



**National Election Office of Hungary**

## **A Short Overview on the Introduction Of E-voting in Hungary**

(By Lajos Farkas)

The introduction of electronic voting in Hungary is still a subject of professional debates and preparatory works. The democratic transformation –that changed the world around us– took place 13 years ago, and induced the quick development of information and telecommunication technology. The conditions required for introducing e-voting are mostly established, but we still have to overcome a number of difficulties. Since Hungary is not the only state in this stage of introduction, you may find it useful to take a short overview on the problems we have to face and the possible answers to be given.

The implementation of e-voting confronts both the election and information experts with a number of challenges. These challenges are diverse, beside professional expectations we have to face the political projection of the topic as well.

In my opinion, election and information experts –sooner or later– will manage to fight these problems in each country, like the former, well-known successes in this field show us. To political expectations, though, we have to come up differently in every state, however common features are recognized.

First of all, for initiating a method that differs from the former practice we need trust. We need confidence in election administration, in the fairness of elections, trust in information, in legal and informational supervision and transparency of elections. The next two questions are related to the secrecy of votes. The first question is that the computer could actually not match the identity of the voter and the vote casted electronically. The second question that comes to our minds is that the computer is not able to recognize the person who casts the vote, but checks only the authority of the card. The family and friends can stand around the PC, or even the voter may trust someone with casting his vote and so on. We must provide satisfying answers to these problems to make the society and the politicians accept this highly developed method.

For the above mentioned reasons my point of view is that there is a certain condition only be fulfilled by conviction: demonstrating former examples, outlining the directives of the European Union, presenting the advanced practices of other countries and choosing those solutions that satisfy both the public opinion and the decision-making politicians. I do not think I'm far from the mark when I say a special lobbying is required, enriched with professional elements.

The greatest professional force of introducing electronic voting could be the integrated project of the Council of Europe, under the title 'Making Democratic Institutions Work'. This forum gives an opportunity for the experts of the interested countries to exchange their experiences, what is really important at this point. The media has predicted the soon introduction of Internet voting several times, however it had only been realized in a few countries, mostly as pilot projects. Among other states, Hungary is also in the stage of preparation, in spite of the fact that election informatics is quite well developed.

Let us have a look at those professional and non-professional challenges we have to get over before introducing E-voting in Hungary! I do think that other countries meet or have met these professional problems too. Concerning social acceptance, though, there can be large divergence between the states, which is attributable to historical and social circumstances and how the informatics came into general use.

Of course, I cannot undertake specifying all the problems and solutions, thus let me select and describe a few of them.

We have to face some of these problems concerning the application of voting machines in the polling centers, working under the supervision of the election bodies, although this method is overshadowed by the importance of Internet, WAP and SMS.

In Hungary, the Register of Voters has been prepared on the base of the national population register for 20 years without problems. Most types of electronic voting require a separate voter's register for those who want to cast their votes electronically. In case it wouldn't be so, not only the E-voting system, but all the polling-stations should be in online connection with the central register of voters on the day of the election, for the registration of those who cast their votes. The latter is a future prospect, for its high material aspects.

Voters should be enabled to subscribe to this separate list also by Internet, WAP or SMS. At the same time they have to be removed from the original voter's register.

Now, we've come across the first challenge. In professional respects we have to work out the perfectly reliable identification of voters, to which the traditional procedures are not eligible. In any case, we have to use a Public Key Infrastructure for authentication, as we could see the example of those countries where e-voting is in an advanced stage. Then, journalists will not hesitate to ask: how do we know that it was really the owner of the Public Key, who cast the vote? Well, it is difficult to answer, because the only unattackable method would be biometric identification (e.g. fingerprint, iris). In a society built on trust this question may not be a problem.

I don't consider it as a problem to create a separate register for "e-voters", it is certainly accomplishable, but in any case the process must end with an acknowledgement. We have good experiences in forwarding election information on the Internet, we managed to carry it out with adequate security. In my opinion WAP and SMS channels can easily be secured, if mobile phones will function as mini-PCs in the future.

Candidate nominations shall also be received on the Internet this way. For introducing electronic candidate nomination, certain procedural acts should be modified. In this case I do not see any difficulty, if we could solve the former.

In Hungary we have a tradition of producing up-to-date ballots. The ballots are prepared according to the register of candidates, and the approval by the election committees is supported electronically.

The electronic organization of an election is a real challenge. The voters shall be identified, they shall be offered the ballot of their electoral district, must be registered while voting, and cast votes shall be acknowledged. We have to prevent multi-voting and we have to create a system that is not able to match the identity of the voter with the vote cast. We have to guarantee the safe storing of the votes, and forwarding to the place of summing up respectively. The whole system shall be defended from unauthorized entry, usual hacker-attacks, and wilful falsification attempts.

All the above mentioned shall be realized in a way that public opinion, its influencing agents and political decision-makers shall be able to make sure of the impartiality, security and reliability of the procedure. According to my experiences in this field, to obtain trust is the most difficult thing, however, informatics has been serving the election management for 10 years correctly and on a high level – which is also confirmed by international observers.

The first problem is that electronic voting has a virtual form. There are no paper ballots that could be recounted manually, information specialists conjure something instead and perhaps, manipulate the result. It is very hard to fight against this over-simplified point of view or to prove the contrary of it. The disposal of this problem may be that information specialists of the political parties should be enabled to make sure of the fairness of the information system and when the political decision is brought, they could audit the concrete method to be introduced. Until then, public opinion shall be accustomed to electronic voting by experimental applications.

There will always be a losing party at an election, whose opinion can alter after becoming aware of the result. I think it is easier to handle this type of problem.

Concerning the casting of votes, authentication seems to be a hard question, for we're not able to see who's actually voting. The only thing we can make sure is that the vote is cast with the identifier of the voter. I have mentioned this problem already, though.

The secrecy of polling also depends on the voter, because we cannot assure the privacy of the polling-booth by coercive measures. E-voters are casting their votes in their own private sphere. This problem may be solved by establishing voting machines in the polling stations under the supervision of the election administration, where the polling station committees check the identity of the voter and there are also secure polling-booths that

provide secrecy. Although, by voting in the polling station we lose most of the advantages of electronic voting, first of all: mobility, which means that we could cast our e-ballot from wherever in the World we may stay.

The electronic votes are collected in a virtual ballot-box. This ballot box may be central, or arranged locally. Both solutions have their own advantages and drawbacks.

For local arrangement we have to assure data-storage in the memory of the voting PC or a PC used exactly for the purpose in a way that no technical error may cause the loss of votes—excluding catastrophe. Among others, we shall establish a triple data-storage system with one removable memory unit that could be inserted in a reserve PC. The latter shall be carried out in all those polling-stations that use electronic voting equipments. During the polling hours, the PC could be switched off from the network to increase security. Generally, votes are forwarded to the vote-counting centre after the closing of the polling-stations. In my opinion, forwarding election data shall only be allowed in a classified form, provided with digital signature and time verification.

Internet voting and voting by cellular phone both require a central virtual ballot-box. The central equipment park serving the election administration has a full guarantee for preserving the votes. For internet or cellular phone-voting one-time or nearly continuous connection shall be assured between the central equipment park and the electronic voting equipment, depending on the number of voters. At this time the Internet cannot guarantee a current connection, thus we have to work out spare solutions. These reserves are required especially for the equipments located in the polling stations, because voters arriving there would like to cast their votes within a reasonable time. Breakdown would be an easy subject for the media as well.

Authentication procedure is the first step of casting an electronic vote. After the authentication appears the ballot of the citizen's electoral district, for which he can vote. There shall be great confidence to accept that despite of the above mentioned, the voter's identity and the vote are not linked together by the system.

For voter identification and separation of votes an ingenious solution has been worked out by the researchers of Vienna University of Economics and Business Administration. This is called "Two-Stage Protocol". When citizens subscribe to "e-voters" register they receive a classified token. Later, by using this token they can cast their votes without further identification. For vote-counting these votes are only available by using the token of the election committee. Of course, there are several guarantees concerning this method to verify the correct conduction of the electronic voting.

In the case of traditional (paper-based) voting, before the polling starts the election committee makes sure that the ballot-box was empty. After they seal the box and the polling starts. Then, after closing the polling-station the committee examines the ballot-box to ascertain that it has not been injured and opens it. This procedure insures that ballots can only be placed in the ballot-box during the polling-hours. No matter what kind of method we'll choose, these also have to be accomplished in the case of an electronic ballot-box. Target PCs used for voting shall require the committee's token to activate and to close the virtual ballot-box, while to activate the central ballot-box, the digital signature and time verification of the election committee is needed.

It is a commonplace that the news is when the postman bites the dog, no one's interested in the contrary. That's why we can read only about the shocking deeds of hackers and that any crime can be committed by PCs. Once PC is the secret territory for violating the law, another time it's a marvelous invention. We're never informed of the fact that most of the information systems usually work without any problem. I think that the spread of modern information technology will change this general approach. Until then we need patience, steady work, conviction and lobbying, of course. In my opinion, the coming generation is not going to face these problems, because PC is already a completely customary and natural thing for them.

Summing up what has been said, I think that informational, procedural and legal guarantees together can create the primary condition for a society and the leading political forces to accept the method of E-voting. I do hope that in a short period of time Hungary will be able to close up to the countries presently using this advanced technology.