

International Standards and ICT Projects in Public Administration: Introducing Electronic Voting in Norway, Estonia and Switzerland Compared

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Abstract

This research focuses on the interrelationship between international standards and e-voting projects. With the rise of e-government activities, a multitude of new international standards is discussed or adopted in conjunction with such innovative reform steps. In order to gain a perception which role international standards dealing with legal, organizational and technical aspects play in national contexts and whether they are actually implemented, this essay specifically examines standards used in e-voting projects, as this area can be clearly distinguished from other e-government projects. Case studies in Estonia, Norway, and Switzerland show that there is a general interest in international sources and that real international standards are considered to be more important and "binding" than private organizations' standards or other documents. In all three countries, the Council of Europe Recommendation on e-voting, the only real international standard in this field, played a role in the respective e-voting projects, but did not coin all phases. Once the international standards were endorsed as national regulations, they only played a minor role for the continuation of the projects. However, they are used for orientation and evaluation purposes.

Keywords: *International standards, electronic voting, e-voting, Norway, Switzerland, Estonia, case study*

1. Introduction

Aim of the paper

Pioneering e-government (von Lucke and Reiner mann 2000) projects face multifaceted challenges. They often depend on interdisciplinary approaches, are politically delicate, contain a high potential for conflicts, and must deal with heterogeneous groups of stakeholders. A multitude of international standards are now being adopted in conjunction with such innovative e-government projects. These are directly or indirectly targeted at addressing one or more aspects of the challenges confronting these projects.

But how are such international standards actually implemented within public administrations? Are national Public Administrations aware of the existence of these standards? Do they actually help support public administrations with their work or are they perceived to be an additional constraint?

In order to gain a perception of how international standards are being implemented in national contexts, we examined international standards and their implementation in delimited fields. We chose to look into the topic of international standards used for e-voting, since e-voting is a project that can be clearly distinguished from other e-government projects (International IDEA 2011, 6). At the same time, e-voting is a very ambitious topic, bearing challenges and risks that are relevant in different countries. Hypotheses have been developed for further research on the interrelationship between international standards and innovative e-government projects based on three e-voting case studies.

The assumption is – alongside national principles – that international standards dealing with legal, organizational and/or technical aspects play a certain role in all phases of e-voting projects. Since these are confronted by various new challenges, national public administrations are likely to examine all the existing e-voting standards in order to obtain ideas of how to tackle their own challenges. Moreover, adherence to international standards may contribute towards establishing confidence in new technological solutions and the acceptance of innovations by various stakeholders. At the same time, we estimate that public administrations tackling e-voting projects have a considerable interest in bringing their experience to bear in the work of the international organizations which set the standards. Cooperation when defining international standards is an effective way of ensuring that a country's national e-voting solution is in conformance with and complies with the international standard.

The focus of this research is the interrelationship between international standards and e-voting projects. We consider whether the alleged effects actually exist. In this paper we will not look into the specific content of international e-voting standards, but will rather focus on the process of implementing the standards in a national context.

Structure of the paper

The paper is divided into two parts: in the first part (Chapter 2) we present the results of the three case studies, the second part (Chapter 3) contains preliminary conclusions and hypotheses with regard to developing a general research concept on the interrelationship between international standards and innovative e-government projects.

International e-voting standards

For the purposes of this paper, international standards are defined as voluntary regulations that are adopted by an international organization (defined as a form of intergovernmental cooperation established between states). International standards play an important role in the field of elections in general. They are generally accepted as qualitative criteria for running and assessing elections. The former Council of Europe Recommendation Rec(2004)11 (Council of Europe 2004) and the new Recommendation Rec(2017)5 (Council of Europe 2017b) revising Rec(2004)11 are the only international legal documents specifying more detailed requirements for using electronic technologies in elections (OSCE/ODIHR 2012a; The Carter Center, 2012). Rec(2004)11 was still in force during the case studies. Besides, the Directorate General of Democracy and Political Affairs of the Council of Europe published two guidelines in 2010 that took account of developments subsequent to the adoption of Rec(2004)11 (Council of Europe 2010a, 2010b). Since an organ of the Council of Europe did not formally adopt the two guidelines, these did not fall under the category of international standards in the strictest sense. However, we still refer to them in this paper, since they were mentioned during the case studies.

A distinction must be made between international standards and standards from private organizations, with an international focus (e.g. ISO standards). Since the three case studies revealed that international standards as well as standards from private organizations can play a role, the latter will also be included in this paper. They will be referred to as "private organizations' standards".

Excursus: Update Revising Rec(2004)11

According to paragraph V. of Rec(2004)11, a review was needed after two years "in order to provide the Council of Europe with a basis for possible further action on e-voting". After the first review in 2006, the experts convened then decided to continue with reviews every two years (Stein and Wenda 2014, 1-6). With the passage of time and more review meetings to follow, it became obvious that updating Rec(2004)11 would be necessary. Academic discussions and research on new technological solutions as well as new social attitudes, practical experiences, and court decisions in a number of countries led the fourth review meeting in Lochau near Bregenz, in Austria, to conclude on 11 July 2012 that the Recommendation was still appropriate, but that in light of recent practical experiences, and despite the additional guidelines of 2010, a number of issues could no longer be dealt with. As a consequence, the representatives of the Member States "agreed to recommend that the 2004 Committee of Ministers' Recommendation ... should be formally updated." Based

on a report "on the possible updating of the Council of Europe Recommendation Rec(2004)11 on legal, operational and technical standards for e-voting", commissioned by the Council of Europe in 2013, several countries demanded updating Rec(2004)11 by "taking the issues listed in this report into account and the high probability that in the medium to long term, a number of electoral systems will comprise some electronic features." The Ministers' Deputies/Rapporteur Group on Democracy (GR-DEM) agreed that experts from the competent Election Management Bodies in different Member States should lead the updating process. Similar to the Ad Hoc Group of 2002-2004, work on Rec(2004)11 was not deferred to another existing committee or group but was put in the hands of the very experts in electoral matters. An "Ad-hoc Committee of Experts" was created, to be placed directly under the Committee of Ministers and whose Terms of Reference were approved on 1 April 2015. The objective of the new "Ad Hoc Committee of Experts on Legal, Operational And Technical Standards for E-voting" (CAHVE) was to finalize a "draft Recommendation updating Recommendation Rec(2004)11 of the Committee of Ministers to Member States on legal, operational and technical standards for e-voting" as well as the "explanatory memorandum to the updated Recommendation". Members were "representatives of highest possible rank from electoral management bodies with direct experience or specialised knowledge on e-voting" (nominated by the Member States). Each state had one voting right.

The first meeting of CAHVE took place on 28 to 29 October 2015 in Strasbourg. Approximately 50 participants from 25 countries, organizations, institutions, and academia were present. The Lead Expert presented the results of the questionnaire, and the Committee reached its initial decisions: The definition of e-voting should be extended to include all kinds of optical scanners. Provision with a much broader scope should be introduced to remind EMBs of their special responsibilities in e-enabled elections, taking into account specific features of electoral administration in each member state. Awareness of the challenges accompanying the introduction of e-voting should be stressed more strongly; accordingly, the updated recommendation should set out the difficulties that could be encountered when introducing e-voting. A new multi-layered structure was decided upon with regard to the actual update: The main aspects of e-voting, mostly of a legal, statutory and more "timeless" nature, should be put into a "core layer" and constitute the actual Recommendation. Complementary layers could be updated more frequently and could include guidelines, regional issues, and best practices. The Committee also considered that the revised, updated recommendation should formalize a review mechanism comparable to previous biannual review meetings. Within the context of this mechanism, complementary layers could be revised and updated more easily. The review mechanism should be based on the experience acquired by Member States in the field of e-voting and on the examples of best practice identified in previous review meetings. Pursuant to the CAHVE meeting, the Secretariat commenced the second phase of updating and revision work. In the summer of 2016, the draft document was eventually deposited onto a newly created online platform where CAHVE's participants are granted access to review proposals and contribute to the text of the final version. Another plenary meeting was held on 3 and 4 November 2016 in Strasbourg to finalize the documents. The Recommendation, an explanatory memorandum, and guidelines were finalized towards the end of 2016 and were officially endorsed by the Committee of Ministers of the Council of Europe on 14 June 2017. With the new Rec(2017)5 coming into effect, Rec(2004)11 and the old guidelines were no longer effective (Driza Maurer 2017).

Designing the case study

Various countries are conducting experiments with or are already using different forms of e-voting, but there are still only a few international standards, except of course the first attempt at a real European standard with the Council of Europe Recommendations Rec(2004)11 as well as Rec(2017)5 and its guidelines on implementing the Recommendation (Council of Europe 2017a, 2017b). Selecting countries for this study was based on theoretical sampling in order to find the best combination of both countries and cases. The three countries selected, Norway, Estonia, and Switzerland, each represent a rather different approach towards e-voting. They also conduct e-voting motivated by different factors, and their projects examine very different futures. In Switzerland, the initial motivation to conduct e-voting tests was the wish to provide voters with the means of voting that they use in their daily life, especially since Swiss voters can cast their vote in referendums at least four times a year. Furthermore, the

Swiss government wanted to facilitate voting for physically handicapped persons and for Swiss citizens abroad (Swiss Federal Council 2002).

In Estonia, the introduction of e-voting was part of a bigger e-governance strategy. Estonia, after its independence, was dedicated to using the benefits of the new technologies. The private sector and the political system work in the same direction, as it was continuously assumed that the positive economic development after 1989 was closely related to the development of the information technologies (Feldmann 2013).

In Norway, the Parliament approved the use of Internet voting in 2008, and trials were carried out in a small number of municipalities in both 2011 and 2013. The main goals were to provide better accessibility to voters, to ensure rapid implementation of elections and the efficient use of resources in municipalities, as well as to facilitate direct democracy (Barrat i Esteve and Goldsmith 2012a). Increasing the turnout was no objective for the trials in 2011 and 2013, but it played a significant role in re-introducing e-voting solutions in local referendums (no elections) in 2016 and 2018 (Bull et al. 2018).

The cases have thus been selected in order to allow a thorough insight and not just for a simple affirmation of the theoretical approach behind the paper. The objective of such sampling is to generate an elaborate data sample from the study, a sample that allows us to observe contrasts between countries and not merely unrealistically homogeneous results. This permits us to compare data via triangulation. The overall results of the study therefore become more reliable.

We chose these three member states of the Council of Europe for the case study, since the Council of Europe Recommendation is still the only international standard in the field of e-voting. One objective is to see how the three members deal with the international standard and what influences are derived from its introduction. Estonia and Switzerland were two of the few countries that started their e-voting projects before the Council of Europe Recommendation was adopted. Norway began developing e-voting some years later. In all three countries, e-voting encompasses the use of the Internet to transmit the vote to the polling station (also referred to as "remote e-voting" or "Internet voting").

This case study is hence an explanatory and comparative one. The objective of the cases is to show how international standards and international comparisons can impact the development of an e-voting project. A second and implicit concept is the idea that the cases can indicate in which direction the standards steer the projects (Yin 2013). The three cases were selected in order to provide the best information possible. The data was generated by different means. A study of the literature and legal fundamentals provided the basis for this paper, but the more profound results that distinguish this study from most other studies were derived from semi-structured interviews and from several background documents, such as election monitors' documentation from the OSCE/ODIHR. The three countries demonstrate three different approaches to the introductory process for e-voting systems, at three different times and exemplified the challenges with their introductions at different times and with different perspectives.

In order to gain relevant information, a semi-structured questionnaire was sent to the Section of Political Rights at the Federal Chancellery (the Swiss Electoral Management Body), the Election and Local Democracy Unit of the Ministry of Local Government and Modernisation (the Norwegian Electoral Management Body) and the Estonian National Electoral Committee (Estonia's Electoral Management Body). They all returned completed questionnaires. The case studies are mainly based on their responses and are complemented by the analysis of additional resources.

2. Case studies

2.1 International standards & e-voting in Switzerland

Background

Swiss work on e-voting began in the year 2000 with the launch of the project "vote électronique". It commenced with a joint effort on a national as well as on a cantonal level. Three cantons developed their own e-voting-systems. They were closely accompanied by the Federal Chancellery to ensure that the cantonal systems could be used on the national as well as on cantonal and local levels and for coordinating the various efforts in the field of e-voting (Federal Chancellery 2018d). A permanent working group with cantonal and federal representatives also followed the work from the very beginning. In 2011 a steering committee was additionally established. It comprises decision-makers from cantons with e-voting systems as well as representatives from the federal administration and is headed by the Federal Chancellor. Its tasks include evaluating the results of the project and consolidating strategic proposals for the project made by the Federal Chancellery before they are presented to the Federal Council and Parliament (Federal Chancellery 2018c). All in all, the project is developed and carried out with a strong focus on coordination and cooperation between the various federal levels (Driza Maurer 2016).

The project "vote électronique" has been developed carefully and steadily since the year 2000: Over 300 e-voting trials have been carried out on a federal level. In addition, numerous trials have been realized at cantonal and communal levels. Besides the three initial cantons (Geneva, Neuchâtel and Zurich), several other cantons joined the e-voting project to make e-voting available for their citizens living abroad (Federal Chancellery 2018b). All in all a total of 15 cantons have allowed certain groups of citizens to vote online (Federal Chancellery 2018). In 2017 for example, up to 67 per cent of the population living abroad voted electronically (egovernment Switzerland 2018). The tests concentrated on using e-voting in referendums and, later, also in parliamentary elections. Further steps, including an electronic signature for popular initiatives, requests for referendums, and proposing candidates for parliamentary elections are still pending. However, the Swiss e-voting project also experienced some setbacks (Serdült et al. 2015). The following events can be mentioned as particularly drastic: the decision of the canton of Zurich in 2011 not to pursue its e-voting project for the time being – however, the canton of Zurich resumed e-voting trials in 2013 as a member of the so-called Consortium (Canton of Zurich 2018) –, reports in the press about allegedly hacked e-voting systems, the dissolution of one of the three consortia just briefly before national elections in 2015 and the decision of the Geneva government to stop its e-voting project in 2020 due to excessive costs. The Federal Council has adopted three reports in which the e-voting project was presented and evaluated, and in which proposals were made for further development of the project (Swiss Federal Council 2002, 2006, 2013; Federal Chancellery 2017). The reports did not require approval by Parliament, but Parliament took note of these reports. They were an important source of information during the process of adopting the legal basis for e-voting. In April 2017, the Federal Council asked the Federal Chancellery to install a group of experts in order to prepare for the transition from an e-voting-trial period to a mode of regular operation. In April 2018, the group of experts presented their final report (Federal Chancellery 2018a) in which they concluded that in Switzerland, sufficient technical know-how as well as the procedural requirements are available in order to introduce e-voting as a regular mode of voting. On 19 December 2018, the Federal Council opened consultations on an amendment to the Federal Act on Political Rights (Swiss Federal Council 2018). Until the end of April 2019, interested parties can submit their comments on the planned revision, which will offer the legal basis for e-voting as a regular mode of vote casting.

Legal basis

The current legal basis for e-voting in Switzerland can be found in two Federal Acts and in two Ordinances (Federal Chancellery 2017). Whilst the Federal Acts are being adopted by Parliament, the Federal Council (Government) enacts the Ordinance on Political Rights and the Federal Chancellery issues the Ordinance on Electronic Voting.

In the year 2000, no legal basis was provided for tests with electronic voting. Drafting legal fundamentals commenced in 2001; the Federal Council adopted its draft proposal of the relevant paragraphs in two Federal Acts in November 2001. The proposal was then discussed and adopted in Parliament. Drafting the relevant paragraphs for the Ordinance on Political Rights took place in parallel to the parliamentary debate on the provisions for the two Federal Acts. The Federal Council decided on e-voting provisions in the Ordinance on Political Rights on 20 September 2002. The relevant articles of the Federal Act on Political Rights and the Ordinance on Political Rights assumed legal effect on 1 January 2003. The Federal Chancellery Ordinance on Electronic Voting came much later; it became legally effective on 15 January 2014.

Influence of international standards on the work of the Federal Administration

Awareness of international standards and private organizations' standards within the Federal Administration

Several standards are regarded as relevant for the e-voting project within the Swiss Federal Administration. For more than 10 years, the Council of Europe's Recommendation Rec(2004)11 was perceived as *the international* standard. Accordingly, Switzerland supported the idea of revising and adjusting these recommendations to reflect the latest developments. Furthermore, the OSCE's recommendations were being considered, in particular as a consequence of monitoring the 2011 election (OSCE/ODIHR 2011). A series of technical standards can also be included: BSI Common Criteria Protection Profile, ISO 27001, WCAG2.0, FIPS 143-3, NIST, and ECRYPT.

The standards of an international organization are perceived as enjoying a higher degree of legitimacy, as an institutional author issues them. Private organizations' standards obtain their significance from the fact that they are respected by many organizations and are thus disseminated widely.

Influence on initial regulation of e-voting

There were no international standards or other model international documents available throughout the drafting phase of the first national legal regulation in Switzerland, which took place in 2001. Drafting the first e-voting regulation in Switzerland began more than one year before the Council of Europe started its work in the context of the Project "Making Democratic Institutions Work" (within which the draft Recommendation Rec(2004)11 was developed). The first exploratory meeting on e-voting by the Council of Europe took place on 1 and 2 July 2002.

Rec(2004)11 had *no direct influence* on the Swiss regulation that came into effect in 2003. Rather, it was the other way around: the Swiss regulation served as a model document for the Council of Europe working group (Swiss Federal Council 2006). Members of the e-voting team represented the Swiss Federal Chancellery during working group meetings of the Council of Europe from 2002 to 2004. There was direct communication between the national Electoral Management Body, the section for Political Rights at the Swiss Federal Chancellery and the people representing the e-voting project at the Council of Europe working group meetings. It was two-way communication: The Swiss representatives in the Council of Europe working group were able to share their information and know-how on e-voting and regulating e-voting with the Council of Europe working group and at the same time benefit from the know-how exchanged at working group meetings. So, even if the Council of Europe Recommendation was adopted after drafting the Swiss regulation, the exchange of information facilitated through working group meetings was very valuable. Thus, one could say that the Rec(2004)11 at least had *an indirect influence* on the Swiss regulation of 2003.

Influence on adapting a regulation for e-voting (2013/2014)

The legal foundations for e-voting were adapted in 2013/2014, based on the Federal Council's third report on e-voting (Swiss Federal Council 2013). This adjustment was made with respect to an extension of the electronic voting channel. The Federal Act on Political Rights has not changed. However, the provisions of the Ordinance on Political Rights have been adapted, and the Federal Chancellery has created a new Ordinance on Electronic Voting. This new Ordinance contains detailed provisions for implementation. These define the criteria for auditing the systems in place by a certified body.

When adapting the legal foundations in 2013 and 2014, and especially when drafting the Federal Chancellery Ordinance, the following standards were considered: Common Criteria, ISO 27001, WCAG2.0, and Regulation on Certification of Services, with reference to other international standards.

In addition, discussions about verifiability (and at the same time about the associated protection of the secrecy of voting) decisively shaped the revision of the legal foundations in the international environment and in the scientific arena. The basic components of cryptography were based on current international standards and recommendations (FIPS 143-3, NIST, ECRYPT).

Interestingly enough, the Federal Chancellery did not mention the two "Guidelines" developed by the Secretariat of the Council of Europe and a group of experts, dated 16 February 2011 (Council of Europe 2011), in their responses to the questionnaire. The guidelines did not play an important role in adapting the national regulations in 2013 and 2014. No reference is made to any of the standards adopted by the Council of Europe or its Secretariat in the final report by the group of experts that was considering introducing e-voting as a regular mode between April 2017 and April 2018 (Federal Chancellery 2018a).

Assessing the relevance of international standards in the field of e-voting

In the view of the Swiss Federal Administration, international standards are important for developing e-voting projects. They indicate a possible framework for designing a project. Accordingly, international standards must be updated continually. Otherwise they lose significance, and countries wishing to promote the digitization of political rights can scarcely make any use of them. In the current further work on e-voting (introducing e-voting as a regular mode), no explicit reference is made to international standards.

According to the Swiss authorities responding, international standards should be designed so that they can be translated into the specific context of each country. Political rights and entitlements of systems differ from country to country. International standards must take this into account. International standards are firmly embedded in a field of tension: on the one hand, they must be abstract in order to take country-specific circumstances into account. On the other hand, they must be specific enough to allow a reliable assessment of whether the standard is being met. One solution could be to work with different standards or regulatory levels. Thus, while fixed standards and norms could address key issues and could be evaluated in the form of principles, the technical provisions could demonstrate, for example, how these principles should be implemented. By describing the options for implementation, it would become clear which solutions must be considered suitable by the international community.

2.2 International standards & e-voting in Norway

Background

In 2004, the Ministry of Local Government and Regional Development appointed a working committee to examine fundamental questions with regard to e-voting (Ministry of Local Government and Regional Development 2004). This working committee, composed of representatives of the Ministry, several municipalities, scientific institutions as well as two private companies, recommended a step-by-step approach by which e-voting should be systematically tested (Ministry of Local Government and Regional Development 2006). The

Norwegian Government and Parliament decided to run trials on the use of e-voting in 2008. The first trial took place during local government elections in ten municipalities in September 2011. The Ministry of Local Government and Regional Development was in charge of supervising and evaluating the trial. It commissioned several assessment and evaluation studies on the first e-voting test and invited the OSCE to monitor the trial with the objective of obtaining inputs for improvements (Barrat i Esteve and Goldsmith 2012b).

Following the positive experiences of 2011, the government decided to conduct another e-voting trial during parliamentary elections in 2013. The controversial issue was discussed at length in Parliament, and in April 2013 a narrow majority approved continuing with e-voting trials during the parliamentary elections. Twelve municipalities were involved in this second e-voting trial. The OSCE and the Carter Center monitored the use of e-voting during the 2013 parliamentary elections (Barrat i Esteve and Goldsmith 2012b; Gebhardt Stenerud and Bull 2012).

From an overall perspective, the 2011 and 2013 pilots appeared to be technically successful (Vinkel and Krimmer 2016). Although the trials in 2011 and 2013 were reported on positively, and no significant security concerns were raised, the topic remained politically controversial. In the discussions, fears that the security mechanisms for transmitting the vote over the Internet were inadequate and that casting a vote outside the polling station might endanger the sanctity of voting were alluded to. In the end the lack of broad political support for introducing Internet voting led to the government deciding not to conduct further e-voting pilot studies in Norway (Ministry of Local Government and Modernisation 2014). Notwithstanding, several municipalities and one county deployed Internet voting solutions for local referendums in 2016 and 2018 (Bull et al. 2018). In contrast to the election trials of 2011 and 2013, the use of e-voting for these referendums did not require a national act of legislation but was merely based on local provisions.

Legal basis

Internet voting as such is not mentioned specifically in Norwegian legislation. The law regulating how elections are carried out, the Representation of the People Act (Ministry of Local Government and Regional Development 2017), makes no provisions for Internet voting. The Representation of the People Act (§ 15-1) contains a provision for trials where deviations from the law can be made. In these cases, specific regulations are drafted specifying the legal framework for deviations.

Special regulations were issued for both the 2011 and the 2013 Internet voting trials in Norway (Ministry of Local Government and Regional Development 2013). Deviations from the legal framework were specified in these regulations, and where no deviation is specified, the RPA applied. The first draft of the regulations related to the 2011 trials and was despatched for public hearing on 17 December 2010. It came into effect on 31 March 2011 and expired on 31 December 2011. New regulations were drafted for the 2013 trials. They were despatched for public hearing on 8 May 2013 and assumed legal effect on 19 June 2013. They expired again on 31 December 2013.

These regulations only covered the specific trials and expired once the trial had been completed. There were minor changes made from the first set of regulations for the trial in 2011 and the regulations for 2013. On both occasions, the Ministry of Local Government and Regional Development adopted the regulations. These did not require approval by Parliament.

Influence of international standards on the work of the Ministry of Local Government and Regional Development

The Council of Europe Recommendation Rec(2004)11 is regarded as an important source of information for drafting e-voting regulations by the Ministry of Local Government and Regional Development. A representative of the ministry was involved in drafting Rec(2004)11. When crafting the e-voting regulations for the 2011 and 2013 pilots, key aspects of the Council of Europe's Rec(2004)11 were considered (Barrat i Esteve and Goldsmith 2012a) and eventually incorporated. Little exception to the recommendation was actually taken (Carter Center 2014).

Apart from the Council of Europe Recommendation, the also referred to the Code of Good Practice in Electoral Matters issued by the Venice Commission (Council of Europe 2002), the Council of Europe's e-voting handbook, (Council of Europe 2010c) as well as the Council of Europe's Guidelines on certification and on transparency. The security issues during parliamentary elections in September 2013 show that small issues or inadequacies in the source code can have a big impact on the integrity of an entire election. The encryption mechanism failed in this process to a large extent (Bull et al. 2016). The full case study is an example of how to learn from mistakes, and how and why international standards can and should be implemented.

Assessing the relevance of international standards in the field of e-voting

According to the ministry responding, professional standards issued by international organizations such as the Council of Europe, the OSCE, the United Nations, etc., are generally perceived as being more significant – in terms of being more (politically) binding – than standards issued by private bodies.

However, mention was also made that standards from international organizations are not necessarily more helpful than standards set by private bodies. This depends on the nature of and purpose for the standard. Professional standards from private bodies may be a useful source of inspiration and for learning. However, standards from international organizations would pull more weight in order to gain international support for certain views and assessments. Furthermore, mention was made that too many different standards could contribute to uncertainty as to which standard should be attributed the greatest validity.

Private bodies create standards which are not always useful to governments. International standards are, however, extremely useful when launching an e-voting project. Field of e-voting has moved on considerably during the last 15 years.

2.3 International standards & e-voting in Estonia

Background

Estonia was the first country to announce a full-scale electronic election in 2001. It was also the first country to introduce Internet elections on a national scale in national elections. The parliament voted in 2002 to delay full-scale introduction until 2005 (Drechsler and Madise 2004). This puts Estonia in a special position as a pioneer and frontrunner, and hence there were few opportunities for orientation or chances to exchange experiences. This frontrunner position has Estonia left in a continuous development process (Vinkel and Krimmer 2016). The latest example of this is verifiability, which at present is probably the most challenging aspect of e-voting.

Due to a growing discussion on the issue, verifiability measures were introduced in Estonian elections. These additions for the security of the system are supposed to detect whether a vote has been compromised. The changes were introduced without formal consultation of international standards, due to a lack of such standards. More recent developments, such as the IVXV framework, are targeted at improving the tabulation integrity of the Estonian system. The system was implemented for the municipal elections in October 2017. The parties handling implementation recognize that this is only one step and that development will continue for many years (Heiberg et al. 2017).

Legal basis

The Riigikogu Election Act is the central regulatory framework for electronic and Internet voting. It was passed on 16 June 2002 and assumed legal effect on 18 July 2002. Changes were also introduced before the 2005 municipal elections. The technical solution had been completed at that time, but the law needed changing to accommodate the changes. Further changes were also made following the OSCE mission report in 2011, based on the report's recommendations. The Electronic Voting Committee which has now become significant was also created at that time.

The Act has been updated several times since its introduction, and many newly introduced paragraphs cover the particular needs of Internet and electronic elections, such as § 60 introduced in 2006 and § 57 introduced in 2014 (Riigi Teataja 2014). It was last changed in 2016 and assumed legal effect on 1 January 2017 (Riigi Teataja 2018a). The Riigikogu Election Act (RT I 2002, 57, 355) included provisions on Internet voting, especially § 60.1. The 2016 changes clarified crucial aspects like §38 and changes related to the duration and modus of changing votes. Additionally, territorial polling districts have been abolished, and voting rolls are held electronically from now on (Riigi Teataja 2018a). The additions to the Riigikogu Election Act provide a solid and still developing basis for electronic elections in Estonia. The most recent signs for the continuous development are the changes added to the law in 2017, all of which will step into force in 2021 (Riigi Teataja 2018b). Other regulations that govern elections and Internet voting in Estonia are the Local Government Election Act, the Referendum Act and the European Parliament Election Act.

The Riigikogu Election Act was introduced at a time when no country had conducted legally binding elections on a national scale. Estonia was also a pioneer and frontrunner and had to establish a procedure first. The only references made are to the Council of Europe's recommendations not yet published at that time, which the Estonian election administration participated in.

Influence of international standards on the work of the Estonian authorities

The Estonian administration responsible monitors international standards and developments in countries where Estonia is represented. The developments in other countries and regions are taken into consideration and also the standards that private organizations use are in general not neglected, depending on the reputation and work of the particular organization. The most important international guideline for Estonia is the Council of Europe recommendation Rec(2004)11. A general guideline for the field of electronic elections, these are still the basic electoral principles applied for every election.

The legal changes implemented in 2016 were partially built on the OSCE report on the election in 2015 (OSCE 2015). One issue that the Estonian electoral administration perceives is the lack of stronger standards in the field. Administrations must be flexible and open-minded in order to find appropriate means to conduct their elections.

Assessment of the relevance of international standards in the field of e-voting

The question of international standards in electronic elections faces many obstacles. One of the most prominent issues is issuing certified Internet voting systems. Such certification is criticised as not being meaningful, or even as being impossible. Private-sector standards should also be established due to the numerous elections held in the private sector with the help of electronic means. Applying these standards to national elections on the other hand depends on many aspects.

One positive aspect of the current situation, where no real international standards exist, is that there are no conflicting or competing ones. This should also be prevented in the future, whilst there is no question of whether international standards should be updated. Technology develops and hence the standards should continue to develop further. International standards are seen as helpful, as they facilitate a systematic approach, and compliance with fundamental principles and potential risks are accounted for.

3. Conclusions

The three case studies offer several insights into the interrelationship between international standards and e-voting projects. It becomes clear that various international documents are of interest to national administrations when tackling e-voting projects. In conjunction with international standards in the strictest sense, standards set by private organizations are often taken into account as well as documents from international organizations that do not fall under the definition of international standards (e.g. OSCE/ODIHR reports or the two CoE Guidelines). In other words: inspiration and know-how is obtained from various kinds of

international sources, irrespective of their classification. However, when it comes to political significance, international standards are considered to be more important than private organizations' standards or other international documents. They are assessed as being "more binding". Furthermore, they also seem to be attributed a significant role in building trust amongst voters in e-voting systems.

None of the three authorities responding perceived international standards to be a constraining factor. The only disadvantage mentioned with regard to the Council of Europe Recommendation was the fact that by 2014 it was clearly out-dated. There could be no orientation guideline without attempting to formulate some form of international standard. If the lessons of other administrations and their mistakes are forgotten, countries will be bound to repeat them. Not adopting standards can also lead to underperforming systems due to a lack of understanding of the matter. Such unsatisfactorily performing projects could slow down and impede further the development of electronic voting as it would dispel the trust in electronic systems within a country, region or even globally.

Concerning the question of how international standards are being implemented in national administrations, it becomes apparent that the main focus is on implementing the standard into the national legal context. In all three countries, the international standard had, at least indirectly, served as a basis for drafting national legislation and statutory regulations. Having noted this, international standards played the most important role at the start of the e-voting projects. So, contrary to our preliminary assumptions, the international standards did not play a role in all phases of e-voting projects. Based on our three case studies, we can summarize that once the international standards have been endorsed as national regulations, they only play a minor role for the projects. The most prominent role remaining for them is to be used as a source for evaluation, and to be cited in official documents to enhance the acceptance of e-voting amongst stakeholders (Barrat i Esteve and Goldsmith 2012b).

Based on our three case studies, the following hypotheses for further research on the interrelationship between international standards and innovative e-government projects can be developed:

- i) Case studies are a useful way of gaining an insight into the interrelationship between international standards and e-government projects.
- ii) Research should not be limited to international standards in the strictest sense, but should include standards from private organizations as well as other international documents.
- iii) Since the major influence of international standards is supposed to be on national statutory regulations, a thorough analysis of the legal basis should be an integral part of case studies. The legal regulations should be studied in advance, whenever questionnaires are sent out or interviews are being prepared. This helps when formulating adequate questions.

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5. References

- Barrat i Esteve, J. and B. Goldsmith. 2012a. *Compliance with International Standards Norwegian E-Vote Project*. Oslo: IFES. Available at https://www.regjeringen.no/globalassets/upload/krd/prosjekter/e-valg/evaluering/topic7_assessment.pdf (last accessed 15 April 2019).
- Barrat i Esteve, J. and B. Goldsmith. 2012b. *International Experience with E-Voting: Norwegian E-Vote Project*. Oslo: IFES. Available at <https://www.parliament.uk/documents/speaker/digital-democracy/IFESIVreport.pdf> (last accessed 15 April 2019).
- Bull, C., K. Gjøsteen and H. Nore. 2018. "Faults in Norwegian Internet Voting." *E-Vote-ID 2018 Proceedings*, 166-169.
- Bull, C., K. Stemland Skjelsvik and I. Gebhardt Stenerud. 2016. "The Imperfect Storm." *E-Vote-ID 2016 Proceedings*, 116-120.
- Canton of Zurich. 2018. *Schlussbericht zum Vorprojekt für einen flächendeckenden Einsatz von E-Voting im Kanton Zürich, 21 March 2018*. Available at https://wahlen-abstimmungen.zh.ch/internet/justiz_inneres/wahlen-abstimmungen/de/evoting/_jcr_content/contentPar/downloadlist/downloaditems/921_1467808957304.spooler.download.1522912314174.pdf/Schlussbericht+zum+Vorprojekt+f%C3%BCr+einen+fl%C3%A4chendeckenden+Einsatz+von+E-Voting+im+Kanton+Z%C3%BCrich+vom+21.+M%C3%A4rz+2018.pdf (last accessed 15 April 2019).
- Carter Center. 2012. *The Carter Center Handbook on Observing Electronic Voting*. 2nd edn. Atlanta: Carter Center.
- Carter Center. 2014. *Internet Voting Pilot: Norway's 2013 Parliamentary Elections*. The Carter Center Expert Study Mission Report. Available at https://www.regjeringen.no/globalassets/upload/krd/kampanjer/valgportal/valgobservatorer/2013/rapport_cartersenteret2013.pdf (last accessed 15 April 2019).
- Council of Europe. 2002. *Code of Good Practice in Electoral Matters: Guidelines and Explanatory Report*. Science and Technique of Democracy 34. Strasbourg: Council of Europe.
- Council of Europe. 2004. *Rec(2004)11, Recommendation*. Available at https://search.coe.int/cm/Pages/result_details.aspx?ObjectID=09000016805dbef8 (last accessed 15 April 2019).
- Council of Europe. 2010a. *Certification des systèmes de vote électronique Lignes directrices pour la conception de processus de confirmation du respect des exigences et normes recommandées*. Strasbourg: Council of Europe.
- Council of Europe. 2010b. *Guidelines on Transparency of e-Enabled Elections*. Strasbourg: Council of Europe.
- Council of Europe. 2010c. *PDF – E-Voting Handbook: Key Steps in the Implementation of e-Enabled Elections*. Strasbourg: Council of Europe.
- Council of Europe. 2011. *E-voting: Website of the Council of Europe*. Available at <https://www.coe.int/en/web/electoral-assistance/e-voting> (last accessed 19 November 2018).
- Council of Europe. 2017a. *1289th Meeting, 14 June 2017: Website of the Council of Europe*. Available at https://search.coe.int/cm/Pages/result_details.aspx?ObjectID=0900001680726c0b (last accessed 15 April 2019).
- Council of Europe. 2017b. *Recommendation CM/Rec(2017)5, Council of Europe*. Available at https://search.coe.int/cm/Pages/result_details.aspx?ObjectID=0900001680726f6f (last accessed 15 April 2019).
- Drechsler, W. and Ü. Madise. 2004. "Electronic Voting in Estonia." In N. Kersting and H. Baldersheim (eds). *Electronic Voting and Democracy: A Comparative Analysis*. London: Palgrave, 97-108.
- Driza Maurer, A. 2016. "Internet Voting and Federalism: The Swiss Case." In J. Barrat (ed.). *El voto electrónico y sus dimensiones jurídicas: entre la ingenua complacencia y el rechazo precipitado*. Madrid: Iustel, 261-288.
- Driza Maurer, A. 2017. "Updated European Standards for E-voting: The Council of Europe Recommendation Rec(2017)5 on Standards for E-voting." *E-Vote-ID 2017*, 146-162.
- egovernment Switzerland. 2018. *Electronic Voting: Website of egovernment Switzerland*. Available at <https://www.egovernment.ch/en/umsetzung/schwerpunktplan/vote-electronique/> (last accessed 15 April 2019).
- Federal Chancellery. 2018a. *Berichte und Studien – e-Voting: Website of the Swiss Federal Chancellery*. Available at <https://www.bk.admin.ch/bk/de/home/politische-rechte/e-voting/berichte-und-studien.html> (last accessed 15 April 2019).

- Federal Chancellery. 2018b. *Federal Chancellery: Website of the Federal Chancellery*. Available at <https://www.bk.admin.ch/bk/de/home/politische-rechte/e-voting/chronik.html> (last accessed 19 November 2018).
- Federal Chancellery. 2018c. *Frühere Medienmitteilungen 2008-2016 – Presseleases 2008-2016: Website of the Federal Chancellery*. Available at <https://www.bk.admin.ch/bk/de/home/politische-rechte/e-voting/bundesrat-beschliesst-naechste-schritte-zur-ausbreitung-der-elek/fruehere-medienmitteilungen-2008-2016.html> (last accessed 15 April 2019).
- Federal Chancellery. 2018d. *E-Voting, Website of the Federal Chancellery*. Available at <https://www.bk.admin.ch/bk/en/home/politische-rechte/e-voting.html> (last accessed 15 April 2019).
- Feldmann, M. 2013. "Varieties of Capitalism and the Estonian Economy: Institutions, Growth and Crisis in a Liberal Market Economy." *Communist and Post-Communist Studies* 46(4), 493-501.
- Gebhardt Stenerud, I.S. and C. Bull. 2012. "When Reality Comes Knocking: Norwegian Experiences with Verifiable Electronic Voting." In M.J. Kripp, M. Volkamer and R. Grimm (eds). *EVOTE 2012: 5th International Workshop on Electronic Voting. Lecture Notes in Informatics* P-205. Bregenz, Austria, 21-33. not referred to in the text
- Heiberg, S. et al. 2017. "Improving the Verifiability of the Estonian Internet Voting Scheme." In Krimmer R. et al. (eds) *Electronic Voting. E-Vote-ID 2016*. Cham: Springer, 92-107. doi:10.1007/978-3-319-52240-1_6.
- International IDEA. 2011. *Introducing Electronic Voting: Essential Considerations*. PolicyPaper. Stockholm: International Institute for Democracy and Electoral Assistance.
- von Lucke, J. and H. Reinermann. 2000. *Speyerer Definition von Electronic Government*. Edited by Forschungsinstitut für öffentliche Verwaltung. Speyer: Deutsche Hochschule für Verwaltungswissenschaften Speyer.
- Ministry of Local Government and Modernisation. 2014. "Internet Voting Pilot to be Discontinued." Available at <https://www.regjeringen.no/en/aktuelt/internet-voting-pilot-to-be-discontinued/id764300/> (last accessed 15 April 2019). what does the highlighted part mean
- Ministry of Local Government and Regional Development. 2004. *Use of Electronic Media for Voting in Elections to the Storting, County Councils and Municipal Councils*. Oslo: Ministry of Local Government and Regional Development. Available at <https://www.regjeringen.no/globalassets/upload/krd/vedlegg/komm/evalg/mandate.pdf> (last accessed 15 April 2019).
- Ministry of Local Government and Regional Development. 2006. *Electronic Voting: Challenges and Opportunities*. Report. Oslo: Ministry of Local Government and Regional Development. Available at https://www.regjeringen.no/globalassets/upload/kilde/krd/red/2006/0087/ddd/pdfv/298587-evalg_rapport_engelsk201106.pdf (last accessed 15 April 2019).
- Ministry of Local Government and Regional Development. 2013. *Regulations Relating to Trial Internet Voting during Advance Voting and Use of Electronic Electoral Rolls at Polling Stations on Election Day during the 2013 Parliamentary Election in Selected Municipalities*. Oslo: Ministry of Local Government and Regional Development. Available at <https://www.legislationline.org/documents/id/18798> (last accessed 15 April 2019).
- Ministry of Local Government and Regional Development. 2017. "The Main Features of the Norwegian Electoral System." Available at <https://www.regjeringen.no/en/topics/elections-and-democracy/den-norske-valgordningen/the-norwegian-electoral-system/id456636/> (last accessed 15 April 2019).
- OSCE/ODIHR. 2011. *Swiss Confederation Federal Assembly Elections 23 October 2011*. Warsaw: OSCE/ODIHR. Available at <https://www.osce.org/odihr/87417?download=true> (last accessed 15 April 2019).
- OSCE/ODIHR. 2012a. *Handbook on the Observation of New Voting Technologies*. Warsaw: OSCE/ODIHR.
- OSCE/ODIHR. 2012b. *Election Expert Team Report on the 12 September 2011 Local Government Elections in Norway*. Warsaw: OSCE/ODIHR.
- OSCE/ODIHR. 2013. *Election Assessment Mission Final Report on the 9 September 2013 Parliamentary Elections in Norway*. Available at <http://www.osce.org/odihr/elections/109517?download=true> (last accessed 15 April 2019).
- OSCE/ODIHR. 2015. *Estonia, Parliamentary Elections, 1 March 2015: Final Report*. Available at <https://www.osce.org/odihr/elections/estonia/160131> (last accessed 15. April 2019).

- Riigi Teataja. 2014. *Riigikogu Election Act – Riigi Teataja, Website of Riigi Teataja*. Available at <https://www.riigiteataja.ee/en/eli/501092014005/consolid> (last accessed 19 November 2018).
- Riigi Teataja. 2018a. *Riigikogu valimise seadus*. Available at <https://www.riigiteataja.ee/akt/109072018005> (last accessed 15. April 2019).
- Riigi Teataja. 2018b. *Euroopa Parlamendi valimise seaduse ja teiste seaduste muutmise seadus*. Available at <https://www.riigiteataja.ee/akt/109072018001> (last accessed 15. April 2019).
- Serdült, U. et al. 2015. "Fifteen Years of Internet Voting in Switzerland: History, Governance and Use." In L. Terán and A. Meier. *ICEDEG 2015: Second International Conference on eDemocracy & eGovernment*, Quito, Ecuador, 8–10 April 2015, IEEE Xplore CFP1527Y-PRT, 126–132.
- Stein, R. and G. Wenda. 2014. "The Council of Europe and e-Voting: History and Impact of Rec(2004)11." In Krimmer, R., et al. (eds.). *2014 6th International Conference on Electronic Voting: Verifying the Vote (EVOTE)*. Bregenz: IEEE, 1–6. doi:10.1109/EVOTE.2014.7001139.
- Swiss Federal Council. 2002. *Bericht über den Vote électronique Chancen, Risiken und Machbarkeit elektronischer Ausübung politischer Rechte*. Bern: Swiss Federal Council. Available at <https://www.admin.ch/opc/de/federal-gazette/2002/645.pdf> (last accessed 15 April 2019).
- Swiss Federal Council. 2006. *Bericht über die Pilotprojekte zum Vote électronique*. Bern: Swiss Federal Council. Available at <https://www.admin.ch/opc/de/federal-gazette/2006/5459.pdf> (last accessed 15 April 2019).
- Swiss Federal Council. 2013. *Bericht des Bundesrates zu Vote électronique Auswertung der Einführung von Vote électronique (2006–2012) und Grundlagen zur Weiterentwicklung*. Bern: Swiss Federal Council. Available at <https://www.admin.ch/opc/de/federal-gazette/2013/5069.pdf> (last accessed 15 April 2019).
- Swiss Federal Council. 2018. *Bundesgesetz über die politischen Rechte: Vorentwurf vom 19. Dezember 2018*. Available at https://www.admin.ch/ch/d/gg/pc/documents/3014/Elektronische-Stimmabgabe_Entwurf_de.pdf (last accessed 15 April 2019).
- Vinkel, P. and R. Krimmer. 2016. "The How and Why to Internet Voting: An Attempt to Explain E-Stonia." *E-Vote-ID 2016*, 178–191.
- Yin, R.K. 2013. *Case Study Research Design and Methods*. 3rd edn. Edited by K. Wiley and S. Robinson. Thousand Oaks: Sage Publications Incorporate.

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