusing on Croatia to present differences between methodological approaches to measurement of e-services benefits and results, and their coherence for comparison.*

Keywords. E-services, Croatia, E-government, Methodology, Country e-strategy

1 Introduction

For the last two decades public e-services started to emerge on a global level. They started to gain speed in development and offering of such services for the last ten years. Nowadays, many countries over the world offer public administration and government services online. Public administration and government e-services started to develop in Croatia in 2003 with a start of the project "e-Croatia 2007". There were a few pilot projects before 2003 that were focused on public e-services and e-Government in Croatia, but systematic approach started with first e-Government strategy. As many other countries, Croatia had used best practices from other countries to speed up the development and implementation process of public e-services. The project "e-Croatia 2007" was extended following modern global trends in e-services, with projects and plans until year 2012. It is covering the fields of broadband Internet, digital television, e-business and e-Government services, up to fields concerning Internet society and e-safety. As an overreaching and complex project for entire country, its results are measured and tracked to monitor the progress and development of set goals. To accomplish this task internal measurement methodologies have been developed, which relay on EU guidelines and practices. This allows the government and responsible bodies to compare results with similar projects in Europe. [2] [7]

Different countries have developed their own methodologies and ways for measuring progress and accomplishments of set e-government strategies and goals while implementing and developing e-services. Some of them have adopted European Union guidelines and recommendations for indicators that should be monitored. In Croatian case the list was fulfilled with 6 additional elements which are considered as special interest to Croatian Government. To the set of 20 basic areas proposed by European Union, Croatian Government added agriculture, tourism, culture, state inspection, protection of personal data and Croatian assets. The list of 26

elements recognized and adopted by Central State Administrative Office for e-Croatia is used for planning and monitoring development and implementation of individual projects and comparison of their results. [1]

Since countries in Europe have different political approaches to development of e-government with various priorities there is a need to measure and compare results from such variety of countries. Since some countries have developed their own ways of monitoring and measuring realization progress, it is hard to compare such data. Because of that, we have to reach for methodologies that are widely accepted or find data that is measured using similar ways. In next chapter we are presenting 7 different methodologies, some of them with their data and results, to show and emphasize differences between countries as well as differences among methodologies.

2 Methodologies

"Global E-Government" [9] is a project conducted by Brookings Institution which is focused on economic studies, foreign policy, global economy and development, governance studies and metropolitan policy programs. Global E-Government has collected data from 1,687 national government websites from 198 different countries all over the world. They are focusing on analysis of legislative and judicial offices, as well as major agencies serving crucial government functions. In that segment they are focused on healthcare and education systems, economic development and taxation, administration, natural resources, transportation, tourism, business regulation and some more. Their methodology is based on evaluation of stated websites by criteria of: "information availability, service delivery and public access". By stated criteria they look for different features which they use for data comparison. [9]

Table 1 is showing data presented in Global E-Government reports for the years 2006 and 2007. We are presenting top-ten countries in those reports, while adding ranking for Croatia which is placed on 45th position in 2007. In the same report Croatia is stated to have 60% of online services covered by websites, from which 100% have publications online, 80% of them have some sort of databases and 20% have privacy policy as well as security policies. From those pages 0% were adopted to W3C disability accessibility standards. This study also presents differences among world regions. In 2006 average score for Eastern Europe was 30%, while in 2007 it was 32%. Focusing back on Croatia, it scored below average in year 2006 with 28%, but made a big leap in next year where the score was above average (35%). This study was conducted on 198 countries from all over the world. [9]

Table 1: E-Government Country rankings in 2007 with 2006 results stated in brackets (adopted from Global E-Government) [9]

Rank in 2007 (2006)	Country
1. (1.)	Republic of Korea
2. (3.)	Singapore
3. (2.)	Taiwan
4. (5.)	United States
5. (6.)	Great Britain
6. (5.)	Canada
7. (48.)	Portugal
8. (12.)	Australia
9. (27.)	Turkey
10. (8.)	Germany
31. (56.)	Austria
45. (88.)	Croatia

On the other hand, "UN e-Government survey" [7] has much more holistic approach. This methodology is based on infrastructure development, human capacity and access to knowledge and information. Since governments are viewing their citizens as "customers" this methodology is also more focused on government-to-citizen (G2C) approach which is becoming more common in this field. Their questions are focused on "21 citizens' informative and participatory services" which are grouped in 3 categories: "e-information, e-consultation and e-decision-making". [7] Their survey is based on telecommunication infrastructure index and web measurement, which we will compare to the results of the previous methodology in the next chapter.

Table 2 shows top-ten ranking of countries plus Austria and Croatia for the year 2008. Those results are showing cumulative results of UN e-Government survey in 2008 and are focused on e-government readiness. In the same survey Eastern Europe has an average score of 0.57 concerning e-government readiness, while Croatia scored the same result. Since UN e-government survey has holistic methodology they also take into consideration Web Survey in which Croatia was ranked as 69th with a score of

0.43. UN survey was conducted on 192 countries from all over the world. Croatian final 47th place was calculated from 3 main categories in UN survey: Web measure index where Croatia had 0.43, infrastructure index with a result of 0.37 and human capital index of 0.9. As stated, Croatian e-government readiness index was 0.57.

Table 2: E-Government Readiness Index in 2008 (adopted from UN e-Government Survey 2008) [7]

Rank in 2008	Country
1.	Sweden
2.	Denmark
3.	Norway
4.	United States
5.	Netherlands
6.	Republic of Korea
7.	Canada
8.	Australia
9.	France
10.	United Kingdom
16.	Austria
47.	Croatia

Mareva methodology is a method for analysis of impact of various government e-services. It is based on "return on investment (ROI) calculations for large public projects and comparable approaches in the private sector". [5] Since this approach is based on ROI it is focused on four main aspects. First one is focusing on investment objectives and their alignment with missions of the investor. Second, it monitors if the level of risk is acceptable for the project that is carried out. Method is focused on different types of risks: human, financial, technical, organizational, etc. Third aspect is related to clear definition of project benefits and goals, their appropriate indicators showing realization progress. At last, Mareva is focusing on expected benefits and their coverage of investment and costs. As such Mareva is considered as pre-defined method and tool to assess value of an e-government project. It has a more holistic approach which is focusing on project profitability and applies consistent evaluation of e-administration projects in which it takes into consideration both external and internal aspects. Monitored external aspects are based on benefits for individual users (ie. citizens), as well as organizations and business entities, while internal aspects are based on elements of public sector employees and public administration. With ROI Mareva methodology is focusing on key elements for comparison of projects and risk control. [5]

Value Measuring Methodology (VMM) [3] is based on defining, capturing and measuring values associated with e-services which are not accounted in ROI. It is also focusing on costs and risks of a project. Therefore VMM is considered to be a hybrid methodology used by government bodies for development and steering of e-government initiatives. It is designed to monitor and help in choosing best alternative and decision making between different initiatives in the field of e-government projects. This methodology is analyzing and estimating values, risks and costs as well as evaluating them and calculating relationships among those elements. It is used to analyze projects on both enterprise and project level. As Mareva, it is focused on benefits that a project will have for citizens, business entities and government bodies. VMM has four main steps: first is to develop a decision framework which goal is to identify and define numerous elements like value and cost structure, risks, etc. Second step is based on alternative analysis. Third step puts that information together in way of aggregating costs, calculation of ROI and risks. Final step is the communication part of the methodology where main task is to present final results to stakeholders followed by implementation of best practices and creation of documentation for important elements. [3]

Table 3: E-Government Web assessment in 2008 (adopted from UN e-Government Survey 2008) [7]

Rank in 2008	Country
1.	Denmark
2.	Sweden
3.	United States
4.	Norway
5.	France
6.	Republic of Korea
7.	Netherlands
8.	Canada
9.	Australia
10.	Japan
19.	Austria
69.	Croatia

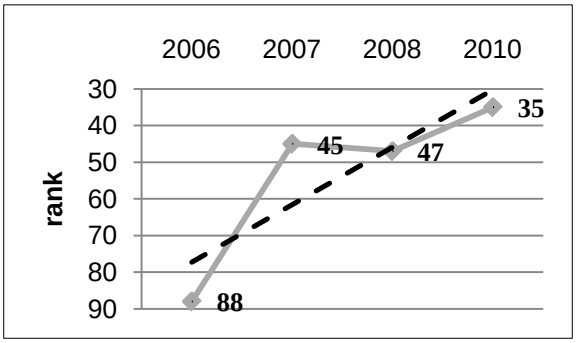
WiBe methodology [6] is based on economic efficiency assessment with particular focus on e-administration elements. As such it is meant to assess investments in a field of e-government. It is focused on services and efficiency while applying costs and best practices. WiBe has 3

main areas of impact. First one is "Monetary economic efficiency" which is divided into two subcategories of "Benefits" and "Costs" for a project. Second area is "Extended economic efficiency" which is also divided into two subcategories of "Urgency of the measure" and "Qualitative, strategic importance". Last area is related to "Economic efficiency from an external point of view" and is considered to be an optional part of WiBe methodology. For measurement and assessment of impacts it uses standardized catalogue of criteria. It is focused on bringing results to stakeholders with methodical calculations and project costs related to anticipated benefits and documentation. As one of the final results it also tries to present gain for end user and stakeholders. Worth mentioning is that WiBe methodology is used in German Government and administrative bodies. [6]

E-Business Watch focuses on economic analyses of ICT impact and bases its methodology on four main analytical methods. Those methods cover the fields of growth accounting, dynamic econometric models, panel data models and multiple regression models. Stated methods and models enable it to assess ICT contribution to economic growth and take into consideration time necessary to realize the project which can be crucial, especially in ICT and e-services sector, as well as business and organizations performance. Data type surveys are based on data collected from case studies, interviews and telephone surveys among companies and organizations. [4]

3 Comparison of methodologies

Within presented methodologies there are clear differences in their approach to the assessment of e-government and e-services initiatives. Since all those methodologies are mainly unbiased respective to country specific goals and were not developed for use in one particular country, we are shortly presenting Croatian Government's way of measuring and monitoring adaptation and implementation of e-Government services in Croatia. It is based on monitoring success of projects related to e-services, while taking into consideration other factors like surveys conducted by nongovernment organizations which measure and collect data like user satisfaction, number of broadband users, etc. It is mainly focused on monitoring elements of 20 basic fields proposed by European Union which are mentioned in the introduction part of this article, and for that it is applying recommended EU measuring scale. In year 2007 Croatia has adopted EU recommendations and measured current state for each of 20 services (see Table 4), while setting goals for the future. Next step was based on monitoring the progress for each individual field by means stated above. This allows the Government to monitor project realization, but also influences set goals, and adapt them if they were set as too ambitious or too low. That flexibility is necessary for maintaining fluent project realization. In Table 4 we are presenting results from "Central State Administrative Office for e-Croatia" which used stated way of measuring and monitoring e-Government progress. Obtained results are compared to European initiative i2010 and e-Europe project. Originally this type of approach is using a scale from 1 to 5 (5 being the highest score). Since we are presenting cumulative results they are rounded to two decimals so the differences could be clearly visible. [1]



Graph 1: Ranking of Croatia for e-Government services (combined results from UN E-Government surveys and Global E-Government surveys)

The latest UN E-Government survey results for the year 2010 show that Croatia has advanced in the field of e-services and e-government. It positioned itself on the 35th place, compared to the 47th place it had in the same survey for the year 2008. This is a clear indicator of effort that Croatian Government is investing to raise the quality of e-services. It is worth mentioning that Croatia is one of seven countries in the world that have the possibility to pay registration fees, fines, etc. with mobile phones. One more relevant information is that Croatia is mentioned as one of four countries which are stated as "best practices" in the same UN report. [8]

Table 4: Review of services for citizens (adopted from e-Croatia Implementation Plan for Year 2008) [1]

Service	2007	i2010	eEurope
Income tax	3.00	3.00	-
Employment	1.14	3.29	-
Social benefits	2.41	4.00	-
Personal documents	1.80	3.00	-
Vehicle registrations	1.50	3.75	-
Building permits	2.00	4.00	-
Reports to police	1.00	3.00	-
Public libraries	3.00	3.00	-
State heritage	1.20	3.00	-
Higher education	3.33	4.00	-
Residence application	1.67	3.00	-
Health services	4.00	4.00	-
Pension and health insurance	3.50	-	4.00
Income tax	2.00	-	4.00
Value added tax	4.00	-	4.00
Registration of new companies	3.00	-	4.00
Application of data to central bureau for statistics	2.00	-	3.00
Customs declaration	3.00	-	3.00
Environmental protection	3.00	-	4.00
Public procurement	4.00	-	5.00

As it is shown in Graph 1, for the past few years there was a clear progress of e-Government services in Croatia. Dotted line represents a trend-line for Croatian average growth of e-services and matched ranking in the world. It is also representing a constant development of e-Government services in Croatia. For this Graph we used combined results from two different studies. To show the differences between methodologies we would like to draw attention to the results presented in Table 1 and Table 3. Both of these results are based on inspecting the web elements, but results from Table 1 are based on Global E-Government survey methodology, while those from Table 3 are based on UN E-Government Methodology. There is a visible difference between the results, 45th place compared to 69th place from the UN survey. Since both of the mentioned results are focusing just on the web elements it is obvious that there is a difference in the approaches and methodologies used. When we take into consideration the final result from the UN survey for 2008 (with web survey result being just a part of it), we are much closer to the result of Global E-Government survey that is focused only on the elements from the web. [7] [8] [9]

In the previous chapter we presented 7 different methodologies for monitoring e-services, and there is noticeable difference in their approach and results. In Table 5 we are presenting summarized differences of mentioned methodologies with a focus on four key factors.

Table 5: Comparison of 7 methodologies for measuring e-services

Factors / Methodology	ROI	Web	Economical	Project	E-strategy
Global E-Government (by Brooking Inst.)	-	+	-	-	-
UN E-Government	-	+	+/-	+/-	-
Mareva	+	-	+	+	+
VMM	+	-	+	+	+/-
WiBe	-	-	+	+	-
E-Business Watch	-	+/-	+	+/-	-
Central State Administrative Office for e-Croatia	-	+	+	+	+

Data in Table 5 is showing which methodology is using which factors for their analysis. Most of them take into consideration economical aspects for e-services, and bind those to project elements. With implementation of those two factors methodologies can estimate financial aspects for a project, and their benefits for stakeholders. Only 3 of mentioned methodologies use web as a part of their survey for collecting data. This is unusual since all of them are focused on e-services which are available on the Internet. On the other hand, just two methodologies, Mareva and way of measuring and monitoring used by Central State Administrative Office for e-Croatia take into consideration e-strategies and their goals. Country strategies are an important part for development and implementation of public e-services. They can widely differentiate among countries, but they are the sole document which influences and determinates which elements of e-services are going to be fulfilled, in given period of time, by which means and who is going to realize it. All that influences on other factors like Web elements, economical and financial aspects and project parts. Since other factors are determined by country e-service strategies, it is strange that so few methodologies take those

important documents into consideration. On the other hand, methodologies that do take them into consideration are more complex, and take longer time to conduct. Those two factors influence why a lot of surveys do not decide to collect data by utilizing such complex methodologies. E-service strategies and documents that define e-strategy goals and ways of implementation also define how great financial investment is going to be made for those elements. With different financial coverage and goals, there is even more diversity in results, which cannot be seen in data collected by methodologies which do not take them into consideration. For that reason it is useful to analyze both budgetary investments as well as e-strategy documents which vary among countries, because of their different priorities and economical power. Another reason for not analyzing e-strategies could be language barriers and different formatting of such document. Both would raise the costs of research and extend time required for their realization.

4 Conclusion

This article emphasizes differences between methodologies that are used to collect data and make analysis related to e-government projects and services. Since this field had dynamic development in the past few years, with many countries implementing e-services and e-government solutions many aspects have to be considered. While it is not too frequently possible to conduct surveys utilizing complex and time consuming methodologies to extensively collect data and do a detailed analysis, those steps are required to get accurate results which would be in alignment with country priorities. With that mentioned we wanted to emphasize the use of e-service documents and strategies which greatly influence the way e-services have been developed in various countries and set the criteria for their evaluation. Unfortunately these documents are often neglected at validation phase especially while using global benchmarking methods. It is quite obvious that in the future strategic intentions of certain country should be mapped to benchmark indicators. By such approach we would achieve way for collecting the data according to standardized country reports which would take into consideration their e-strategies as well as other local factors while still enabling cross country analysis.

5 References

[1] Central State Administrative Office for e-Croatia: e-Croatia Implementation Plan for Year 2008, available at http://e-hrvatska.hr/sdu/hr/ProgramEHrvatska/Provedba/StrategijeIPrograma/categoryParaGraph/01113/document/Plan_provedbe_Programa_e_Hrvatska_za_2008.pdf, Accessed: March 2010

[2] Central State Administrative Office for e-Croatia: e-Croatia Implementation Plan for Year 2009, available at http://e-hrvatska.hr/sdu/hr/ProgramEHrvatska/Provedba/StrategijeIPrograma/categoryParaGraph/01117/document/Plan_provedbe_programa_e_Hrvatska_za_2009_konacni_tekst.pdf, Accessed: March 2010.

[3] CIO Council: Best Practices Committee, Value Measuring Methodology, 2002, Available at http://www.cio.gov/Documents/ValueMeasuring_Methodology_HowToGuide_Oct_2002.pdf, Accessed: January 2010.

[4] E-Business Watch: Methodology, Available at http://www.ebusiness-watch.org/about/methodology.htm, Accessed: January 2010.

[5] Republic of France Premier Minister ADAE: MAREVA methodology guide: Analysis of the value of ADELE projects, available at http://ec.europa.eu/information_society/activities/egovernment/docs/pps/2_mareva_methodology_guide.ppt, Accessed: February 2010.

[6] Rothing, P.: WiBe 4.0 Measuring Impact, 2004, Available at http://www.epractice.eu/files/03_Peter_Röthig.pdf, Accessed: January 2010.

[7] United Nations: United Nations e-Government Survey 2008, available at http://unpan1.un.org/intradoc/groups/public/docudocum/UN/UNPAN028607.pdf, Accessed: January 2010.

[8] United Nations: United Nations e-Government Survey 2010, available at http://unpan1.un.org/intradoc/groups/public/documents/UN-

DPADM/UNPAN038853.pdf, Accessed: March 2010.

[9] West, M. D.: Global E-Government, 2007, available at http://www.insidepolitics.org/egovt07int.pdf, Accessed: January 2010.