Internet & Democracy Case Study Series

Three Case Studies from Switzerland: E-Voting

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ABSTRACT

Since 1998, the Swiss government has actively pursued the implementation of electronic voting ("e-voting") in its elections. This case study examines how these systems have worked in the test cantons of Geneva and Zurich. The evidence and analysis in this case study suggest that e-voting might serve as a powerful tool to augment the participation rate, the quality of voting, and aid in the implementation of political rights. This study also evaluates the risks of e-voting, noting that the concerns around integrity often associated with electronic voting have for the most part not materialized in the Swiss case. Questions such as the digital divide in access to networked technologies are also a real concern that should be addressed by the government as it expands the system.

THE INTERNET & DEMOCRACY PROJECT

This case study is part of a series of studies produced by the Internet & Democracy Project, a research initiative at the Berkman Center for Internet & Society at Harvard University, which investigates the impact of the Internet on civic engagement and democratic processes. More information on the Internet & Democracy Project can be found at: http://blogs.law.harvard.edu/idblog/.

The initial case studies of the project focused on three of the most frequently cited examples of the Internet's influence on democracy. The first case looked at the user-generated news site OhmyNews and its impact on the 2002 elections in South Korea. The second documented the role of technology in Ukraine's Orange Revolution. The third analyzed the network composition and content of the Iranian blogosphere. Fall 2008 saw the release of a new series of case studies, which broadened the scope of our research and examined some less well-known parts of the research landscape. In a pair of studies, we reviewed the role of networked technologies in the 2007 civic crises of Burma's Saffron Revolution and Kenya's post-election turmoil. Urs Gasser's three-part work will examine the role of technology in Swiss democracy. Another case study, set for publication in spring 2009, will expand our study of foreign blogs with ananalysis of the Arabic language blogosphere. The authors wish to thank Anja-Lea Fischer and Sandra Cortesi for research assistance, and Herbert Burkert, John Palfrey, Bruce Etling, and Tim Hwang for comments on the cases.

This set of case studies was produced in association with the Research Center for Information Law at the University of St. Gallen in Switzerland. The Center supports research initiatives to analyze and assess legal frameworks and provisions that are regulating the creation, distribution, access, and usage of information in economic, cultural, and political systems. It also works to explore the dynamic changes in information technologies and their impact on the legal system. More information about the Center is available online here: http://www.fir.unisg.ch/.

INTRODUCTION

The story of e-voting in Switzerland began in February 1998 when the Federal Council—Switzerland's executive body—adopted its "Strategy for an Information Society in Switzerland" and introduced an inter-ministerial coordination group labeled as the "Information Society."[1] The group developed a general action plan for e-government and identified two major projects: the "electronic desk" on the one hand and e-voting on the other. While the "electronic desk" consists of promoting the use of online channels for administrative procedures such as tax or military service-related procedures, the second project is aimed at the development of secure, online methods for voting. In the meantime, many of the projects envisioned as part of the original strategy have been realized and ICTs are implemented in all areas of the information society (economy, democratic opinion-making, contact with agencies, culture, education, science, and law).[2] Among these projects is e-voting, which has been the subject of both theoretical discussions and, more importantly, practical experiments in different cantons.

This case study seeks to examine the Swiss example(s) of e-voting and draw general conclusions based on the Swiss experience with regard to the possible benefits and risks associated with e-voting. The case study is divided into six main parts: After a brief definition of e-voting as understood for the purposes of this case study (Section 2) we will discuss the potential benefits of e-voting systems in general (Section 3) as well as concerns and risks (Section 4). In the main section of the case study, we will describe the current Swiss experience with e-voting projects and tentatively assess them against the backdrop of the general benefits and risks identified in the preceding section (Section 5). As a caveat against overbroad conclusions from the Swiss example, we will finally comment on cultural matters that shape the experience of e-voting in different countries (Section 6).

E-VOTING IN SWITZERLAND

In its preliminary report to parliament, the Swiss government uses the French term "vote électronique," which has not only been coined to describe the actual casting of a ballot through a secure channel on the Internet but also the general exercise of political rights[3]: envisioned was not only the facilitation of electronic votes, but—in a later stage—also of elections and the exercise of other political rights practiced in Switzerland, such as the signing of initiatives (i.e. proposal for a new article of the constitution or of a law) and referenda (i.e. challenge to a law passed by the parliament), the signing of lists of candidates to the parliament, as well as the dissemination of information about votes and elections provided by governmental authorities.

There were roughly 4.9 million eligible voters in 2007.[4] Average turnout for federal votes (excluding elections) per year has been oscillating between 32.1 percent (in 1975) and 55.0 percent (in 1974) over the past 40 years.[5] Since many cantonal and municipal votes are held alongside federal votes, and ballots are usually sent out in the same envelope, turnout for those votes can be expected to be very similar, at least within any given canton. E-voting, theoretically, falls on fertile ground as postal voting was implemented more than a decade ago. The fact that municipalities are legally obliged to keep a registry of eligible voters is certainly also favourable for any e-voting system.[6]

POTENTIAL AND BENEFITS OF THE E-VOTING SYSTEM

Implimentation of Political Rights

Use of the Internet and other electronic devices for communication has not only become a standard for work but also for people's private lives. The facilitation of online voting will be an adaption of democratic procedures to people's need for simplicity and convenience.

A more important aspect of e-voting, however, is its potential facilitation of the implementation of political rights. Especially for people with disabilities, the possibility to cast a ballot online can prove to be a major improvement of their capacity to exercise their political rights. E-voting systems, for instance, could be equipped with added features to assist those with visual impairment. Additionally, individuals with disabilities may prefer the use of their home computers where they provide conveniences over traditional forms of writing and communication. Article 6 of the federal law on political rights obliges the cantons to assist people with disabilities in the exercise of their political rights.

Augmentation of the Participation Rate

Politicians and defenders of democracy in general who seek the increased legitimacy of democratic decisions may hope that e-voting will raise voter turnout. We will examine whether these hopes have been fulfilled in the examples of Geneva and Zurich in Section 5. Indeed, e-voting is very appealing to young voters[7] and thus may raise their involvement in the polls.

Since the introduction of e-voting will not replace any other channel for voting, there should either be a positive or neutral influence on voter turnout. In other words, no one is pushed out of the electorate but rather more people—e.g. Swiss citizens living abroad[8] or the handicapped—will have the possibility of casting their vote more easily, just as with the introduction of mail-in ballots.

It is important to note, however, that distance (i.e. postal) polling's success has not been the same in all parts of Switzerland. Rather, it is particularly popular in the cities where people are accustomed to convenience and simplicity. In more rural regions, the walk to the ballot box is more common.[9] In those areas, we are not likely to see a great increase in voter turnout. For other countries, authors are generally sceptical of the potential for e-voting to boost turnout.[10]

A factor that is likely to have more weight is trust in the e-voting environment and in one's own computer. This is mostly a very subjective factor as it depends very much upon the personal perception of the system's security. However it is also influenced by the way the system is designed and by the security measures taken.[11]

One might also argue that participation on the part of non-naturalized immigrants will increase, if they are allowed to vote. However this will most likely not be a major factor. Moreover, one could argue that even this increase in participation will not increase the quality of the democratic decision-making process, as immigrants may lack information and involvement in the issues at stake.

Augmentation of the Quality of Votes

Whether an increase in voter turnout also brings a corresponding increase in the quality of participation depends on different factors. There is of course an opportunity to find information online on the issues or candidates running for office. Moreover, the government can post the information they usually send by mail on the e-voting Web site.[12]

Since votes are counted electronically the risk of human error is significantly decreased and the number of electronic votes should—in theory—always be correct. In addition to enhancing economic efficiency, this increases the legitimacy of the vote. Since the system asks voters to confirm their choice, there should be no "wrong" votes, i.e. incidents of voters submitting a ballot that does not convey their vote correctly.

In addition, along with the ballot itself, increased input from the voting public could be gleaned by giving voters the possibility to express their thoughts on the vote. As the Federal Council remarks in its report from 2002, through electronic evaluation of votes and comments, the population could gain more influence on decision-making which would be a remarkable benefit for democracy.[13]

Other Benefits of an Early Introduction of e-Voting in Switzerland

Adapting the voting process to the digital environment has several benefits: not only will it bring simplicity but, as a pioneering task, it will allow the state to secure a dominant position in the market for e-democracy systems. The Canton of Geneva speaks of a "defence of the public service: If states do not define their needs and develop their own solutions and standards, they will be facing a closed market, dominated by private companies."[14] Thus, one might argue that developing a state-owned e-voting solution not only holds opportunities for democratic processes but is necessary to defend the state's autonomy to design its democratic system and the future of its citizens' political rights.

As Hans-Urs Wili from the Federal Chancellery points out, likely future scenarios such as the liberalization of postal services will probably make a timely introduction of e-voting necessary, if direct democracy as it exists today in Switzerland is to be kept alive.[15] Radical changes in communication behavior have already weakened the business model of postal services and will continue to do so. Therefore e-voting will be an important alternative to

walking to the ballot box when Swiss postal services will no longer be able to guarantee delivery of 90% of ballots by the polling deadline.

CONCERNS AND RISKS ASSOCIATED WITH THE E-VOTING SYSTEM

Participation Gap

A very important concern weighing against e-voting in general is the fear that it will split society into two parts: one that enjoys the convenience of e-voting and additional services connected with it and another that does not have access to the Internet. E-voting, as the argument goes, may contribute to a growing gap of participation and knowledge between the skilled and knowledgeable on the one side and the badly equipped and unskilled on the other. This phenomenon, known as the digital divide, is a significant problem on a global scale where differences in wealth and welfare between different geographic regions are strong. However, two thirds of Switzerland's population already uses the Internet[16] and the danger of a significant amount of people being kept away from the developments of e-voting or other e-government services is very low since there is a clear trend towards higher numbers of Internet users.[17] Still, e-voting cannot replace postal voting at this moment but rather can only be introduced as a supplementary option. Otherwise there would be the risk that some would be excluded from voting.

Technological Concerns

Federal law guarantees voters the confidentiality of their ballot.[18] This is a challenge for the design of the e-voting system since voters have to identify themselves when logging in and, according to the principle "one man, one vote," individuals have to be prevented from voting more than once. In order to secure confidentiality, personal data and the ballot have to be kept strictly separate.

Moreover, any e-voting system must be secured against acts of manipulation of the vote. Since no signatures are used, there is the risk that the e-voter is not actually the person he or she claims to be. Additionally, there are many different security problems that concern all sorts of Web services alike: particularly Web spoofing, danger of abuse, misuse, or the system failure, not to mention the issue of supporting the diverse software, browsers, and hardware that people use to cast their vote. As the Federal Council clarifies, just like postal or ballot box voting, e-voting will probably never be completely safe from manipulation or unlawful observation. [19]

Legal and democratic issues aside, whether people trust the system will have a tremendous influence on the success of e-voting in Switzerland. Threats like hackers, viruses, trojan horses, etc. are responsible for a significant amount of mistrust in the digital environment.

Another concern that comes with the use of digital technology in voting procedures is the lack of transparency since "all processes of data generation, transformation, and storage occur in black boxes that are often not fully transparent even for technical experts."[20] This can turn out to be a threat to the legitimacy of the ballot since most people are not technically skilled enough to be able to control whether the system is truly working flawlessly. As of now, "average" citizens have always helped in the counting of votes. This has—in some way—added to a feeling of control and a sense of connection with the state among the people.

Voting Quality

Cyberspace and the Internet represent a massive universe of information. Part of the e-voting process also involves the diffusion of polling information on the part of the authorities. However, official information provided by the state will not be the only information on the debated issues that is available online. Political parties are making use of the new possibilities to advertise and propagate their message online at low costs. For users, this might result in information overload and confusion about the origins of information.

Since voters have to deal with this overload, they will try to reduce information intake. This might lead to reduced political discussion and interaction among e-voters. In this context, the Federal Council's report speaks of a "de-ritualization" of the voting procedure.[21] In other words, while acceleration of the voting process certainly seems appealing to many people, it might also have a negative impact on the process of opinion formation. Engi and Hungerbühler use the term "fast-democracy" to describe this tendency.[22] The fear is that voters would no longer feel the need to

leave their homes and discuss their point of view with others over a longer period of time in order to inform their voting decisions.[23] Much to the contrary, e-voting only takes a minute or so, which encourages voting without much reflection or in an emotional (and irrational) state.[24]

Therefore, voters might be more vulnerable to populism. The Federal Council also points out that the right to launch initiatives and referenda (by way of collecting signatures online) might overtax the political system in a direct democracy since too many might successfully be entered.[25] A regulatory framework for the observance of the people's right to a direct democracy in the digital environment has yet to be developed.

E-VOTING IN GENEVA AND ZURICH

Overview

The pilot experiments of the cantons of Geneva, Neuchâtel, and Zurich were needed to clarify whether the electronic communication tools can also be used for democratic purposes. The use of an e-voting system on a cantonal level is seen as an important step for the strategy of the Federal Council in order to clarify the feasibility of the electronic vote for the federal state. For that reason, these pilot experiments were subject to evaluation and analysis. They help us to assess whether the potential and risks of e-voting as discussed above have materialized.

In September 2004, Geneva introduced its e-voting system for a cantonal and a federal ballot. It may be considered a success: 21.8% of the voters in the four communities of Geneva where the pilot experiment was launched used the new voting method. Turnout for the election reached 56.4%.[26] In November 2004, the second pilot test was conducted on the federal level in eight communities of Geneva (Anières, Cologny, Carouge, Meyrin, Collonge-Bellerive, Onex, Vandoeuvres, and Versoix). Twenty-two-point-four percent of all votes were cast online and no technical problems were reported during the scheduled e-voting time period.[27] This means that with an overall turnout of 41.1%, 3755 voters (22.4% of participating voters) used the e-voting system while 71.4% submitted their ballots in the mail.

Eight polls were conducted within the pilot project in Geneva between January 2003 and April 2005. After an initial high of more than 33%, votes submitted electronically in the following polls made up for 22% to 25% of all votes.[28] More than 90% of the citizens who submitted their ballot electronically in the September 26, 2004 poll in the communities of Meyrin, Carouge, Anières, and Cologny stated that they would be willing to vote electronically in future polls.[29]

The e-voting project in the canton of Zurich was launched in 2002 together with the e-voting projects in Geneva and Neuchâtel.[30] The very first implementations of the Zurich system were introduced for student elections at the University of Zurich in 2004.[31] Following the system's successful operation in those student elections, the system was then tested out in public elections in the community of Bülach for a referendum on October 30, 2005.[32] The pilot project was then extended to the communities of Bertschikon and Schlieren as well for a referendum on November 27, 2005.[33] The pilot project officially closed in 2006,[34] but reportedly, e-voting was due to be available to the communities of Bülach, Bertschikon, and Schlieren for a vote on a popular initiative on June 1, 2008, and there continue to be plans to extend the system to other communities within the canton—including portions of the city of Zurich—and ultimately, in 2009, to Swiss citizens residing abroad as well.[35] News reports have confirmed that e-voting would be available in 11 communities within the Canton of Zurich for a September 30, 2008 vote,[36] and roughly 24% of inhabitants in the historic district of the town of Winterthur had reportedly cast their vote electronically by September 29.[37]

Geser considers Geneva a "designated candidate" for the introduction of e-voting for several different reasons.[38] One is the fact that there is a centralized electronic voting registry. As mentioned above, Swiss law requires citizens to register with local authorities. Often these registries have not been interconnected. In the canton of Geneva, however, which happens to have only a small number of communities, local voters' registries have been linked electronically since before the start of the e-voting project. This fact would give the e-voting project a good "head start."

Unlike Geneva, the Canton of Zurich does not have a centralized voter registry. Rather, voters register to vote within their local community, and these communities maintain the registries independently. Thus, the Zurich

e-voting model had to deal with the issue that there was no centralized database against which voter authorization could be verified. This issue was resolved by designing the Zurich system to retrieve voter registration data from the computer systems of the various towns and communities within the canton.[39]

Geneva was also well prepared for an e-voting project, since its cantonal voting law, dating back to 1982, authorizes the cantonal authorities to test new voting methods in collaboration with the communities in light of technological developments.[40]

The Systems

Geneva

As part of the Geneva e-voting system, all official documents are sent out to voters by mail three weeks prior to the date of the vote. With the enclosed personal voting card voters can either submit their ballot by mail, online, or at the ballot box. The voting card is only valid for the upcoming ballot. In fact, it signifies the right to vote in the election and ensures the "one man, one vote" principle since it cannot be used a second time. For the electronic vote, the authorities in Geneva distinguish four stages in the e-voting procedure.[41] No additional software is needed; rather, the user is guided through the process on the e-voting Web site:

> 1. In order to be verified as an eligible voter, the e-voter has to enter an individual identification number. It is located on the ballot sheet and is changed for every polling occasion. Of course, one can try inserting random numbers, but the chance of finding an existing number is one in five billion. When the system recognizes the user as an authorized voter, he or she is then connected to a secure server.
>
> 2. The user then enters his or her actual vote.
>
> 3. The system provides a restatement of the choices made and requests user confirmation. Then, voters must confirm their identity by giving their date of birth and the PIN code printed on their ballot sheet. The PIN code is hidden by a rubber seal, which can be scratched off to reveal the number. (Once the rubber seal is removed, the voting card is invalidated and cannot be used for a second vote by mail or at the ballot box. It can, however, still be used if the voter has not already cast their vote electronically.[42])
>
> 4. Finally, voters receive a confirmation that their vote was accepted and recorded by the system.

Zurich

The Zurich model has additional features which distinguish it from the Geneva model. In addition to Internet-based voting, the Zurich system also permits votes to be cast via text message[43] as well as via interactive television systems (ITV).[44] None of the available data, however, indicate that votes have been submitted via ITV. It is unclear whether this aspect of the model is still under development or simply indistinguishable from voting via the Internet. In 2007, however, it was announced that SMS-voting would be discontinued.[45] In addition to SMS-based voting's lack of popularity in the trials, other reasons for the discontinuation were the desire to reduce the e-voting system's complexity as well as the expectation that in the future all cell phones would be able to access the Internet-based voting system.[46]

The Zurich e-voting system consists of several elements housed in different locations and maintained by different parties. It includes: (1) the pre-existing voting system, which collects, validates, and processes the relevant data;[47] (2) the actual e-voting platform itself; (3) the data centers of the various communities within the canton, which hold voter registration data, and; (4) the user's interface with the system, which can take the form of a PC with an Internet connection, cell phone, or interactive television system. All of these elements are connected together by a special public data network.[48]

As in Geneva, the voter receives voter registration information in the mail which contains information for all forms of voting. With respect to e-voting, the registration letter contains a user-ID, hidden PIN-code, "fingerprint" for verifying the validity of the browser certificate, as well as a special security symbol for further authentification.[49] Additionally, the letter contains a table of SMS codes to be used in connection with the SMS system.[50] For security purposes, these codes are different for each individual.[51]

In order to vote via Internet, the user directs his or her browser to the e-voting Web site and then enters his or her user-ID. The user is then presented with the ballot and fills it out. Afterwards, the user should verify that the security symbol displayed by the e-voting Web site matches the symbol he or she received in the mail. Lastly, the user is requested to enter his or her date of birth and the PIN that he or she received in the mail and is then able to submit the ballot.[52] The user then receives a confirmation message.[53]

Voting via the SMS-based system follows a similar procedure. The user drafts an SMS containing his or her user-ID, the code for the particular poll he or she wishes to participate in, and a code indicating the desired vote. The SMS is then submitted to a designated number. The user then waits for a response and upon receiving it, must submit another SMS containing the user's PIN and date of birth. The user then receives a confirmation message.[54]

The Zurich system also incorporates certain security and privacy-related features. Voter registration data is only transferred from the individual communities in order to generate the registration letters and verify voter identification upon using the e-voting system.[55] Thus, a "virtual" registry is generated anew at each instance that the data is needed—for example, each time a user utilizes the e-voting platform—but is then deleted immediately thereafter.[56] Communications between an Internet user's computer and the servers of the e-voting platform are encrypted and the servers are further protected by a firewall.[57] Cast votes are saved in a database in encrypted form and simultaneously saved to a Write Once Read Multiple (WORM) medium for added security.[58] PINs are protected by a security seal in order to ensure that individuals submitting paper ballots have not already voted electronically.[59]

Tentative Assessment

After laying out the potential and risks of e-voting in Sections 3 and 4 and portraying the two systems in Zurich and Geneva in the previous sections, we now come to a tentative assessment of the e-voting projects in those two cantons. The opportunities and the concerns associated with e-voting which were identified earlier will now serve as the criteria applied in this assessment. Thus, we will look at the effect on voter turnout, vote quality, implementation of political rights, the participation gap, and security.

Voter Turnout

The most interesting question for the authorities going into the pilot project concerned the impact of e-voting on voter turnout. The question of the impact of Internet voting on turnout was very much debated, and experts did not agree about the potential of e-voting to attract additional voters. While Linder, whose calculations are based on a nationwide study of voters, only spoke of an additional turnout of 2% or less, Auer and Trechsel, who considered polling developments in the canton of Geneva, estimated that there would be an increase as high as 9%.[61]

The eight polls conducted in Geneva should provide some indication of the potential to increase voter turnout. While the State Chancellery of Geneva (Chancellerie d'Etat) notes that there is still a lack of comparable data to answer the question of the impact of e-voting on turnout,[62] Christin and Trechsel have presented some remarkable results in their analysis of the vote of September 26, 2004. Their report reveals that e-voting draws away voters from postal polling: 17% of the people who usually send in their ballots by mail chose to vote online.[63] At the same time, e-voting seems attractive to people who consider themselves regular or quasi-regular abstainers: among this group, Christin and Trechsel found that 55.5% had voted online.[64] Moreover, 90% of the voters who submitted their ballot electronically on September 26, 2004 expressed the intention to vote online on other future occasions, e.g. municipal referenda, cantonal or federal elections, etc.[65] Christin and Trechsel note, "…the potential for turnout increase through new voting channels has to be looked for among occasional voters."[66]

Although these findings cannot be generalized because more data collected over a longer time frame is needed in order to provide a scientifically sound basis for conclusions, one should have a look at age as a factor that determines the choice of voting channel. A study conducted in Geneva in 2001 revealed that most people who rarely vote are found among the 30 to 39 year-old and 18 to 29 year-old age ranges and that there are many (12.8%) who do not vote at all.[67] Considering the finding that younger voters prefer online voting over postal voting,[68] one can assume a certain trend towards a more active electorate as the generations who are already used to e-voting grow older and younger generations reach voting age. Moreover, one can also hope for an improvement in the representation of the

age groups since more young voters will turn out at the polls.

As for Zurich, a study concerning the implementation of e-voting within this canton was carried out with respect to the participation of the voting population within the communities of Bertschikon, Bülach, and Schlieren in the November 2005 referendum on cantonal and federal questions. For that referendum, 20% of voters participating in the referendum submitted their ballots via the Internet, and 4% chose to submit their votes via SMS.[69] Internet-voting was the second most popular form of voting, surpassing that of traditional ballot-box submissions.[70] The most popular form of voting was postal submission at 65%.[71]

The study concerned a sample of 300 voters from these three communities. Figures from the study also suggest that this sample was quite representative of the whole: 20.3% of study participants submitted their votes per Internet, 4.3% per SMS, and 63.3% via mail.[72]

The typical e-voter within these communities was between the ages of 40 and 49, male, university-educated, and earned a relatively high income.[73] A particularly significant factor, however, was trust in the Internet. Individuals, who, based on a series of questions, were deemed to have high trust in the Internet, were just as likely to submit their ballots electronically as by mail.[74]

The study also presented some evidence suggesting that the availability of e-voting might increase voter turnout. Of those voters who stated that they did not always vote, 34.9% had used the e-voting system, as opposed to 21.9% of those who stated that they always voted. Nonetheless, well over half of the "not always" voters had turned in their votes by mail.[75] Yet, of all the voters who had submitted their ballots through the electronic system, 5% stated that they would not have voted if the e-voting system had not been available.[76] Moreover, when an additional 300 individuals who had not voted in the referendum were included in the sample, 19% of the non-voters indicated that they would definitely vote more often if the e-voting system were available. Another 32.9% of these non-voters answered with "more yes than no."[77] Thus, although the authors of the study did not feel that any definite conclusions could be drawn, they surmised that there was some promise that e-voting could bring some individuals to the polls who did not otherwise usually vote.[78]

It is worth noting that there was some significant variation in usage among the three communities for the November referendum. Most interestingly, in the community of Bertschikon, a more rural area, voting by electronic means proved to be quite popular—surpassing that of ballot submission by post. Available figures indicate that about 27% of voters in that community opted to cast their ballots via the Internet and 16% chose the SMS option.[79] Thus, a total of about 43% used the e-voting system, whereas postal submissions made up 37%.[80] These figures may suggest that e-voting may be particularly attractive for citizens in more isolated areas. This would contradict previous findings, which say that rural areas tend to see more voting at the ballot box.

On the other hand, when we examine utilization of the e-voting system within the single community of Bülach, it is interesting to note that e-voting has generally been declining over time. In the initial October trial, 37.3% of voters exercised the e-voting option.[81] In the November referendum, this percentage fell to under 30%.[82] For local elections on April 2, 2006, only 20.7% of participating voters in Bülach chose to cast their ballot electronically.[83] Similarly, in Bertschikon, use of e-voting fell from 42.8% in the initial November trial to 34.9% in a second trial.[84] Voter turnout, however, was higher for the later poll.[85] These figures may suggest that the novelty of this new form of voting contributed to some of the numbers of individuals who used the system and that fewer individuals will continue to use the system consistently into the future.

To sum up, e-voting has yet to prove its contribution to a significant augmentation of voter turnout. Rural areas tend to have a higher rate of voting at the ballot box. Geneva however is a rather urban region. Thus, additional e-voter turnout in the Canton of Geneva has to be viewed critically. The study conducted in Zurich also gave little evidence of a significant increase in voter turnout. But Dr Hans-Urs Wili from the Federal Chancellery thinks it is the reflection of a perfectly typical Swiss attitude for many individuals to take a wait-and-see approach rather than immediately jump on the bandwagon.[86] The results from the commu-

nity of Bertschikon, however, revealed a remarkable level of take-up of e-voting in a rural area. It is unclear, however, whether this outcome represents an anomaly or to what extent the novelty factor played a role. Nonetheless, it speaks against the automatic assumption that e-voting will not appeal to rural and small-town communities.

Of course, optimistic opinions about an increase of turnout through e-voting should not be rejected out of hand, even though the novelty factor clearly had great influence in the first vote in Bülach. The Federal Council maintains its scepticism of e-voting's potential for increasing voter turnout.[87]

Political Rights

One interesting characteristic of Geneva, as highlighted by Geser, is the canton's unusually high percentage of citizens currently living abroad (5.9%).[88] For these individuals, e-voting will represent a major enhancement of voting convenience. As more than 600,000 Swiss citizens currently live abroad,[89] bringing the eligible voters among them to the polls is an important move for the preservation of the democratic legitimacy of elections and votes. Additionally, the Organization of the Swiss Abroad has repeatedly called for the implementation of e-voting as a way to ensure the observance of the political rights of expatriates, criticizing problems such as the late arrival of absentee ballots and delivery of ballots in the incorrect language or of incomplete voter information.[90]

The facilitation of the exercise of political rights by casting a ballot in Switzerland, however, did not first begin with the introduction of the e-voting projects. Rather, an initial significant improvement was brought about with the introduction of the postal vote: First, voting was made more convenient for any voter in that dependency on the location and opening hours of a polling place was eliminated. Second, some particular groups of voters especially benefited from the new possibility because they had previously had particular difficulties in frequenting a polling place; this observation holds especially for people with disabilities, people that live abroad, the elderly or possibly people that work throughout the opening hours of the polling places.

Essentially, these two improvements to the exercise of political rights can be realized not only through the availability of the postal vote but also e-voting. Arguably, electronic voting can go even beyond the possibilities of postal voting in that voting in one's living room or office may be considered even more convenient than using the mail. Unfortunately, no specific data on e-voting usage by people with disabilities is available for the votes in Geneva and Zurich. We therefore have to make some fair assumptions which should be subject to further investigation in the future.

While e-voting has, therefore, the potential to facilitate the exercise of political rights and may thereby add to the legitimacy of the resulting decisions, one should not neglect that certain conditions have to be met for this potential to be realized. Most importantly, the exercise of electronic voting depends not only on the availability of Internet access (first-level digital divide), but also on the respective IT-skills and familiarity with information technology that are necessary for an electronic vote (second-level digital divide). Such potential obstacles are reflected in the composition of the participants in the Swiss e-voting projects, as discussed in the next section.

Altogether, the projects in Geneva and Zurich have opened new options of making use of political rights. However, e-voting may still be more difficult than traditional voting for some people. These new possibilities come at the price of new potential obstacles, generated namely by a certain split within society between the technically skilled and non-skilled. Therefore, it seems fair to conclude that the exercise of political rights will gain most not from an exclusionary systemic selection between "physical," postal and electronic voting, but rather from a combined offering of all these options. The question of who is most likely to exercise their political rights by e-voting will be addressed in the next section.

Participation Gap

As shown above, participation in the Swiss e-voting projects did not exactly reflect the composition of the Swiss electorate at large or population of actual voters. Instead, certain social groups were overrepresented and others underrepresented. For example, according to a statistical analysis of the vote of September 26, 2004,[91] typical e-voters in Geneva possess the following characteristics: They are between 18 and 39 years old and have a higher average level of education than the overall population; 75% of them

use the Internet at least twice a week. Generally, people with higher income are more likely to vote electronically. Additionally, men are slightly overrepresented among users of online voting. As noted above, the demographic make up of e-voters in the Zurich trials was similar, except for the fact that there was significantly higher usage of e-voting among older portions of the population.[92]

The uneven distribution of adoption of e-voting among the overall population of potential voters as well as among the portion of this population that actually exercise their political rights (by casting a ballot or voting by mail) is arguably influenced mainly by the following three factors, although available figures do not currently permit an assessment of their respective importance: First, lacking access to Internet technology may, naturally, prevent participation in e-voting initiatives. However, mere access does not seem to be the biggest challenge for e-voting in Switzerland where 2 million broadband connections were established in 2006, as compared to a total population of 7.6 million people. Second, even if access is generally available, as mentioned above, successful participation in e-voting procedures may be impeded by a lack of the necessary technical skills to make use of these means. Beyond the mere possession of the necessary skills, it seems safe to conclude that higher skills in using Internet technology are positively correlated with a higher trust in the security of informational exchange in the Internet, with such trust being an important pre-condition of one's actual take-up of e-voting procedures. Third, apart from the availability of Internet access and the ability to make use of it, people might be dissuaded from taking part in electronic voting because the procedure seems too cumbersome to them even if they possessed both the network access and skills needed.

There are several ways to address such challenges to the success of e-voting that are not essentially related to e-voting procedures or their design as such, but rather generally to the access to and use of Internet technology (irrespective of certain specific uses such as e-voting); one might, to name but one example, think of education. However, as the example of Zurich has shown, there are design-related possibilities for e-voting systems that could address the problems caused by the digital divide which are both cheaper and more immediately implemented than measures intended to increase Internet-literacy generally. The SMS voting option not only expanded the convenience of e-voting, but could potentially help close the problem of the digital divide: According to recent figures, there are many more cell phone numbers in use in Switzerland than broadband connections.[93] Whether these additional forms of e-voting will help to increase voter participation, however, cannot be determined with the currently available figures. These suggest that SMS voting has not been particularly popular,[94] and, as stated above, there are indications that the SMS option will be discontinued. Yet, due to the more widespread use of cell phones on the personal level, it is possible that the availability of such a form of voting might prompt the participation of certain individuals in the e-voting procedure that would not use a computer to vote even if they could. Additional expansion of the Zurich model to other common devices may help to bolster turnout even more.

In view of these possible measures to even out the disproportionate distribution of people that actually use e-voting, it should, however, not be forgotten that the final aim is not to make all people vote electronically. Even if such a stage may or even can never be reached, this does not speak against adopting an e-voting strategy. The costs incurred by establishing an e-voting system do not need to be justified by the implausible presumption that everyone will use the system afterwards. Rather, the justification of implementing such systems lies in the expansion of opportunity which they provide the general public—e-voting may and will be used, as mentioned above, by people that would vote anyway, but offers added convenience. However, it also creates (at least) a chance that people will start to exercise their political rights that would not otherwise have done so.

Security

There have not been any reports of manipulations or failures of the e-voting systems during any of the test runs, despite initial scepticism with respect to the maturity of security technologies.[95] One must keep in mind, however, the relatively small scale of usage thus far. It is reasonable to assume, however, that the systems will be exposed to higher numbers of attempted attacks and manipulation as the use of e-voting becomes more widespread.

E-voter turnout in Zurich and Geneva does not offer much insight on users' awareness of the security measures taken or fear to use this new channel. As a safeguard for the legitimacy of Swiss polls and elections in general, participation in e-voting on a federal level is currently restricted to 10% of all eligible voters throughout the nation.[96] Moreover, as Mr. Wili from the Federal Chancellery explained, there is never going to be only one e-voting system which will serve all cantons, since accommodating the many (small and big) differences in voting procedures resulting from the different cantonal voting laws would require an overwhelmingly

complex application—not to mention the lack of political feasibility.[97] The granularity of e-voting systems, however, can serve as a security cushion against attempts to manipulate greater parts of the vote since cantonal systems would not be interlocked.

Quality of Vote

Both systems in Geneva and Zurich featured a review of the voter's choice following the initial selection of votes which has to be confirmed before the electronic ballot is submitted. This feature should prevent citizens from unintentionally giving their vote to a candidate or a legislative draft they do not mean to support. Thus, the quality of a vote is improved as it represents the people's will better than a traditional vote with paper ballots where people might cast a vote which does not represent a true act of will.

Yet, some fear that e-voting might on the other hand also bring a decrease of political discourse, since voters would be able to cast their ballot in the privacy of their own home. If there is a trend towards "fast-democracy" it has been ignited by the introduction of the postal vote. The analysis of Christin and Trechsel shows that 81.3% of Internet votes were cast at home in the ballot of September 26, 2004 in four communities of Geneva.[98] While it is not clear how high the corresponding percentage for postal voting is, it would be excessive to assume that these 81.3% of online voters had not been involved in political discussions and deliberation before casting their vote. The numbers do imply, however, that—contrary to traditions of public voting in other Swiss cantons—voting in Geneva is definitely a private act. But this does not necessarily mean that there is no political discourse. One might argue that political debates among youth (who show the highest percentage of e-voters) have shifted to online spaces like social networking sites or blogs.

Governments also hope for better means to assist citizens in their vote through the provision of information online. Critics warn of an online information overload which could impair rational and sound opinion formation. According to the gfs study, only 2% to 4% of eligible voters had used the Internet as a source of information before votes between 1999 and 2003.[99] Of course, this percentage should have grown since the time the survey was conducted, but it suggests that the Internet does not have a substantial negative effect on information intake leading to information overload in the short run. Still, most eligible voters use traditional media to find out about the arguments for and against legislative proposals.[100] In the long run, the transition from newspapers to online media as the most important source of information will be the most influential factor for increasing information overload, and it is only marginally accelerated by e-voting, if at all. Reliability of online political information represents another issue which will not discuss in depth here. We note, however, that the government could potentially play a role here as a provider of balanced, quality-certified information.

CULTURAL MATTERS

As we have shown, e-voting tests were successfully conducted in Zurich and Geneva. Hopes for higher voter turnout have not really been fulfilled as of yet. Still, the system seems promising for Swiss democracy. Admittedly, we do not expect to see a widespread use of e-voting in all Swiss cantons before many years or even decades. One of the main reasons for this is the complexity of different voting procedures in the different cantons. Another reason is the typically slow adoption of new systems in Switzerland, even if industry and state are ready to pave the way. Other countries, however, have been rather cautious or skeptical of e-voting. The United States, for example, discontinued its SERVE program in 2004—before its deployment—due to security concerns expressed in peer review.[101] Although the United States government has not rejected e-voting altogether, projects for remote online voting have apparently only been planned for soldiers who are stationed overseas.[102]

It is still too early to say with any authority what the implications of e-voting for Switzerland are or will be. Due to political reasons, the program has stalled in the Canton of Geneva following the initial trials. In the Canton of Zurich, the system continues to be implemented. Yet, generally, comprehensive data on voter adoption of and attitudes toward e-voting does not exist, increasing the difficulty of drawing general conclusions. In addition, e-voting is still emerging and developing as a system. The implementation of one nationwide system was never a goal because of the diversity of traditions and voting procedures in all 26 different cantons of Switzerland. Yet, whether e-voting will be offered in all parts of Switzerland or rather remain a luxury only available within certain Cantons or communities remains to be seen.

There seems to be a difference between American and Swiss attitudes towards e-voting. For further insight on this issue we will now look at some particularities of Swiss political

culture and social norms which we believe to provide fertile ground for the implementation of the vote électronique in the long run.[103]

As mentioned above, trust in technology is a decisive factor for the decision of whether to cast one's vote electronically or not. This is closely connected to trust in the state's voting system or confidence in the correct outcome of votes in general. Only with a certain amount of trust in both the democratic system itself and the technology used for remote online-voting, will people chose vote électronique as their method of casting a ballot. Concerning trust in the democratic system, we have to look at political culture in Switzerland to learn about typical Swiss attitudes. Werner Seitz identifies three elements: 1) the perception of being "special" as a part of national identity; 2) political negotiations, the search for consensus and integration; and 3) direct democracy and a strong sense for the sovereignty of the people.[104]

The latter two characteristics seem to be most important for e-voting. Direct democracy gives people a strong sense of identification with the state. Swiss people generally do not feel adverse towards the state but rather see themselves as a part of it. The political system, which has not seen many major changes since 1848, provides the people with a significant voice in government and political rights to take action and audit government decisions and legislative drafts. The traditional search for political consent and compromise has lead to a very stable structure of political actors,[105] which is only slightly altered after elections, but has recently come under increased pressure. Especially the composition of governments at all levels of the state has proven to be very resilient to any changes in the electoral landscape until recently. The stability of the system along with the inseparability of the people and their state give rise to a high level of trust in Swiss democracy as a whole. It is trust in the system as described by Luhmann: it needs constant feedback and is only possible where truth between actors is found as an element for the reduction of complexity.[106] Comparatively low voter turnouts can be seen as a sign of a low urge to intervene and take action, i.e. as a manifestation of approval of the way the state is run.[107] Not to trust the democratic system would mean to be skeptical of one's own decisions. Just like the Federal Council, which acknowledges that postal voting or remote online voting will never be completely secure,[108] the general populace is confident that the system as a whole will produce correct outcomes and represent the people's will. This is not to say that they naively accept any flaws in the system. Rather, there is a generally positive attitude that does not suspect manipulation in every election or vote.

When it comes to trust in technology and its adoption, Switzerland—at least to the Swiss—does not seem to be a front-runner. Even though the Swiss population is only surpassed by some Scandinavian countries, the Netherlands, and Portugal with respect to Internet penetration,[109] adoption of new technology is comparatively slow among the Swiss. Straub et al. point to Hofstede's cultural dimensions[110] to validate the usefulness of the technology acceptance model across different countries.[111] Judging by the value of uncertainty avoidance of 58,[112] Switzerland is more likely to be more reluctant towards the use of electronic media than the US,[113] which is assigned a corresponding value of 46.[114] Still, surveys have shown that the Swiss generally trust information and communication technology. For example, according to the poll "Baromédia 2002," 53% trust in the Internet as a medium to receive information (compared to 65% who trust in banks and churches).[115] The general openness of the Swiss population towards electronic communication is, for example, also reflected by a sharp increase in e-commerce.[116]

The other aspect of Switzerland's political culture, the sense of representing a special case among nations, can be seen as a driving force behind reforms or the implementation of new technologies in order to prove this distinctiveness but also as a retarding element to progress due to the perception that Switzerland's extraordinary position means it does not need to go along with certain trends. The example of Geneva, where authorities seem eager to make Geneva the "E-Capital"[117] of Europe, can be read as a sign of this sense of being special in the former manifestation.

For a look at the social norms associated with voting in Switzerland, one has to refer to the old Swiss tradition of public voting (so-called "Landsgemeinde"). In these voting events citizens gather at a public place and vote on issues to be decided by raising their arm (or by a similar publicly viewable signal). While the tradition has been abolished in most cantons (and was never practiced on the federal level), one may conclude that its characteristics have been an influence in the development of social norms that still persist—namely, a smaller concern on the part of Swiss voters as to the secrecy of their vote. This may also limit concerns as to the security of e-voting systems and therefore facilitate their acceptance.[118]

Switzerland seems to be in some ways particularly suited to the adoption of e-voting procedures since voting takes

place more often than in countries without such a strong tradition of direct democracy. Thus, there would generally be many opportunities within a single year for citizens to try out the e-voting system and less of a danger that those individuals would lose familiarity with the procedure before the next election. Not only are there elections for the legislatures on the federal, cantonal, and communal level, but there are also several other polling events held every year on all three of these levels. As mentioned before, voting in Switzerland is not restricted to physically casting a ballot in a ballot box. Rather, the postal vote is the option most people prefer.[119] As Swiss citizens are, therefore, used to expressing their political will not only by physically frequenting a polling place, but also by filling out a ballot form at home and sending it in by mail, one might conclude that the Swiss are particularly open to e-voting procedures since many are already accustomed to polling from home.

Against the backdrop of these characteristics, it is no surprise that, according to a study conducted by "Prognos" in 2000, the availability of electronic voting seemed to rank high among the interests of the Swiss people. According to this study, 66% of Internet users in Switzerland indicated that they would like to have the possibility to vote via the Internet. Only the opportunity to communicate with the government via e-mail (74%) and to fill in forms for passports and IDs online (72%) were more popular e-government projects.[120] In Geneva, the vast majority of citizens are in favour of the introduction of an e-voting system, as long as it merely supplements existing forms of voting rather than replacing them.[121] Finally, in 2001, all cantonal governments expressed their willingness to engage in e-voting projects.[122]

CONCLUSION

In the previous section we showed that three years before implementation of the first e-voting system in Switzerland, there was reason to be very optimistic about the acceptance of e-voting by the Swiss population and the adoption of remote online voting systems by cantonal administrations. The surveys after the ballots and actual figures of e-voter turnout in Zurich and Geneva, however, urge caution in being too enthusiastic for the speedy and successful implementation of e-voting across Switzerland.

Yet, we can conclude after our tentative assessment that e-voting represents a very promising tool for the improvement of the exercise of political rights on the part of all citizens, and especially of those with disabilities or living abroad. It can also raise the quality of voting and reduce the risk that anyone casts a ballot that is inconsistent with their choice. Additionally, risks of manipulation and other security issues have not materialized in any breakdown of the system or foul-play during the test runs or actual polls and have also always existed for traditional forms of voting. Concerns of information overload and the "de-ritualization" of the voting process have to be taken seriously. They are, however, consequences of a greater change in culture as society enters an ever greater digitally networked world. The threat that e-voting will widen the participation gap calls for a closer look at the details of the design of the system. While disproportions of e-voter representation among the genders are worth a closer look in future studies, assistance to the not so digitally skilled and elderly parts of the population can be provided on the e-voting platforms themselves and even at traditional polling places. Since Internet penetration in Switzerland is already high and rising, and young generations are currently growing up in a digital environment, the danger of a more pronounced digital divide through e-voting is constantly diminishing.

Having understood that the introduction of e-voting across Switzerland should have mostly positive effects, along with some negative ones that can be contained, and seeing the need for a voting system which matches the future environment of pervasive digital communication, the question then arises as to what cultural environment is needed to facilitate the implementation of the vote électronique.

The lessons learned from this case study are the following: The acceptance, and therefore also the implementation, of a remote online voting system depends on both trust in technology and trust in the democratic system itself. An explanation of the slow or rapid adoption of new technologies can be found in a country's propensity to avoid uncertainty as described by Hofstede. Trust in the democratic system is best maintained by constant feedback, which in Switzerland is provided by frequent ballots held throughout every year. Also, the social norms of voting are influential for the importance of the secrecy of the vote. In Switzerland, while the secrecy of the vote is legally guaranteed, traditional voting in public spaces left little room for it. The speed and efficiency of the implementation of an e-voting system also heavily depends on the degree of sovereignty of political units. Complexity and diversity of voting regulation will slow down the penetration of e-voting systems.

We are not likely to see the nationwide use of e-voting systems in every ballot in Switzerland any time soon.

However, economic, social, and cultural characteristics should not pose any major obstacle. As Internet penetration is increased and technology advances, new possibilities of e-voting will require consideration, constant monitoring and qualitative and empirical evaluation in order to realize their potential for democracy in Switzerland and the rest of the world.

ENDNOTES

[1] See the strategy paper "Strategie des Bundesrates für eine Informationsgesellschaft in der Schweiz", available at http://www.bakom.ch/themen/infosociety/00695/index.html?lang=de&download=M3wBUQCu/8ulmKDu36WenojQ1NTTjaXZnqWfVpzLhmfhnapmmc7Zi6rZnqCkkIN0f3mBbKbXrZ2lhtTN34al3p6YrY7P1oah162apo3X1cjYh2+hoJVn6w==.pdf.

[2] See the preface of the Federal Communication Agency's report on the status of the information society in Switzerland, available at http://www.bakom.ch/themen/infosociety/00695/01729/index.html?lang=de&download=M3wBUQCu/8ulmKDu36WenojQ1NTTjaXZnqWfVpzLhmfhnapmmc7Zi6rZnqCkkIN3gHx9bKbXrZ2lhtTN34al3p6YrY7P1oah162apo3X1cjYh2+hoJVn6w==.pdf.

[3] Federal Council, Bericht über den Vote Électronique. Chancen, Risiken und Machbarkeit elektronischer Ausübung politischer Rechte vom 9. Januar 2002, BBl 2002 645, p. 651.

[4] Federal Statistics Office, Abstimmungen – Indikatoren: Stimmbeteiligung, http://www.bfs.admin.ch/bfs/portal/de/index/themen/17/03/blank/key/stimmbeteiligung.html.

[5] Federal Statistics Office, Entwicklung der Stimmbeteiligung bei eidgenössischen Volksabstimmungen, http://www.bfs.admin.ch/bfs/portal/de/index/themen/17/03/blank/key/stimmbeteiligung.Document.21845.xls (last visited Oct. 22, 2008).

[6] Art. 4(1) BPR (Federal Law on Political Rights) (2008).

[7] Christin & Trechsel, Analysis of the 26th September 2004 ballot as held in four Geneva municipalities (Anières, Carouge, Cologny and Meyrin), Geneva 2005, available at http://www.geneve.ch/evoting/english/doc/rapports/rapport_26sept_english_final.pdf, p. 16.

[8] But see Isabelle Imhof, Schritt für Schritt zum "Vote électronique," Neue Zürcher Zeitung, September 13, 2006, available at http://www.nzz.ch/nachrichten/zuerich/article9zhm5_1.333163.html, who doubts that small municipalities will be able to provide their citizens living abroad with the secure infrastructure needed for e-voting.

[9] See Zurich Statistics Office, Briefliches Abstimmen und Stimmverhalten, Nov. 1999, http://www.statistik.zh.ch/themenportal/themen/down.php?id=241&fn=1999_11.pdf, a statistics bulletin on voters' habits in the canton of Zurich during the years 1994 to 1999.

[10] See, e.g., for the UK, Norris, Pippa, Will New Technology Boost Turnout? Evaluating Experiments in E-Voting v. All-Postal Voting Facilities in UK Local Elections, Aug. 19, 2003, p. 10, available at http://ssrn.com/abstract=437140.

[11] The security issue is discussed further in Section 5.3(d) below.

[12] There is, however, the risk of information overload, see Section 4.3. One project aimed in part at tackling information overload in elections is smartvote (see our accompanying case study).

[13] Federal Council, Bericht über den Vote électronique: Chancen, Risiken und Machbarkeit elektronischer Ausübung politischer Rechte, Jan. 9, 2002, BBl. 2002 645, p. 655.

[14] Republic and Canton of Geneva, E-Voting: The Geneva Internet Voting System, July 2007, http://www.geneve.ch/evoting/english/presentation_projet.asp#autonomie.

[15] Telephone interview with Dr. Hans-Urs Wili, Director of the Federal Chancellery's section for political rights, on June 20 2008.

[16] Federal Statistics Office, Indikatoren: Internetnutzung, http://www.bfs.admin.ch/bfs/portal/de/index/themen/16/04/key/approche_globale.indicator.30106.301.html?open=1#1 (last visited Oct. 22, 2008).

[17] Ibid.

[18] Art.5(7) BPR (2008).

[19] Federal Council, Bericht über die Pilotprojekte zum Vote électronique vom 31. Mai 2006, BBl 2006 5459, p. 5528. available at: http://www.bk.admin.ch/themen/pore/evoting/00776/02793/index.html?lang=de&download=M3wBPgDB_8ull6Du36WenojQ1NTTjaXZnqWfVpzLhmfhnapmmc7Zi6rZnqCkkIR2fXx7bKbXrZ6lhuDZz8mMps2gpKfo. For more on trust in the democratic system, see Section 6 of this case study. As the Federal Government acknowledges, security is certainly also an issue with traditional forms of voting. Based on a paper-based voting system, Ben Adida has developed a model for enhancing vote security through the use of encryption which also implements a system for public verification of votes which preserves ballot secrecy. Ben Adida, Advances in Cryptographic Voting Systems, PhD Thesis, 2006, pp. 26 et seq. available at http://ben.adida.net/research/phd-thesis.pdf . This or similar models may also have applications for electronic voting.

[20] Hans Geser, E-voting projects in Switzerland, Zürich 2002, p. 16, available at http://socio.ch/intcom/t_hgeser12.htm.

[21] Federal Council, Bericht über den Vote électronique: Chancen, Risiken und Machbarkeit elektronischer Ausübung politischer Rechte, Jan. 9, 2002, BBl. 2002 645, p. 656.

[22] Lorenz Engi & Francine Hungerbühler, E-Voting -- Stand und Entwicklung in der Schweiz, Medialex 1/06, pp. 17-27, 21.

[23] Yannis Papadopoulos from the University of Lausanne describes this to be part of a general trend toward the "privatization" of political votes. Federal Council, Bericht über die Pilotprojekte zum Vote électronique vom 31. Mai 2006, BBl 2006 5459, p. 5495.

[24] Wolf Linder, Gutachten zum E-Voting, Berne 2001, p. 12. available at: http://www.bk.admin.ch/themen/pore/evoting/00776/02030/index.html?lang=de&download=M3wBPgDB_8ull6Du36WenojQ1NTTjaXZnqWfVpzLhmfhnapmmc7Zi6rZnqCkkIN3hHyAbKbXrZ6lhuDZz8mMps2gpKfo.

[25] Federal Council, Bericht über den Vote électronique: Chancen, Risiken und Machbarkeit elektronischer Ausübung politischer Rechte, Jan. 9, 2002, BBl. 2002 645, p. 656.

[26] See Press Release, Geneva State Chancellery, Success for the first federal ballot on Internet (September 26, 2004), available at http://www.geneve.ch/evoting/english/communiques_20040926.asp.

[27] See Press Release, Federal Chancellery, Pilotversuch mit Vote électronique erfolgreich (Nov. 28, 2004), available at http://www.admin.ch/cp/d/41a9dda8_1@fwsrvg.html.

[28] Federal Council, Bericht über die Pilotprojekte zum Vote électronique vom 31. Mai 2006, BBl 2006 5459, p. 5477.

[29] Thomas Christin & Alexander H. Trechsel, Analysis of the 26th September 2004 ballot as held in four Geneva municipalities (Anières, Carouge, Cologny and Meyrin), Geneva 2005, p. 15, available at http://www.geneve.ch/evoting/english/doc/rapports/rapport_26sept_english_final.pdf.

[30] Etienne Strebel, UNO-Auszeichnung für Zürcher E-Voting, Swissinfo, June 26, 2007, http://www.swissinfo.org/ger/suche/Result.html?siteSect=882&ty=st&sid=7949660.

[31] See Press Conference, Das e-Voting-System des Kantons Zürich im Einsatz bei der Studierendenratswahl (Dec. 14, 2004), http://www.statistik.zh.ch/produkte/evoting/folien.pdf.

[32] See Uwe Serdült & Alexander H. Trechsel, Umfrage bei Stimmberechtigten der Zürcher Gemeinden Bertschikon, Bülach und Schlieren anlässlich des Pilotversuchs zum Vote électronique vom 27. November 2005, Geneva 2006, p. 6, available at http://edc.unige.ch/edcadmin/images/Umfrage%20bei%20Stimmberechtigten.pdf; David Knöri & Elisabeth Prader, E-Voting des Kantons Zürich, Feb. 10, 2006, p. 3, available at http://www.exebit.ch/e_voting_Kt_ZH.pdf.

[33] See, e.g., Serdült & Trechsel, op. cit.

[34] See Statistics Office, Canton of Zurich, Abgeschlossenes Pilotprojekt e-Voting des Kantons Zürich, http://www.statistik.zh.ch/produkte/evoting/index.php?p=5 (last visited Oct. 22, 2008).

[35] Press Release, Statistics Office, Canton of Zurich, Ausbau von E-Voting im Kanton Zürich, May 27, 2008, http://www.statistik.zh.ch/services/mm/2008/mm04_2008_evoting.pdf. See also Press Release, Statistics Office, Canton of Zurich, Ausbau von E-Voting im Kanton Zürich, Aug. 27, 2008, http://www.ji.zh.ch/Internet/ji/de/aktuelles/medienmitteilungen/aktuelle_news/219.html.

[36] Simon Eppenberger, Rubbel-Probleme beim elektronischen Abstimmen, Tages Anzeiger, Sept. 25, 2008.

[37] Jeder Vierte stimmte elektronisch ab, Tages Anzeiger, Sept. 29, 2008.

[38] Geser, op. cit., p. 11.

[39] Etienne Strebel, UNO-Auszeichnung für Zürcher E-Voting, Swissinfo, June 26, 2007, http://www.swissinfo.org/ger/suche/Result.html?siteSect=882&ty=st&sid=7949660. See also Engi & Hungerbühler, op. cit., p. 26. Thus, lists of registered voters will simply be downloaded at the time of the election or referendum rather than building a long-term central database for the entire canton. Ibid.

[40] Loi sur l'exercice des droits politiques du 15. octobre 1982, Art. 188: Departure from the law for cantonal or municipal issues, the government may, in accordance with the concerned municipalities, depart exceptionally and in a limited way from the rules enshrined in the law on political rights and describing the ways these rights must be exercised and the ballots be counted, in order to allow for testing new ways of political expression that technical developments make possible.

[41] Republic and Canton of Geneva, E-Voting: The Geneva Internet Voting System, July 2007, http://www.geneve.ch/evoting/english/presentation_projet.asp.

[42] Ibid., http://www.geneve.ch/evoting/english/securite.asp.

[43] A.k.a. SMS.

[44] Strebel, op. cit.

[45] Press Release, Government Council, Canton of Zurich, E-Voting wird im Jahr 2008 weitergeführt - weitere Gemeinden und Stadtkreise werden zugelassen, Oct. 4, 2007, http://www.ji.zh.ch/Internet/ji/de/aktuelles/medienmitteilungen/aktuelle_news/evoting_2008.html.

[46] Ibid.

[47] David Knöri & Elisabeth Prader, E-Voting des Kantons Zürich, Feb. 10, 2006, p. 2.

[48] Press Release, AWK Group AG, LEUnet im Kanton Zürich eingeführt, Aug. 6, 2004, http://www.awk.ch/pdfs/pc_040806_leunet.pdf. See also Siemens/Finanzdirektion Kanton Zürich, Nutzen statt kaufen: Managed Services für den Kanton Zürich, http://w1.siemens.ch/ch/de/sen/uber/Documents/leunetsuccessstory1_1220123.pdf.

[49] See E-Voting Manual, p. 6, https://evoting.zh.ch/MainPage/manual/v1/Seite6.htm.

[50] Knöri & Prader, op. cit., p. 3.

[51] Ibid., p. 1.

[52] E-Voting Manual, p. 3 https://evoting.zh.ch/MainPage/manual/v1/Seite2.htm, https://evoting.zh.ch/MainPage/manual/v1/Seite3.htm.

[53] E-Voting Manual, p. 8, https://evoting.zh.ch/MainPage/manual/v1/Seite8.htm.

[54] Hans Eichholzer, eVoting - Erfahrungen der Gemeinde Bertschikon – Ein Projektbericht, http://www.sgvw.ch/d/fokus/Seiten/070306_evoting_eichholzer.aspx.

[55] Knöri & Prader, op. cit., p. 2.

[56] Ibid.

[57] David Knöri, E-Voting und dessen Herausforderung (2006), slide 11, http://www.exebit.ch/Vortrag_080306.pdf.

[58] Knöri & Prader, op. cit., p. 3.

[59] Ibid.

[60] Wolf Linder, Gutachten zum E-Voting, Berne 2001, pp. 5-6, available at http://www.bk.admin.ch/themen/pore/evoting/00776/02030/index.html?lang=de&download=M3wBPgDB_8ull6Du36WenojQ1NTTjaXZnqWfVpzLhmfhnapmmc7Z-i6rZnqCkkIN3hHyAbKbXrZ6lhuDZz8mMps2gpKfo.

[61] Andreas Auer & Alexander H. Trechsel, Voter par Internet?, Basel 2001, p. 54.

[62] Republic and Canton of Geneva, E-Voting: The Geneva Internet Voting System, July 2007, http://www.geneve.ch/evoting/english/presentation_projet.asp#impact.

[63] Thomas Christin & Alexander H. Trechsel, Analysis of the 26th September 2004 ballot as held in four Geneva municipalities (Anières, Carouge, Cologny and Meyrin), Geneva 2005, p. 12, available at http://www.geneve.ch/evoting/english/doc/rapports/rapport_26sept_english_final.pdf.

[64] Ibid., p. 13.

[65] Ibid., p. 15.

[66] Ibid., p. 14.

[67] See IPSO study from March 2001, cited in Auer & Trechsel, op. cit., pp. 51-52.

[68] Christin & Trechsel, op. cit., p. 16.

[69] Knöri & Prader, op. cit., p. 3.

[70] Ibid. Eleven percent of voters in these communities dropped their votes in the ballot box according to the study.

[71] Ibid.

[72] Knöri & Prader, op. cit., p. 3.

[73] See ibid., pp. 7-11.

[74] Ibid., p. 12.

[75] Ibid., pp. 11-12.

[76] Ibid., p. 14.

[77] "Eher ja." Ibid. p. 15.

[78] See ibid., pp. 13-16.

[79] Knöri & Prader, op. cit., p. 4.

[80] Elisabeth Prader, Das e-Voting System im Einsatz, March 7, 2006, slide 25, available at http://www.exebit.ch/Vortrag_070306.pdf.

[81] Ibid., slide 24.

[82] Serdült & Trechsel, op. cit., p. 6, initially suggest 22% then later state 24%. Figures from the Schweizerische Gesellschaft für Verwaltungswissenschaften in-

dicate 22%. Hans Eicholzer, eVoting - Erfahrungen der Gemeinde Bertschikon – Ein Projektbericht, http://www.sgvw.ch/sektor/news/archiv/d/070306_evoting_bertschikon.php; see also Prader, op. cit., slide 25.

[83] Behördenwahlen Bülach vom 2. April 2006, April 3, 2006, http://www.statistik.zh.ch/produkte/evoting/buelach020406.pdf.

[84] Eichholzer, op. cit.

[85] Ibid.

[86] Telephone interview with Dr. Hans-Urs Wili, Director of the Federal Chancellery's Section for Political Rights, on June 20, 2008.

[87] Federal Council, Bericht über die Pilotprojekte zum Vote électronique vom 31. Mai 2006, BBl 2006 5459, p. 5503.

[88] Geser, op. cit., p. 3.

[89] See Organization of the Swiss Abroad (OSA), Annual Report 2006, p. 44, http://www.aso.ch/files/downloads/jahresbericht_aso_2006_d.pdf.

[90] See e.g. OSA, Die Auslandschweizer und die Ausübung ihrer politischen Rechte, June 2 2008, http://www.aso.ch/de/die-auslandschweizer-und-die-ausuebung-ihrer-politischen-rechte; Auslandschweizer möchten elektronisch abstimmen, Neue Zürcher Zeitung, July 18 2008, http://www.nzz.ch/nachrichten/schweiz/auslandschweizer_elektronisch_abstimmen__1.786925.html.

[91] Christin & Trechsel, op. cit., pp. 10, 16 et seq.

[92] David Knöri & Elisabeth Prader, E-Voting des Kantons Zürich, Feb. 10, 2006, p. 3.

[93] Just over 2 million broadband connections were reported in Switzerland for the year 2006. "Breitbandmarkt," http://www.comcom.admin.ch/dokumentation/00439/00565/index.html?lang=de. In contrast, there were reportedly over 7 million cell phone numbers in use in Switzerland in that same year. "Mobilfunkmarkt," http://www.comcom.admin.ch/dokumentation/00439/00467/index.html?lang=de. Additionally, a survey following the November 2007 e-voting trials in Bertschikon revealed that 79% of respondents owned and used a mobile phone, whereas only 38% had Internet access at home with an additional 8% who only had access at work. Eichholzer, op. cit.

[94] Serdült & Trechsel, op. cit., p. 7. A more significant percentage of voters in Bertschikon utilized the SMS option, yet usage of the SMS option dropped significantly in Bülach between the original October trial and the November referendum. See Prader, slides 24-25. And for local elections in April 2006, only 0.8% of voters in Bülach chose the SMS option. Behördenwahlen Bülach vom 2. April 2006, http://www.statistik.zh.ch/produkte/evoting/buelach020406.pdf.

[95] Federal Council, Bericht über den Vote électronique: Chancen, Risiken und Machbarkeit elektronischer Ausübung politischer Rechte, Jan. 9, 2002, BBl. 645, pp. 660 et seq.

[96] Art.27c (2) VPR (Ordinance on Political Rights).

[97] Telephone interview with Dr. Hans-Urs Wili, Director of the Federal Chancellery's section for political rights, on June 20 2008.

[98] Christin & Trechsel, op. cit., p. 10.

[99] gfs.bern, Das Potenzial der elektronischen Stimmabgabe, Berne 2005, p. 17. available at http://www.gfsbern.ch/pub/vote-electronique.pdf.

[100] See gfs.bern, VOX-Trendauswertungen, Stand Juni 2008, available at http://www.polittrends.ch/vox-trend/nutzung-allemedien.php.

[101] United States Department of Defense, Expanding the Use of Electronic Voting Technology for UOCAVA Citizens, May 2007, p. 11. available at http://www.servesecurityreport.org/DoDMay2007.pdf.

[102] See generally, United States Department of Defense, Expanding the Use of Electronic Voting Technology for UOCAVA Citizens, op. cit.

[103] Apparently this view is shared by Krimmer and Schuster who rank Switzerland in fifth place for readiness for e-voting. However, they do not seem to consider cultural factors and social norms. See Robert Krimmer & Roland Schuster, The E-Voting Readiness Index, p. 44, available at http://www.e-voting.cc/static/evoting/files/krimmer_schuster_wp_01_2008-pdf.pdf.

[104] Werner Seitz, Elemente der politischen Kultur der Schweiz. Eine Annäherung, in: Roger Blum, Peter Meier, Nicole Gysin, (Eds.), Wes Land ich bin, des Lied ich sing? Medien und politische Kultur, Berner Texte zur Kommunikations- und Medienwissenschaft, Band 10, Haupt Verlag, Bern 2006, pp. 51–64.

[105] Kurt Imhof & Patrik Ettinger, Die Kommunikationsereignisse Wahlen und Abstimmungen als Indikatoren sozialen Wandels: Das Beispiel der Schweiz im Zeitraum von 1910 bis 1995, in: Hans Bohrmann et al. (Eds.), Wahlen und Politikvermittlung durch Massenmedien, Wiesbaden, 2000, pp. 251-272, 255.

[106] Niklas Luhmann, Vertrauen, 4th Ed., Stuttgart, 2000, pp. 64-66.

[107] On the other hand, this might also be traced back to an attitude of mistrust in politics in general, which then would cause people to resign from political efforts.

[108] See Federal Council, Bericht über die Pilotprojekte zum Vote électronique vom 31. Mai 2006, BBl 2006 5459, p. 5528.

[109] Internet Usage in Europe, http://www.Internetworldstats.com/stats4.htm.

[110] Geert Hofstede, Culture's Consequences: International Differences in Work-Related Values, Beverly Hills, 1980.

[111] Detmar Straub, Mark Keil, & Walter Brenner, Testing the Technology Acceptance Model Across Cultures: A Three Country Study, in: Information & Management, Vol 33. (1997), pp 1-11.

[112] http://www.geert-hofstede.com/hofstede_switzerland.shtml.

[113] Straub et al., op. cit., pp. 3-4 consider Hofstede's cultural dimensions along with information richness and social presence theories for the use of e-mail and other ICTs in business.

[114] http://www.geert-hofstede.com/hofstede_united_states.shtml..

[115] Claude Bonard, Chances et défis du vote par Internet, in: Journées 2002 d'informatique juridique Berne, 2003, 29 - 57, p. 31.

[116] Ibid.

[117] See their euphoric press release from Sept. 21, 2004 on the first electronic vote in a federal poll, Press Release, Geneva State Chancellery, Geneva leads the development of tomorrow's voting system (Sept. 21, 2004), available at http://www.geneve.ch/evoting/english/communiques_20040921.asp.

[118] Geser, however, also speculates that this tradition of public spheres might be a reason why political discourse is not very strong online, op. cit., p. 2.

[119] See an analysis of a vote conducted on November 27, 2005, Federal Chancellery, Briefliche Stimmabgabe - Analyse der eidg. Volksabstimmung vom 27. November 2005, http://www.bk.admin.ch/aktuell/media/03238/index.html?lang=de&msg-id=4470.

[120] Geser, op. cit., p. 6.

[121] Andreas Auer & Alexander H. Trechsel, Voter par Internet?, Basel 2001, pp. 63 - 66.

[122] Geser, op. cit., p. 6.