

Internet Voting: State in EU and Croatia

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Summary

Voting through the internet (i-voting) should be a service through which governments enable their citizens to participate in decision making and establish greater democracy in society. This paper investigates the i-voting situation in EU and Croatia, as well as the attitude of student population towards i-voting. The first part of the paper relates to the application of i-voting in EU and Croatia, according to the implementation of i-voting, its problems and legislation. In the second part we present results from the initial research of attitudes among the student population at the Department of Economics, University of Zadar. The research was done with a questionnaire in respect to: participating in the election, advantages and disadvantages of i-voting, problems with ICT related to i-voting, reasons of the absence of i-voting in Croatia. Estonia is the first country which has implemented i-voting in the elections, whereas other countries are still testing it and resolving problems present in the implementation. Croatia still does not plan to implement i-voting and needs to consider strategic steps in this process. The research indicates insufficient information about i-voting among the student population. It is necessary to include topics from e-government in the education curriculum, i.e. in the subjects covering the field of Information science, in order to create education preconditions for the implementation of i-voting.

Key words: i-voting, EU, Croatia, IKT, SWOT Analysis, attitude of student population

Introduction

The development of information and communication technology (ICT), especially the development of the Internet from 1990-ies have changed the way we work, learn and live. The Internet has become the most important infrastructure for data transmission and services.

Internet voting (i-voting) is a method of voting in elections which use internet, where a voter accesses the web pages (services), identifies himself/herself and votes (Kovačić, Škrablin, 2009). Voting is possible from any location, with general principles of classical election. I-voting is one of possible ways of electronic voting (e-voting). E-voting is the aggregate name for voting with electronic devices, which enable voting at the election place or other, remote location. E-voting and i-voting are often used in the same meaning in literature. The framework of i-voting changes from previously fully controlled conditions to the new framework, which is not fully controlled. All procedures and controls are realized with ICT and through the acts of the voters.

ICT is requested to be closed and secured. For this reason, different procedures of control and monitoring have been applied (e.g. logging, every packet of data which is transmitted over the internet has its original address etc.). The elections must provide the confidentiality of vote as well as the transparency of the process.

According to Gibson (Gibson, 2005, 31) it is necessary to research the impact of new technologies related to voting at elections. It is also necessary to perceive all effects which can appear.

Croatia does not have i-voting, there are few data and information about it. The tendency is to create the Information Society and greater democracy. The assumption is that in future Croatia will prepare and test i-voting in order to increase the participation of citizens. There is a need to analyze which factors would appear with i-voting; what and how they would affect. I-voting in Croatia could be mostly used by younger population. According to the research in the USA (Gibson, 2005, 29) there is a low turnout at the election of population between 18 and 24 years. Austria aims at improving students' participation in the student elections by i-voting.

The following research questions are asked in this paper:

- What is the status of i-voting in the EU and Croatia?
- How well is the student population informed about i-voting?
- What are their attitudes towards:
 - what i-voting enables and disables
 - problems related with ICT, which can be present in i-voting
 - reasons that Croatia does not have i-voting?

Method

The state of i-voting in the EU and Croatia will be investigated based on the qualitative analysis of available literature in order to understand the factors that are related to enforcement, legislation and problems present in the i-voting.

Factors that are identified will be analyzed with the SWOT analysis.

The investigation of students' attitudes related to i-voting was done with a questionnaire. This population was chosen because it is expected that students would use the i-voting when it would be available as a service of the state administration, and because in some states i-voting should increase their participation in elections. It is assumed that students could have obtained the information about i-voting through the public media, the Internet, and about ICT through previous education and experience with the use of ICT.

We prepared 8 questions to determine the attitudes of the student population concerning the following topics (Q): 1.) voting in elections; 2.) the use of i-voting; 3.) familiarity with the topic of i-voting; 4.) in which EU country is i-voting organized at the state level (answers: Finland, Austria, Switzerland, Estonia, I do not know); 5.) what i-voting provides (confidentiality, equal access / participation, transparency, security); 6.) what i-voting does not provide (confidentiality, equal access / participation, transparency, security); 7.) which problems are related with ICT, and are connected with i-voting (theft and replacement of identity, multiple voting, manipulation of records in the database, problems with the PC, problems with the Internet, problems with the main server, problems with the software); 8.) which are the reasons that there is no i-voting in Croatia (laws, internet connections, the number of potential users, investment in the process of computerization of state administration, electronic identity and signature, security problems).

Questions and answers are attached to values. Replies in questions 1, 3, 5, 6 and 8 have a value scale from 1 to 5, where 1 denotes negation, and 5 full agreement. The second question was answered with yes and no. Questions 4 and 7 were answered by choosing one of the listed claims. The analysis of statistical results of the survey was done with Mystat 12 tools.

Results

The situation in the EU

The right to participate in the elections and vote is the foundation of democracy. Together with the development of ICT technologies, with political changes that have happened in the EU (integrations) and in the world in the last 10 years, it has been investigated how the ICT technology affects society, democracy, and in what way it can help in these processes. Given the increasing use and impact of ICT technologies (especially the Internet) in the realization of democracy we can talk about electronic democracy (e-democracy). The participation in democracy according to the Hague and Loader and Karmacka and Nya is realized through (Kersting, Baldersheim, 2004, 4): information (www, e-mail), commu-

nication (chat, forum, ..) and transactions (e-voting, services). At the end of the 1990-ies and the beginning of 2000 various projects and research have been done in the area of i-voting. Buchsbaum T. M says there are following categories in the introduction and use of e-voting (Buchsbaum, 2004, 39):

- early (private) pilot projects financed with the EU funds
- states that seek to introduce e-voting
- e-voting and testing in the academic community
- advanced pilot projects and elections (e-voting) that are at the level of local self-government.

The EU Commission in the framework of FP5 launched the project CyberVote associated with i-voting in 2000. European countries have been considering the introduction of i-voting and running various projects in order to research all forms of e-voting. In Switzerland pilot projects on the use of i-voting for the canton Neuchâtel, Geneva and Zurich were launched in 2002; Germany had a research project Wahlen in elektronischen Netzwerken (W.I.E.N.) associated with i-voting, and the United Kingdom (UK) has launched 17 pilot projects related to e-voting (i-voting, e-voting at polling stations, telephone, SMS, digital TV).

The main topics related to i-voting, which are present within the research are: the basic assumptions of i-voting (F. Mendez, A. Treschsel, R. Gibson), legislation (P. Garrone, A. Aurer and M. Mendez), security (L. Pratchett, M. Wingfield, B. Fairweather, S. Rogerson, CARNet CERT and LS & S) digital divide (Grönlund, P. Norris), experience with i-voting H. Gaser (Switzerland), W. Dreschsler and U. Madise (Estonia), R. Krimmer (Austria), A. Karger (Germany) and Lawrence Pratchett and Melvin Wingfield (UK).

For the purposes of the introduction of i-voting, it is necessary to pass the laws. The Committee of Ministers of the Council of Europe issued a recommendation on e-voting in elections and referendums on 30th October 2004, on how to create, implement, monitor system of e-voting in order to ensure that voices are real like those obtained in the classic way.

Recommendations are related to (Council of Europe, 2004):

- legislation – general frame, equality, freedom and secrecy of votes; transparency, checking the proper operation of the system, the possibility of recounting the voices; the system must be reliable and free of possible threats.
- operational standards – informing the voters of elections; the necessity of registration of voters; candidacies; the procedure, way and duration of voting; the procedure of generating the results; the system should enable checks.
- technical requirements – the necessity of determining and assessing the risks; all voters should be able to access and use the service; using open standards to enable interoperability; the list of equipment and program

support, procedures related to unaccepted situations; security database; secure location, security procedures (before, during and after voting), checking the system; monitoring; checking and confirming coordination with laws, certifying the system.

Among the EU countries Estonia and Austria have done most in the application of i-voting. Estonia introduced i-voting in 2005 for local elections, and in 2007 for parliamentary elections.

According to the report (Trechsel, Shuman, 2009) for the Council of Europe, the main reasons for implementing the i-voting were the procedures that lead to the creation of an information society (e.g. in these countries the right to access the Internet is the social right; however, Estonia also leads in the amount of investment in ICT in relation to GDP). Requirements directly related to the i-voting were: legal framework, the introduction of identification cards (the introduction in 1997) which contains a certificate for authentication and certification of digital signatures, and system-voting based on "double envelope" which made it similar to the classic voting. In 2005 from a total of 1,059,292 voters, 9681 voters used the possibility of e-voting, which is 1.92% compared to the voters who came out to the polls. In the parliamentary elections in 2007 the i-voting was used by 30,275 citizens, which is 5.4% of the total number of voters who came out to the polls. In traditional elections voting is allowed only once. The Estonian election law related to i-voting allows the voters the possibility of multiple voting (voting repetition), which counts only the last vote. This was introduced in order to prevent any possibility of buying votes and influencing the voters.

According to the research (Madise, Martens, 2006, 23) conducted after the local elections, the reason for the reduced use of i-voting is the lack of Internet access, lack of knowledge about computers and the adequacy of classical voting by ballots. It was also found that the age of voters plays an important role in participating in i-voting.

Austria started the project at the beginning of 2000 in order to increase the participation in the student elections. I-voting was conducted in May 2009 in the official elections for student representatives. The prerequisite for i-voting for citizens (students) was the possession of the identification card (electronic card e-Card, Bürgerkarte) and certificates.

On the web site of the Ministry it is indicated that Austria still has no legislation for the elections at the state level.

The situation in Croatia

In Croatia, the elections and voting are possible according to the following legislation: the Constitution of the Republic of Croatia, the Law on Elections for the Croatian Parliament, the Law on the Election of the President of the Republic of Croatia, the Law on the Election of members of representative bodies of local and regional (regional) governments, Law on election of municipal may-

ors, mayors, prefects and mayors of Zagreb, the Constitutional Law on National Minorities, the Law on Election of Members of European Parliament (in the process of adoption), the Law on the constituencies, the Law on the Election Commission and the Law on voter registration. Through this legislation the following is defined:

- the right to participate in the elections in Croatia
- the freedom of affiliation of voters and the secrecy of their vote
- the right and obligation to vote only once in the elections
- vote on the basis of residence of voters
- voter gets an extract from the list of voters which refers to him
- secrecy of voting is carried out and allows the voter Board
- Voters Board verifies enrollment of voters in the voters' list
- voting is done in person, via the ballot
- the ballot has a serial number.

Current legislation relating to elections does not provide the possibility of organizing and carrying out the i-voting.

The Central State Office for Administration (CSOA) allows verification of voter registration lists by the single parent and an SMS message.

In the strategic document of the state government "*Public administration reform strategy for the period of 2008 – 2011*" it is stated that one of the goals of the reform is the application of modern information-communication technologies (CSOA, 2009, 1) whereas one of the five main directions is the realization of e-administration (CSOA, 2009, 2). Improving the application of the ICT system of the state administration is seen through (CSOA, 2009, 7): the supply of equipment, development and procurement of appropriate computer software, networking, IT education and training of civil servants. The application of ICT is ensured through the implementation of public administration reform strategy, and is realized through the "*disclosure of the electronic address for communication with the citizens on the web site of all public administration bodies and determining at least one civil servant in each of those bodies in charge of replying to electronic messages of citizens; ensuring full communication with citizens electronically, including applications, requirements and other patterns in all government agencies, except in proceedings relating to the status issues of citizens; courses for beginners and advanced IT training for civil servants*".

The main holder of the ICT activities in the state administration is the Central Office for e-Croatia.

The starting point for the definition of the ICT strategy within the framework of this strategic document was the "*strategy of the Information and Communication Technology – Croatia in the 21st century*" from 2002. The Central State Administration Office in the framework of this strategy has defined the activities in collaboration with the Central office for e-Croatia, but there are no activities related to the conduct of the elections by i-voting.

In the framework of the Strategy for developing the electronic government in the Republic of Croatia (Croatia Government, 2009) for the period between 2009 and 2012 i-voting is not specified as one of the goals or services that are planned for that period.

The goals which are planned within the framework of the strategy, and would be related to i-voting are: the establishment of a central authentication and authorization system (e-identity) (Croatia Government, 2009, 17) and the legal source, base for electronic services that are provided (Croatia Government, 2009, 20).

Besides the already mentioned legislation for elections it will be necessary to consider or finalize the legislation when implementing the i-voting related to: information security, electronic signature, electronic document and electronic communication.

According to the above strategies Croatia is on the level of informing and communication with its citizens within participation in the e-democracy.

SWOT analysis

In the available research literature we find both positive and negative factors that may affect the i-voting. These factors were analyzed using the SWOT analysis, which consists of internal factors (strength, weakness) and external factors (opportunities and threats).

Strength – voting regardless of the location, getting results faster, reducing costs (e.g. persons who are involved at the polling places, in printing, distribution), the implementation of the referendum, a longer period and re-voting (the possibility of reflection), reducing the number of errors in voting.

Weakness – poor turnout of voters, privacy, dependence on other technologies, Internet access, possible technical problems in the implementation of voting, the possible social engineering, a more complex procedure of voting (a problem for people who do not use a computer every day), very hard to establish the control of i-voting (down transparency), inaccessibility to a greater number of people, the secrecy of voting (ballot), identifying and correcting mistakes, misuse of electronic identity, possible dependence on the software manufacturer.

Opportunities – increasing the efficiency of administration, increasing the degree of democracy, the conduct of voting at the EU level, increasing participation (exit) of voters in elections.

Threat – a negative effect due to public perception, influence on political parties, vote trading, the destruction of the ritual of classical voting, questionable transparency of the voting process, technological development and new technologies (such as voting by mobile phone), changing legislation, changing the parliamentary democratic system (direct democracy).

As there is a great number of weaknesses and threats it is not possible to implement i-voting fast.

Analysis of students' attitudes

The questionnaire was carried out on the student population at the 3rd year of undergraduate study of management at the Department of Economics, University of Zadar. The respondents belong to the age group from 21 to 23 years. The analysis comprises $N = 56$ questionnaires.

Based on the analysis of responses for Q1, which is related to voting in the elections, $\bar{x} = 3.625$, $Mo = 4$ (mostly yes), and coefficient of variation is $V = 33\%$. As coefficient of variation refers to insufficient homogeneity, according to the mode we can conclude that the student population generally votes in the classic elections.

In Q2 $f = 47$ (83.93%) respondents expressed willingness to use i-voting, whereas $f = 9$ (16.07%) respondents did not express they would vote through the Internet. According to a study from Austria (Kersting, Baldersheim, 2004, 116) conducted among the student population, 84% of respondents expressed willingness to use the i-voting.

Familiarity with the i-voting is associated with Q3 and Q4. Answers related to Q3 are $\bar{x} = 1.5$ and $Mo = \text{mode } 1$ (not general). We can conclude that the student population is not familiar with the topic of i-voting.

In Q4 – in which EU country i-voting has been carried out, $f = 54$ (96.43%) respondents indicated that they did not know, $f = 2$ stated Switzerland.

Answers to Q5 relate to what i-voting allows. According to the opinion of the students voting via the Internet mainly provides secrecy of voting ($Mo = 4$), generally provides equal access and participation in voting in elections ($Mo = 4$) and transparency ($Mo = 4$). There is a possibility of expression of doubt in the safety procedures ($Mo = 3$).

In Q6 Mo was taken into account. According to it the attitude of respondents related to what i-voting does not allow is the following: sometimes it does not provide secrecy of the vote ($Mo = 3$), respondents express confidence in equal access / participation in voting ($Mo = 2$), according to them transparency of voting ($Mo = 3$) as well as safety in the process of elections ($Mo = 3$) are sometimes made impossible.

Having established the correlation coefficients between Q5 and Q6 a significant negative relationship was obtained.

In Q7, which problems are related to ICT and can connect to or influence the i-voting the respondents list: theft and replacement of identity $f = 37$, the problems with the network (Internet) $f = 32$, possible manipulation in the database records $f = 30$, the possibility of multiple voting $f = 29$, the main problems with servers $f = 21$, problems with PC $f = 18$, and problems with the programs i-voting $f = 11$.

In Q8, relating to relevant reasons why Croatia has no i-voting in elections, the answers of respondents who answered affirmatively to the exit-polling (Q2) were taken into account. The referred question was put in correlation with Q8.

The result is a correlation: if the respondent is ready to vote via the Internet, then he/she believes that the reason why there is no i-voting in Croatia lies in legislation and investment in the process of computerization of the state administration.

Conclusion

I-voting in the elections in the EU is still in a testing phase. There are different problems that need to be resolved before the i-voting can be widely applied. It is necessary to ensure the credibility of the ICT technology as well as to be aware of all the changes that can occur due to i-voting. For now, the i-voting is only allowed in Estonia, on the national and local level. A small percentage of voters participated in the elections through the Internet, 2005 – 1.92% 2007 – 5.4% compared to the total number of voters. Such a small number of voters was due to insufficient access to the Internet and to the ignorance of voters in the use of computers.

At this point Croatia does not have i-voting in the legislation or the strategies. The latter is a disadvantage, because it can be a limiting factor in possible projects related to the i-voting and seeking funds from the EU.

According to the initial research conducted among the student population, respondents would participate in i-voting, but at the same time they have no knowledge about i-voting. Problems that are related to the ICT and can appear in the i-voting are: the theft and replacement of identity, problems with the network (the Internet), the possible manipulation of records in the database. As reasons for the lack of i-voting in Croatia, students state the lack of legislation and investment in the process of computerization of the state administration. It would be necessary to introduce topics that are related to e-governance in the educational process in order to create the environment for the application of this service.

Since i-voting is connected with a lot of problems and carries with it a series of changes, additional research in the area of i-voting is required (e.g. area security, influence of i-voting on the society, the analysis of justification, the use of open standards (codes), defining metrics, models monitoring, ISSX – students e-cards), in order to ensure the application of ICT technologies in the social areas.

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