ICT in Local Public Sector

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ABSTRACT
Government institutions and agencies represent - big systems that slowly react and adapt to new technologies. However, there are many local public agencies in Croatia that communicate with their customers through the Internet. Electronic government (e-government) represents the infrastructural transformation of administrative state bodies. It includes usage of the information communication technology in order to achieve more efficient work, more rational budget funding and better quality of services provided to a customer. We report on the analysis of investment in ICT done by twenty-one counties in Croatia. Also we have analysed current web sites used by each of them. Finally, the degrees of communication with their customers and the quality of web sites are also presented.

Key Words*: e-government, ICT investment, web site quality*

1 INTRODUCTION

Term e-government is variously defined but generally it refers to usage of ICT to transform the way in which government bodies operate. Croatia, as well as other European countries, recognized the need to improve service delivery to the customer in the public government sector. To accomplish that Croatia has defined a framework for the development of information-communications infrastructure for e-government. Strategy *Information Communication Technology – Croatia in the 21st Century* constitutes the foundations of e-government in Croatia. This strategy describes the role of information-communication technology in the overall development of the information society in Croatia. Many preconditions for the development of information society in Croatia have been established until today. Legislative framework for the development was defined, an information-communications infrastructure of state administrative bodies was built (the HITRONet network). A number of state administration electronic services were devised, the Central State Administration Portal (My Administration) was initiated (Central State Administrative Office for e-Croatia, 2010). *The Electronic Government Strategy of the Republic of Croatia for the Period from 2009 to 2012* (The Government of the Republic of Croatia) determines the framework and goals of future e-government development. This strategy is focused on providing modern electronic services to the e-government users. E-government users are citizens, businesses, employees in state administration bodies, local and regional self-administrative bodies and users from other countries. Territory of Croatia is divided in twenty one counties. Every county represents regional unit that is self-administrative. Regional government has wide range of responsibilities, from planning and development of network of

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health care, educational, social and cultural agencies, to providing regional economical and social development. County budgets are limited, and also investments in information and communication technology are becoming a sensitive issue. Therefore, in order to accelerate e-government development, it has become crucial to effectively manage the requirements for e-government investments. The purpose of this article is to analyze investments in ICT done by twenty-one counties in Croatia. Furthermore, we have assessed quality of current county web sites and investigated online communication between counties and their customers. In addition, we have compared the amount of ICT investment with results of web site quality assessment.

2 E-GOVERNMENT

E-government represents the usage of the information-communication technology to transform the infrastructure of state administrative bodies. E-government can be seen as an answer to the pressing need for integration of existing administrative information systems. This integration is needed in order to provide integrated services for citizens and businesses as well as to reduce the cost (Klischewski, Abubakr, 2010). Citizens and business (the end user of government services) should be able to measure difference between acquiring the service over the Internet and using traditional communication channels. Sang and Lee (2009) describe three e-government perspectives: (1) technical perspective, (2) management perspective, and (3) economic perspective. Technical perspective of e-government refers to a new technology used by the government to simplify the transaction between goverment and her customers. Management perspective is related to the usage of ICT to achive more cost-effective, customer-oriented and better government. From economic perspective e-government is seen as usage of a new communication channel to distribute public service interactively.

2.1 ICT investments and e-government

ICT investments in Croatian counties are divided in four main sections: computer services, communication equipment, computer equipment and computer programs. In officially published budgets of all counties we can explore only these main sections and it is possible that we couldn't find all investments.

Table 1: Percentage of ICT investment in overall budget

County name	% of ICT in overall budget	County name	% of ICT in overall budget
Primorje-Gorski Kotar county	1,35%	Zadar county	0,30%
Istria county	1,08%	Virovitica-Podravina county	0,29%
County of Zagreb	0,93%	Karlovac county	0,28%
Split-Dalmatia county	0,58%	Vukovar-Sirmium county	0,27%
Dubrovnik-Neretva county	0,57%	Pozega-Slavonia county	0,26%
Brod-Posavina county	0,56%	Bjelovar-Bilogora county	0,18%
Medjimurje county	0,35%	Koprivnica-Krizevci county	0,16%
Zagreb county	0,32%	Krapina-Zagorje county	0,12%
Varazdin county	0,31%	Osijek-Baranja county	0,11%
Sisak-Moslavina county	0,31%	Sibenik-Knin county	0,09%
Lika-Senj county	0,30%		

The result is given in Table 1 and it describes the percentage of ICT investment in overall budget for all counties. It must be stated that some of the counties, like Primorje - Gorski Kotar County and Osijek - Baranja County, has special organizational departments for ICT and because of that their investment in ICT (in our survey) can be lover of real investments because of different accounting posting.

2.2 E-government and e-service quality

Although the increase of ICT investments results with improved web site features, there is a need to measure the effectiveness of changes that were made. Managers need to measure the effectiveness and importance of ICT investments as well as changes that they have done (Cid, Gil-Garcia, Pardo, 2009). The quality of web site (the communication medium) is often confused with the quality of content of web site. It is important to understand how an e-service is provided, how it can be evaluated, and how the specific web sites can be compared (Ancarani, 2005). Diverse metrics and methodologies were used to assess the effectiveness and/or success of government's web sites.

3 PRELIMINARY STUDY

In order to measure the quality of present county web sites in Croatia we used Web Assessment Index (WAI) (Gonzalez, F.J.M., Palacios, T.M.B., 2004) that can be used to *compare the current usage of Internet by different organizations*. Gonzalez and Palacios used WAI to assess the web sites of commercial web sites, but the authors stress it can be used to analyze some other web site types as well. WAI covers four categories: (1) *accessibility*, (2) *speed*, (3) *navigability* and (4) *content*. In this preliminary research WAI was modified to encompass all characteristics of e-government web sites.

Gonzalez and Palacios suggest two factors to measure *accessibility* group: (1) search engine presence and (2) link popularity. According to Nielsen NetRatings (Johnson, 2009) three search engines that are most frequently used are: Google, Yahoo and MSN (now called BING). So we checked if the county web sites are indexed in those search engines. For link popularity testing we used LinkPopularity.com (The PC Edge, 2010)

Next category, *speed*, was originally measured by determining the size of the home page. Instead of the originally-proposed size measuring we measured the loading time/speed of the entire web site. We used Firebug tool (Mozilla, 2010) to measure loading time for each county web site.

The third category, *navigability*, was originally measured by establishing the existence of (1) site map and (2) search function. Moreover, we defined seven new factors to assess this category: (1) every page has organization name or logo, (2) every page contains hierarchical structure of web site, (3) every page contains a link to home page, (4) there is a global navigation system on all pages, (5) if there is a local navigation system it inherits the structure of a global navigation system, (6) there is a usage guide for the web site, (7) existence of a web site index.

The *content* category was originally measured with a set of three factors: (1) informational content, (2) transactional content and (3) communicational content. We modified this category by adding one new set of factors, which we named information quality. This set of factors we named information quality according to Vidgen and Barnes (Vidgen, R., Barnes, S., 2003). Vidgen and Barnes used instrument eQual (named WebQual in the past) to assess the quality of a Web site

provided by the UK Government. In this new set of factors we include: (1) information accuracy, (2) information reliability, (3) if information are up to date, (4) information understability, (5) how detailed the information are and (6) information presentation. From the *information content* set of factors we excluded the following factor: search for dealers, agents and stores. From the set of factors for communication content we excluded the free e-mail service factor. Table 2 illustrates the modified (proposed) Web Assessment Index. Table provides an overview of proposed categories and weights that were used as modified Web Assessment Index.

European Commission (2001) identified four comparable indicators for e-government. They proposed methodology to measure the degree to which a service is available online. The electronic service provided by the government can be divided into a number of stages/levels:

stage 1. Information – information about online service,
stage 2. Electronic intake – downloading the form,
stage 3. Electronic aids – processing of form,
stage 4. Electronic transaction – the delivery of the product/service through the Internet.

Table 2: Modified Web Assessment Index

Categories	**Weights**	**Categories**	**Weights**
ACCESSIBILITY	**20**	**NAVIGABILITY**	**20**
Presence in search engines	***15***	Search function	6
Google	5	Site map	2
Yahoo	5	Site index	2
MSN	5	Link to home page	2
Popularity	***5***	Global/local navigation system	2
SPEED	**10**	Hierarchical structure	2
Loading time	***10***	Organization name or logo	2
		Guide to use web site	2
CONTENTS QUALITY	**50**		
Informational content	***18***	***Communicational content***	***10***
County background	4	Contact e-mail	4
Product/service description	4	Contact telephone or address	3
Daily news highlights	2	Receive news by e-mail	1
Financial information	2	Personalization capacity	1
Job opportunities	2	Entertainment elements	1
Check order/shipment status	2	***Information quality***	***12***
External links	1	Information accuracy	2
Link to firm divisions	1	Information reliability	2
Transactional content	***10***	Are information up to date	2
Online orders	10	Information understability	2
		Level of information provided razina detaljnosti informacija	2
		Information presentation	2
		TOTAL	**100**

4 DISCUSION AND CONCLUSION

The implementation of e-government implies different objectives and levels of transformation (Weerakkody, V., Baire, S., Choudrie, J., 2006). Future development and success of e-government depends on the benefits and level of usefulness of the provided services. This paper has attempted to offer better understanding of delivery of public service in Croatia provided by twenty one counties.

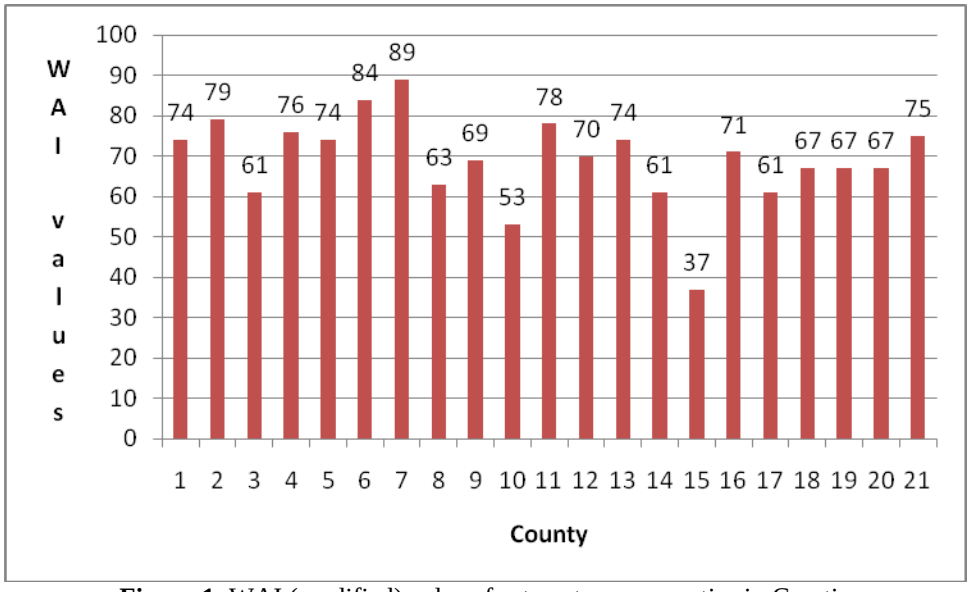

Figure 1: WAI (modified) values for twenty-one counties in Croatia

In the starting phase of our research we couldn't predict which e-service was provided by a specific county. We decided to measure the level of communication between a county and her consumer online. This communication level was assigned to a certain stage, ranging from 1 to 4. According to analysis results all of examinated web sites offered communication that we ranked with stage 1 or 2. Only four web sites enabled downloading of some kind of form (this communication was ranked with stage 2). Rest of webs sites provide communication like e-mail contacts, online form for questions and suggestions or documents downloading. To assess quality of web sites we used modified WAI. Figure 1 shows the results of web site quality assessment. WAI values are represented as summed values according proposed categories (accessibility, navigability, speed and contents quality) and measures. Most of web sites have WAI values over 50 (except one). We have 11 web sites that are valued with 70 and more which mean that those web sites are ranked with average web site quality. Only one web site has very good quality rank - value 89.

In second part of our survey we have analyzed percentage of ICT investment planed in counties budgets for the current year. After that, the web site quality results were compared to ICT investments. The results shows that higher percentage of ICT investments doesn't mean that the web site quality will be higher. Usage of new technology to communicate with customers, like web site, is nowadays recognized as advantage. But, businesses as well as government agencies should take in consideration quality of this kind of communication. When evaluating communication with particular businesses, customers include not only the way of commnucation but percieved benefits and quality of online services as well.

REFERENCES

Ancarani, A. 2005. *Towards quality e-service in the public sector:The evolution of web sites in the local public service sector*. Managing Service Quality, Vol. 15, Issue 1, pp. 6-23.

Central State Administrative Office for e-Croatia. 2010. *Strategy for the development of Electronic Government in the Republic of Croatia for the period 2009 - 2012*. http://e-hrvatska.hr/sdu/en/EGovernment/EGovernmentStrategy.html (accessed 24-05-2010).

Cid, G.P., Gil-Garcia, J.R., Pardo, T.A. 2009. *Longitudinal Analysis of the Effects of IT Characteristics on Web Site Ratings Across State Governments in the US (2001-2006).* Proceedings of the 42nd Hawaii International Conference on System Sciences Hawaii: IEEE Computer Society, pp. 1-10.

Gonzalez, F.J.M., Palacios, T.M.B. 2004. *Quantitative evaluation of commercial web sites: an empirical study of Spanish firm*. International Journal of Information Management. Vol. 24, pp. 313-328.

Johnson, N. 2009. *Nielsen Online December 2008 Search Engine Share Rankings*. http://searchenginewatch.com/3632382 (accessed 25-05-2010).

Klischewski, R., Abubakr, R. 2010. *Can e-Government adopters benefit from a technology-first approach? The case of Egypt embarking on service-oriented architecture*. Proceedings of the 43rd Hawaii International Conference on System Sciences – 2010. IEEE Computer Society. pp. 1-10.

Mozilla. (2010). *Firebug - Web Development Evolved*. http://getfirebug.com/ (accessed 25-05-2010).

Narodne novine. 2005. Pravilnik o proračunskom računovodstvu i računskom planu. http://narodne-novine.nn.hr/clanci/sluzbeni/287993.html (accessed 25-05-2010).

Sang, S., Lee, J-D. 2009. *A Conceptual Model of e-Government Acceptance in Public Sector*. Third International Conference on Digital Society Washington. IEEE Computer Society. pp. 71-75.

The Government of the Republic of Croatia (2009). *The Electronic Government Strategy of the Republic of Croatia for the Period from 2009 to 2012*. http://e-hrvatska.hr/sdu/en/EGovernment/EGovernmentStrategy/categoryParagraph/00/document/eGovernment_strategy_Croatia_ENG_final.pdf (accessed 25-05-2010).

The PC Edge (2010). *LinkPopularity.com*. http://www.linkpopularity.com/ (accessed 26-05-2010).

Vidgen, R., Barnes, S. 2003. *Interactive E-Government: Evaluating the Web Site of the UK Inland Revenue*. Journal of Electronic Commerce in Organizations. Vol. 2, Issue 1, pp 42-63.

Weerakkody, V., Baire, S., Choudrie, J. 2006. *E-Government: The Need for Effective Process Management in the Public Sector*. 39th Hawaii International Conference on System Sciences (HICSS'06). IEEE Computer Society. pp. 74b.