From Initial Idea to Piecemeal Implementation: Switzerland's First Decade of Internet Voting Reviewed

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Switzerland's first decade of Internet voting reviewed

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Abstract

The formal genesis of e-voting in Switzerland can be traced back to a series of motions deposited by parliamentarians in 2000. At the time the Swiss were not alone in trying to roll out e-voting programmes in the early 2000s. Indeed, a large number of European countries were pursuing similar e-voting policy agendas. A decade later very few countries can be said to have implemented e-voting. One of these, Estonia, has fully generalised e-voting as a mode of participation for a range of electoral contests. While much has been written about the Estonian case, less is known about the Helvetic route to implementing e-voting. In this paper we analyse the piecemeal approach to implementing e-voting in the Swiss case. The fact that the Helvetic route to implementing e-voting involved three competing systems offers a comparative anchor for examining the sustainability of each system. It is in this sense that Switzerland offers a useful political laboratory for analysing the problems of modernising elections in the digital era and provides insights that may be generalisable to other cases.

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Introduction

The formal genesis of e-voting in Switzerland can be traced back to a series of motions deposited by parliamentarians in 2000. At the time the Swiss were not alone in trying to roll out e-voting programmes in the early 2000s. Indeed, a large number of European countries were pursuing similar e-voting policy agendas. A decade later only two European countries can be said to have implemented e-voting. One of these, Estonia, has fully generalised e-voting as a mode of participation for a range of electoral contests. While much has been written about the Estonian case, less is known about the Helvetic route to implementing Internet voting. In this paper we analyse the piecemeal approach to implementing Internet voting in the Swiss case. The fact that the Helvetic route to implementing e-voting involved three competing systems offers a comparative anchor for examining the sustainability of each system. It is in this sense that Switzerland offers a useful political laboratory for analysing the problems of modernising elections in the digital era and provides insights that may be generalisable to other cases.

This paper is divided into three parts: The first provides the comparative setting in which the Swiss Internet voting agenda was launched in the 2000s. In the next section we focus on the process of introducing e-voting and some of the problems that have been encountered by public officials in a polity where elections are very decentralised affairs. The third part is more quantitative and focuses on the political behaviour aspects of introducing new voting channels - especially on rates of participation. Based on the evidence provided, the discussion in the concluding section focuses on the sustainability of e-voting in the Swiss context and identifies some potentially generalisable insights from the Swiss case as other countries implement programmes of electoral modernisation.

The Comparative Setting

During the late 1990s and early 2000s a host of European countries outlined plans to introduce e-voting. Indeed, a paper in 2003 listed 13 Western European countries experimenting with e-voting (Svensson and Leenes 2003). Most of these programmes were initiated in the early 2000s yet well over a decade later only a handful of countries can be said to be at an advanced stage of rolling out e-voting as a generalised mode of participation (Mendez 2010). Some of the most notable backtracking in terms of initially pioneering experimentation with e-voting that was subsequently shelved include the UK, the country to have been the first to launch binding e-voting in 2002 and 2003 on a relatively extended scale on the local level, and The Netherlands, the first country to have provided e-voting to some of its citizens abroad for the European Parliamentary election of 2004. In both countries, which appeared at the forefront of e-voting in the early 2000s, a number of political problems effectively put an end to their e-voting programmes. Two other countries that had

relatively advanced e-voting programmes during the early 2000s were Switzerland and Estonia. Whereas Switzerland, as argued in this paper, has adopted a piecemeal approach to e-voting Estonia has fully implemented e-voting as a generalised mode of participation. Critically, it has done this at the national level when in 2007 Estonia was the first country to offer e-voting for the more salient national elections to the entire electorate. In addition, the Estonians were also the first to offer e-voting to an entire national electorate for the 2009 European Parliament elections. The comparative insights from Estonia in terms of political dynamics are perhaps somewhat more limited for this paper given the country's very small scale and the fact that it is a unitary state. Instead our focus is on introducing e-voting in very decentralised political settings.

From the perspective of introducing e-voting in a more decentralised setting with special attention to the local setting developments in two other countries, Norway and Canada, in the latter part of the 2000s are more relevant than some of the failed cases from the early 2000s. In the case of Norway, after a thorough planning phase by public administration and experts including study trips abroad remote voting via the Internet was introduced for ten trial municipalities in 2011 on the occasion of local elections (Norway Report 2006). Besides an unsuccessful parliamentary motion in November 2010 to stop the trials no further public debate seemed to have taken place (Pammett/Goodman 2013: 23). In September 2011 more than 167.000 people had the option to vote via the Internet (Bock Segaard et al. 2013). 26.4% of votes in the local elections in these municipalities were cast via this new channel, with a range of Internet voting turnout in the ten trial municipalities from 19.8% to 31.6%. Voters were able to cast an unlimited number of votes via the internet; only the last one would count. Voters could also vote by post prior to or in person on election day. A paper ballot would always be counted instead of an e-ballot if both had been cast. As an innovation compared to other systems, when e-voting, a voter would get a confirmation SMS indicating a code corresponding to the party for which he/she had voted. These codes were unique to each voter. The e-ballot confirmation code via SMS was generated without the authorities knowing the content of the vote. Other countries (France, UK, and Australia) only gave voters a confirmation code that the vote had been recorded, not who they had voted for. It was mandatory to register a cell phone number to which the return code would be sent. However, one should be aware that the electronic registration process including the registration of the cell number and passwords is not directly connected to the internet voting project, but to public service in general (tax, welfare services etc.). Further, a mechanism was included to ensure that the votes had been correctly dealt with by the system, providing a mathematical proof of correct counting (Bock et al. 2012: 37-38).[1]

[1] For a more operational and technical account of the Norwegian Internet voting trials see: Gebhardt Stenerud and Bull (2012).

The increase in accessibility by the electronic voting channel did not lead to an increase in voter turnout. Neither did the conducted surveys show evidence that different groups voted more because of the option of Internet voting (Bock et al. 2012: 54). Furthermore, there is no evidence that Internet voting appealed more to young voters; the use of e-voting was roughly constant in the 16-60 age groups and falls thereafter (Bock et al. 2012: 55). After the first successful pilot in September 2011, an extension of local e-voting trials had taken place on the occasion of the September 2013 parliamentary elections, adding two extra municipalities to the list of the original ten.

Due to the remoteness of many municipalities in Norway, a generally very high internet penetration, high confidence in government, and e-government applications with identification technologies already in place the conditions to introduce remote voting via the internet can be considered as almost ideal. Norway as a relative latecomer also has the technical advantage of being able to set up a verifiable e-voting system. Except for a brief debate in parliament not much public criticism has come to the fore. Among political parties the Conservative Party on the national level opposes internet voting whereas the local chapters are even in favor (Pammett/Goodman 2013: 39). As a general pattern, the implementation process is largely driven by the relevant unit of the national public administration and experts in the field. The participating municipalities are all relatively small and volunteered to participate in the trials (Pammett/Goodman 2013: 25).

Whereas in other English-speaking countries Internet voting was mostly abandoned (UK) or ephemeral even in trials (USA), practice in Canada seems to be growing. In 2006 the province of Ontario, for example, offered 20 municipalities this new voting channel and approximately 400.000 citizens were potentially allowed to use it. For the 2010 elections the figure of Ontario Internet voting towns and cities rose to 44 (Goodman 2010: 495-96). In Canada, the approach to Internet voting is as decentralised as in Switzerland and only implemented on the local level so far. Markham in the province of Ontario has been at the forefront of trials in Canada, trying to present and establish itself as a modern, technology oriented city. Surveys showed that in Markham, in the absence of generalised postal voting, the convenience factor seemed to be decisive. However, the two-step voting process including a registration would explain the relatively low percentage of the electorate opting for the electronic channel and going through the whole procedure. The respective registration rates for 2003 were 7.5% and for 2006 9.7% of all eligible voters, however, with roughly 17% the actual percentage of votes cast via the Internet can be considered as moderately high (Goodman 2010: 503, 505). Furthermore, research reports hint at higher overall turnout rates due to Internet voting (Pammett/Goodman 2013).

The hitherto largest Internet voting trials in Canada took place in Halifax, Nova Scotia, with an

electorate of approximately 310.000.[2] Just as in Markham and many other parts of the world, the desire to increase turnout and to reach younger cohorts for local elections were among the driving forces leading to Internet voting trials. Because of concerns regarding accessibility there was also a telephone voting option available. In contrast to Markham, the online voting period was extended beyond the advance polling phase. No pre-registration was necessary (Goodman 2010: 505). As a further peculiarity of the Halifax Internet voting solution, just as in Markham implemented by a private company, the elector also had the option of actively spoiling the vote, an option which is a perfectly legal way of voting in several countries but oftentimes not available in electronic voting systems (Goodman 2010: 508). In the 2008 trial only 10 percent of all cast votes came in via the electronic channel. However, the option was only available during four days. With the extension of the Internet voting period to sixteen days for the 2012 elections turnout rose to 22 percent (Pammett/Goodman 2013: 28). However, no overall effect on turnout could be detected. Interestingly, in 2012 Halifax had to face a request for a judicial recount of the election results because of a district seat that was won with only six votes difference. Thanks to the recount procedures laid out already in a 2008 by-law there was no uncertainty about how to administer this task with Internet voting in place. Whereas the recount brought a mistake in one of the polling stations to the fore (result was submitted twice), no irregularities were detected for the votes cast via the Internet (Pammett/Goodman 2013: 28).

The Swiss Experience of Implementing E-voting

Switzerland is characterised by two distinctive political institutions that have affected experimentation with e-voting. First, its extremely decentralised system of *federalism* and, second, a special tradition of *direct democracy* in which citizens are called to vote very frequently, in the region 3-4 times a year on federal, cantonal and communal issues (Linder 2010, Kriesi/Trechsel 2008; Serdült 2014). The interaction of these two formal institutions played an important role in shaping the approach to e-voting (Geser 2004). With regard to federalism, the division of competencies between distinct territorial units - there are three tiers of government, federal, cantonal and municipal each with significant competencies (Serdült/Schenkel 2006) - has ensured that elections and referendums are a decentralised affair that poses significant constraints on the ability of central government to step in and offer Internet voting solutions. First, although there is an overarching umbrella legislation on the national level to guarantee political rights, the cantons are within certain boundaries in charge of legislating, implementing and administering elections as well

[2] Further Internet voting experiences in Nova Scotia included (see Pammett/Goodman 2013 for more detail): Cape Breton Regional Municipality (83.000 electors, started 2012), Truro (10.000 electors, 2012) with the peculiarity that only electronic voting via the telephone or the Internet were available. Turnout in Truro increased from 19 to 47 percent between the 2008 and 2012 elections.

as referendum votes (Driza-Maurer 2013). They are free to chose whether or not to implement Internet voting. Second, a crucial element for the administrative and technical implementation of Internet voting solutions are the voter registries. Depending on the canton they are harmonised across all municipalities or organised in a decentralised way on the level of the commune. Because of Switzerland's strong tradition of direct democracy and the fact that a referendum vote involves only a binary yes/no vote (which is easier to implement than an e-election[3]), experimentation was first started with the much more frequent referendum votes and not elections (Auer and Trechsel 2001).

So far we can identify three phases of Internet voting implementation in Switzerland: 1) an initial phase (2000-2007) with the setup of three distinct pilot systems and some trial and error corrections in the process, 2) the current phase (2008-2015) in which Swiss Internet voting is extended to the Swiss living abroad and enhanced to handle elections, and possibly 3) a third phase (2015-), with the announcement of second generation verifiable Internet voting systems and the generalisation of Internet voting in most if not all cantons, first for the Swiss abroad and then also for Swiss residents.

1) Initiation

After a number of Swiss parliamentarians deposited motions on Switzerland's progress on matters related to e-government and e-voting, the Federal government's administration initiated a study on the feasibility of e-voting.[4] In its 2002 study the Federal Council (the executive power) also mentioned Switzerland as a potential pioneer in the use of ICT for all forms of participation, not just elections and referendums but also for signature gathering to launch citizens' initiatives (a core component of the Swiss model of direct democracy). The e-voting project was led by the Federal Chancellery's Political Rights Division, a unit which is functionally similar to national Electoral Commissions. Since the organisation of elections is a cantonal (and in some cases a communal) competence, central government can only establishes certain basic procedural guidelines for federal elections. Under such conditions, the role played by federal agencies would, at best, be limited to facilitating e-voting experimentation rather than implementing it. This is indeed what happened when, in response to a questionnaire sent out by the Federal agency, three cantons took up the e-voting challenge and initiated preparations for conducting trials. The federal level provided financing of up to 80 per cent of the additional cost of organising e-voting trials for national

[3] Switzerland uses a complex and relatively uncommon voting system allowing to strike candidates from a party list, to double candidates or to mix them from several lists (panachage).

[4] See the Rapporto sul voto elettronico: le opportunità, i rischi e la fattibilità dell'esercizio dei diritti politici per via elettronica del 9 gennaio 2002, avaialable at http://www.bk.admin.ch/themen/pore/evoting/00776/02029/index.html?lang=it&unterseite=yes

referendums in the three pioneer cantons. In effect, this means that Switzerland has developed three distinct e-voting systems, the Geneva, Zurich and Neuchâtel models. The only proviso stipulated by the federal government was that ownership of the e-voting solutions would remain the property of the cantons though they were obliged to make the system available to other cantons wishing to experiment with e-voting and not allowed to commercialise them.

Three years after the parliamentary initiatives were adopted the first e-voting trials took place in a small commune in the Canton of Geneva in 2003. Since then, numerous e-voting trials have been conducted in the three cantons for national (as well as cantonal and communal) referendums as well as a few elections providing a veritable learning experience in the domain of Internet voting. The canton of Zurich was the first one to experiment with Internet voting for elections.[5] At this point it would appear that the roll out of e-voting, having been the subject of numerous and successful trials, was on a secure path to becoming generalised, at least in those pioneer cantons. But this is not the case yet and, furthermore, neither was such a smooth trajectory envisaged for e-voting. It took around thirty years for another form of remote voting - namely postal voting - to become generalised, and even now it is still subject to some variation across cantons. The Federal Council is pursuing a similar 'open approach' with Internet voting as it did with postal voting in which for many years it was available in only half the cantons.

2) Step-by-step extensions

Federal financing for Internet voting has now been terminated given that the initial budget was limited to 5 years. But the problems with the roll out of e-voting have been more political than financial. In short, e-voting has not been universally welcomed and there were some significant political forces against e-voting. The arguments ranged from the risks involved in conducting e-voting trials, the cost implications, to arguments related to digital divide issues and claims that it devalues the symbolic act of voting. The cantons are of course free to implement e-voting for cantonal and/or communal elections. However, given the frequency of votes in Switzerland, in practice the cantons tend to 'bundle' federal and cantonal votes thus making it impractical to have a separate voting systems for each election. The operation of a very decentralised federalism has, in this way, structured the step by step implementation of e-voting in Switzerland. One of the earlier problems was that some politicians, especially those from the right-wing, conservative Swiss People's party, perceived themselves to be the most likely losers if e-voting were generalised. This led to a typical Swiss style negotiated compromise. In 2006 a 10% limit was set for e-voting which will be kept in place at least until 2015. For the time being, this means that no more than 10% of the electorate can be offered Internet voting for federal-level referendum votes or elections (which

[5] This was the case in the commune of Bülach during elections in March and October of 2006.

amounts to roughly 150.000 citizens).

In the 2011-2015 legislature the main focus of Swiss Internet voting implementation is directed at the Swiss living abroad. In particular those who have a postal vote at their disposal via a registration in the consulates, a feature that has been available since 1992 (Driza-Maurer et al. 2012). Before 1992 Swiss citizens had to travel back to Switzerland in order to cast their votes. The Organisation of the Swiss Abroad (OSA) has been lobbying since 2007 to extend Internet voting to their clientele - who would make up 9% of the electorate if they would all register. New federal rules have been put in place calling on the cantons to harmonise their voter registration systems in order to facilitate Internet voting.[6] Swiss citizens living abroad and registered as voters in the Cantons of Neuchâtel (since 1 June 2008) and Geneva were among the first having the option to vote electronically.[7] In Geneva for the referendum votes of September and November 2009, 32.8% and 34.8% respectively opted to use this channel (Serdült 2010). In other cantons with Internet voting for their Swiss abroad respective turnout rates for the electronic channel usually amount up to 50%. The federal government together with the cantons has adopted the strategic goal to have most of the cantons provide for the Swiss abroad to vote electronically by 2015, especially for the National elections taking place in that year. Currently a little more than half of the cantons are ready. The cantons providing this option were free to implement their own Internet voting solution. However, for obvious economic reasons their strategy has been to form consortia using copies of the already existing Geneva or Zurich e-voting systems.

It is important to note that insofar as federal votes are concerned a threshold applies also within cantons. Since April 2012 the cantons providing Internet voting are only allowed to offer this new channel to 30% of their electorate in relation to national votes (it used to be a 20% threshold, while Swiss abroad are not counted in).[8] With regard to purely cantonal or municipal votes however, the cantons are free to offer Internet voting to the whole electorate. This was for example the case in October 2012 when all municipalities in Geneva were allowed to vote electronically in a mandatory referendum on a total revision to the Geneva Constitution. With Internet voting turnout a bit lower than 20% in Geneva, this new voting channel has established itself as the second most popular one - it is still far behind postal voting but clearly ahead of traditional voting at the ballot box. As the Federal Chancellery stated in one of their 'Vote Electronique Newsletters' it is not a matter of whether Internet voting will establish itself as a voting channel anymore but when.

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[6] Loi fédérale du 23 mars 2007 sur la révision de la législation sur les droits politiques et de l'adaptation de l'ordonnance sur les droits politiques.

[7] See Driza-Maurer (), chapter 5.1, for an overview of trials.

[8] So that there are in fact two caps: the 10% one on the national level and a 30% one within each canton.

The three Internet voting systems

In the following section we present some of the peculiarities of the three systems of Internet voting currently in place during this second phase of implementation.

Geneva – dealing with political opposition

Geneva had the advantage of already having a centralised voter registry in place. The canton of Geneva is a city state where the municipalities are, comparatively speaking, less autonomous than in other cantons. This rather centralised system facilitated the introduction of Internet voting. A critical role was played by the former State Chancellor of Geneva, who can be considered as a *policy entrepreneur* that wanted to present Geneva as a modern, technology driven public administration. The Geneva Internet voting solution is completely hosted, operated and owned by the public administration. Voting is considered a state activity that should not be outsourced. As in Zurich but unlike Neuchâtel, Internet voting in Geneva is a separate application not embedded into an E-government platform. Geneva is also hosting the Internet voting for the Swiss abroad in several other cantons (Basel City, Lucerne, Bern). To a certain degree the two systems able to host other cantons' Internet voting – Geneva and Zurich – are competing to get other cantons on board. In the beginning, the Geneva Internet voting solution was limited towards handling binary referendum votes. The first election with Internet voting was performed in November 2012, almost ten years after the first trials.[9]

The main problems during the whole implementation phase in Geneva were not caused by any misuse or technical issues but rather by political opposition that led to a temporary halt of Internet voting (see also Figure 1 below). Opponents of Internet voting claimed that without a proper legal basis that channel should not be used. For the years 2006 and 2007 Internet voting in Geneva had to be stopped until legislation was ready. As soon as parliament had passed the relevant legislation Internet voting could resume in late 2008.[10] In a referendum vote of 8 February 2009 the voters of Geneva overwhelmingly accepted the introduction of Internet voting as an official channel into their Constitution with an approval rate of 70%. All municipalities were in favour.

Zurich – dealing with technical problems

The Zurich system started with trials in three municipalities 2004-2006 and then entered a pilot phase with thirteen municipalities. The Zurich pilot wanted to prove that Internet voting should also be feasible with decentralised voter registries as opposed to Geneva's centralised model of voter

[9] For more detail on the Geneva system see for example CEPP (2013). For a description of the respective Internet voting solutions and how they are operated see also Gerlach and Gasser (2009: 7-8).

[10] The respective vote in parliament resulted in 39 in favor, 28 against, and 9 abstaining.

registry. Crucially, from a canton wide perspective, this is actually the most prevalent system of voter registry across the Swiss cantons. With its 171 municipalities, the solution in the Zurich model of e-voting consisted in making the vote registries of the municipalities visible to the cantonal authorities. Essentially this created a virtual central system based on the sharing of data, while the municipalities remain in charge of keeping the records and of updating them. The Zurich system was able to handle election events from the beginning and is maintained by a private company. During the trial phase the canton also experimented with voting by text messages from cell phones (5% use) but later abandoned that channel in order to reduce complexity and cost (Beroggi et al. 2011).

In September 2010 the Swiss abroad registered in the city of Zurich were allowed to use Internet voting for the first time (52% use). Shortly thereafter, in December 2010 the canton stopped Internet voting because of technical problems and cost. The technical problems had to do with the fact that hardware had to be replaced, software licences started to run out and the interaction between the proper Internet voting solution with the vote and election management system could not be guaranteed anymore. Zurich also claimed that under the current restrictions (meaning that not all municipalities are allowed to use Internet voting) the system cannot be operated in a cost efficient way. Also, the initial expectations regarding uptake were not met. Turnout did not increase in general nor were the younger age groups particularly responsive to the new voting channel (Beroggi et al. 2011; Serdült/Trechsel 2006). The canton of Argovia then took over responsibility and is now managing the consortium of the Zurich system (with Argovia, Fribourg, Grisons, Schaffhausen, Solothurn, St. Gallen and Thurgau). Zurich lately announced that it will re-join the consortium in early 2014.

Neuchâtel – dealing with relatively low financial resources

The Neuchâtel system of Internet voting is peculiar since unlike the two others it is fully integrated into an E-government portal ('Guichet unique') where citizens can interact with government, for instance by filing their tax reports or ordering a car license plate. Without the initial subsidy of the Federal Chancellery the relatively small and economically weak canton of Neuchâtel could not have afforded to integrate Internet voting into its E-government portal. The Neuchâtel E-government portal works with a staff of six people. The advantage of it is that all municipalities can use Internet voting at once, the disadvantage being the relatively high hurdle to activate it. A potential user has to sign up for it in person at an office of the commune. The encryption part of the Internet voting solution is outsourced to a private company. Apart from some administrative reorganisations of voting procedures in the municipalities in 2003, Internet voting did not lead to any major changes in the way voter registries are handled. The integration of Internet voting into the E-government portal

also seems to be an advantage when it comes to budgetary debates in parliament. To question Internet voting for financial reasons would put the whole E-government portal of the canton into question, especially since there is no separate budget for Internet voting. For the time being in Neuchâtel no major political problems are visible or can be reported.[11] Furthermore, the Neuchâtel system has been tested for elections the first time on the occasion of the Spring 2013 cantonal elections, which was an important step to get the system ready for the 2015 national elections. More generally, as we can see in Figure 1, Internet voting turnout is relatively low but tends to grow organically. Turnout among E-government portal users fluctuates between 30-40%. In the end, it might be the most sustainable version of all three but for now it is still too early to tell.

Current political ramifications

The Swiss Internet voting trials had to face political opposition from various sides during the last ten years, from the Pirate Party, the Greens, the Social Democrats, and representatives of the Swiss Peoples Party. On the other hand, a petition signed by 15'000 citizens asked to broaden the scope of Internet voting and to extend the pilots, respectively to generalise Internet voting for all.[12] Most recently, in a conference presentation[13] it was demonstrated how on a reengineered demo version of the Geneva system, under the condition that the voter decides otherwise and wants to go a step back in order to change the vote during a running session, a yes vote could be turned into a no vote and vice versa. Although parts of the press presented it that way, the actual Geneva system had not been hacked. Nonetheless, the conference presentation had an immediate mobilising effect on a number of parliamentarians from all the major political parties, which are now planning to hand in parliamentary motions to stop or restrain Internet voting. Representatives of the Social Democrats, the Green Liberals and the Swiss Peoples Party handed in two motions, one asking not to increase the allowed share of the electorate to use Internet voting (the 10% cap), the second asking not to allow Internet voting systems of the first generation to be used anymore because they are less safe. As an exception those systems would be allowed for an intermediate time for the Swiss abroad only. For all systems the source code must be published. It is of course too early to tell whether these most recent political ramifications are going to hamper Internet voting or not.

Impact of Internet voting

The introduction of Internet voting in Switzerland is characterised by a piecemeal implementation and diffusion process very typical for its federal political system. Although Internet voting is only

[11] Interview with three senior public officials of the Canton Neuchâtel, 20 June 2011.

[12] See the various informative Newsletters on Internet voting issued by the Federal Chancellery, http://www.bk.admin.ch/themen/pore/evoting/06636/index.html?lang=de .

[13] See: www.youtube.com/watch?v=Q2VkE3Iz1vQ (accessed 05/09/2013).

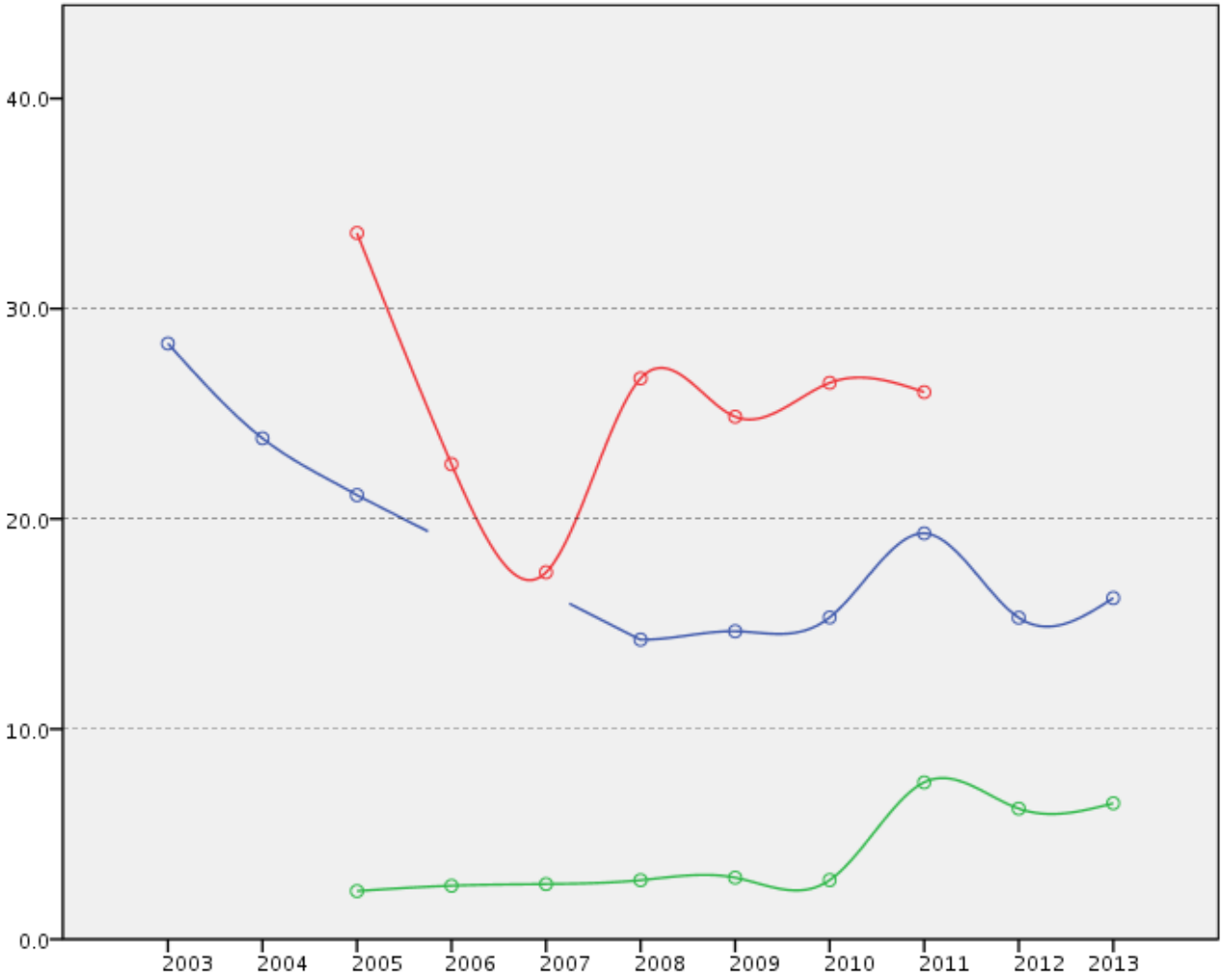
available in a selection of municipalities in three cantons (as well as slightly more than half of all cantons that offer it for the Swiss abroad) and is officially still in a pilot phase, it has nevertheless been available for nearly a decade on a more or less permanent basis. To date more than 2'000 e-voting events in municipal constituencies have been conducted. The high number of e-voting events is of course again related to the frequent use of referendum votes in Switzerland in general. Such votes are held on all three state levels up to three or four times a year. In Figure 1 we present an overview of the Internet voting experience for Swiss resident voters in the three pilot cantons to date. Internet voting turnout data was collected from official sources on the municipal level per canton and was then averaged for the year. The Internet voting turnout figures over time mirror the decentralised, technically varied setup in each of the three pilot cantons as well as some generally interesting traits.[14]

First, the well known *novelty effect* can be observed for the Geneva and Zurich systems. Users are keen to test the new voting channel once or twice before they revert back to their common voting channels - either voting by post or at the ballot box. In the case of Zurich average Internet voting turnout fell from above 30% to below 20%, only to move around a more stable level around 25% between 2008 and 2011. Zurich enters a more stable phase in the year 2008 when more municipalities were allowed to join the Internet voting pilots. From 2005 to 2007 only the three municipalities Bülach, Bertschikon and Schlieren were part of the trials. However, just when entering a more stable phase Zurich opted to pause the trials due to technical problems at the end of 2011. In Geneva, the effect was just as dramatic with the level falling from nearly 30% to slightly under 20% during this initial phase. In Neuchâtel with its altogether different system where voters have to sign up for using the e-voting channel in person at the office of the municipality *no such novelty effect* is observable. Citizens do not seem to rush registering for the e-government portal of the canton only in order to activate the e-voting channel. Since e-voting is only one e-government application out of many its use seems to grow slowly but steadily with the total number of registered users of the e-government platform in general. The upward spike between 2010 and 2011 is related to the introduction of electronic tax filing capability of the e-government portal which in turn boosted e-voting turnout as a side effect. Also detectable for Neuchâtel and Geneva is a slight upward spike in the year 2011. Besides the introduction of enhanced e-government capability in Neuchâtel this increase can be explained by the fact that both did some promotion activities in the municipalities, informing the electorate about the new voting channel. These activities appear to

[14] In order to have a comparable data set we left out turnout rates of the Swiss abroad. In detail, the electorate across the three pilot cantons still varies (eg. foreigners are allowed to vote on cantonal and municipal matters in Neuchâtel and on municipal matters in Geneva whereas this is not possible in Zurich). However, these differences do not have a big effect on the patterns we find based on the highly aggregated, annual turnout figures we are presenting here.

have generated another small novelty effect, i.e. initially drawing in new e-voters that after testing seem to have dropped out.

Figure 1: Average annual e-voting turnout in municipalities of the three pilot cantons of Geneva, Neuchâtel and Zurich (without the Swiss abroad)



blue = Geneva; red = Zurich; green = Neuchâtel

Source: edc E-voting database based on cantonal offices of statistics and state chancelleries

The example of Geneva shows another effect which has to do with the *continuity* or rather discontinuity of offering Internet voting. In Geneva Internet voting was available off and on in some municipalities because they were rotating the ones allowed to use this new channel from time to time. For the individual Internet voter this is rather unpleasant and does not help to create a stable electorate for this particular channel. However, more devastating to Internet voting turnout in Geneva was the two year stop in 2006 and 2007. Many Internet voters seemed to have lost confidence and reverted back to postal voting. This suggests that practice, i.e allowing voters to get familiarised with the system, seems to be crucial for an Internet voting system to operate on a stable basis.

Discussion and Conclusions

From a global perspective, the e-voting policy agenda is very much in its early stages of diffusion. What remains clear, however, is that despite the enthusiasm of the early 2000s very few countries have been able to generalise e-voting. This is somewhat paradoxical given the ubiquity of the internet in all matters of social and political life. To date, it seems that only Estonia has been able to generalise e-voting as a permanent mode of political participation to the entire electorate for a range of elections, including those that are typically the most salient - the national elections. The problems in most countries have been mostly political rather than specifically technical - though as we have seen technical issues can become politicised. This has occurred in some of the early e-voting pioneer countries and could even potentially occur in Switzerland if the current mobilisation of parliamentarians against e-voting is successful. Our view it is unlikely that the current e-voting programme will be terminated, though the latest events could pose a significant constraint on the further extension across the cantons of offering e-voting for Swiss nationals residing in the country (as opposed to nationals voting from abroad).

Our main aim in this paper was to draw on the Swiss case as an example illustrating some of the difficulties involved in upgrading elections in a multi-tiered polity where elections are extremely decentralised affairs. Its example could therefore be pertinent to other federal or decentralised systems, more so perhaps than the more celebrated Estonian case. The latter is likely to be more relevant to a unitary and more centralised state settings. In the Swiss case there were manifold interactions between levels of government, federal-cantonal initially and then cantonal-municipal during the implementation stages. Furthermore, there are increasing horizontal interactions among the cantons as they develop e-voting platforms, with a number of consortia emerging. This is precisely what one would expect in a decentralised federal context that is ideally suited, and frequently operates, as a political laboratory for policy ideas. To this end, the Swiss political laboratory for experimenting with e-voting has been predicated on the development of three competing e-voting systems, those of Geneva, Neuchâtel and Zurich. There are notable differences between the three models and their uptake has varied across the cantons. We have shown that e-voting could be prone to novelty effects as well as the detrimental impact of interrupting e-voting once it has been launched, as has been the case for Geneva and Zurich. The latter have been caused by difficulties that are eminently political in nature. What emerges from this overview is that, despite its slower uptake the Neuchâtel model may prove to be the more sustainable of the three. As other countries further develop and modify their e-voting agendas there is a lot to learn in terms of the success and failures in the roll out of e-voting across different political systems. This will ensure that a comparative policy approach, especially combining qualitative case studies with quantitative data where available, will have a continued relevance for analysing further developments.

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