E-Voting Discourses in the UK and the Netherlands*

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Abstract

A qualitative case study of the e-voting discourses in the UK and the Netherlands was performed based on the theory of strategic niche management [15, 7]. In both countries, eight e-voting experts were interviewed on their expectations, risk estimations, cooperation and learning experiences. The results show that differences in these variables can partly explain the variations in the embedding of e-voting in the two countries, from a qualitative point of view.

1   Introduction

In order to explore the conceptual differences in discussions on e-voting, we decided to conduct a comparative study of e-voting discourses, starting with two countries. The two countries should be different enough to allow the extraction of relevant concepts. The Netherlands and the UK were found suitable for the following reasons:

- the Netherlands were one of the early adopters of electronic voting, whereas the UK has not made any decisions yet;

- the UK and the Netherlands have different voting systems (district-based versus proportional representation);

- both the British and the Dutch government have programs for electoral modernisation, which guarantees availability of information;

- the countries have the pragmatic advantages of geographical closeness and our ability to understand the languages.

In the future, it would be interesting to repeat the project in more countries, notably the US, Ireland and Estonia, and possibly also India and Brazil.

2   Preliminaries

The UK voting system is traditionally district-based. This holds both for local and national elections. The candidate with a plurality of votes in her district wins the seat. More recently established elections, such as those for regional assemblies and the European Parliament, may use different setups. In the Netherlands, all elections are based on proportional representation. For national elections, participating parties and their lists of candidates may be different in the various districts, but the differences concern mostly minor parties.

In both countries, elections are run on weekdays, which may be significant in terms of the ease with which people can manage to get to their polling station.

In the UK, the Electoral Commission was established in 2000 through the Political Parties, Elections and Referendums Act, among other things to give advice on modernising the voting process. Since the introduction of the ballot [4], voting procedures had remained largely unaltered, and people were dissatisfied with the archaic system. From that year onwards, an experimental approach to modernising the process, including e-voting, has led to various pilots in local elections. The focus of the experiments was the evaluation of ways of casting vote that would make the experience more convenient for the voter. The focus, therefore, was on remote electronic voting.

Pilots with e-voting were conducted in local elections in 2000, 2002, 2003, 2006 and 2007. In 2004 and 2005, there were no pilots, since the local elections were combined with the European and general elections, respectively. Local authorities can apply to the central government with a proposal for a pilot, usually in combination with a technology supplier. Next to polling place and remote e-voting, pilots have also been run with all-postal voting. Also, from 2000 people do not have to specify a reason to request a postal ballot (postal voting on demand). The hope is that e-voting can be used in a (nationwide) general election around 2010.

After the 2004 local elections on June 10th, six councillors of the Labour party were found guilty of fraud with postal ballots in two wards in Birmingham. According to the judge, the postal system used was "wide open to fraud".[1] This case of fraud, the judge stated, would "disgrace a banana republic". The persons involved allegedly managed to get their hands on thousands of postal ballots and had them completed to their wishes. It was ordered that the elections in the two wards be rerun.

This incident, even though local in scale, sensitised the media to problems with the pilot schemes, and had a major influence on the framing of discussions on the pilots afterwards. The problems with the postal system were the most important reason for the limited pilots in 2006. E-voting was not deemed to be appropriate, because the problems with postal voting had to be solved first. New e-voting pilots were planned for the local elections on May 3, 2007. Major problems with these pilots were reported [5].

The Netherlands have been ahead in electronic voting for some time. Already in the late 1980s, attempts were made to automatise the counting, and the first electronic voting machines appeared. Since the mid-nineties, voting machines have been used extensively during elections. In 1997, a list of requirements was drawn up that voting machines have to meet. Types of machinery are validated against the requirements by the authorised testing institute BrightSight, formerly TNO. Demands on the verifiability of the calculations, however, largely remain unspecified. The most widely used voting machines are produced by the company Nedap. These are so-called full-face DREs, with a button for each candidate. More recently, touch-screen based systems marketed by the former state press SDU have also been used, notably in Amsterdam. Nedap machines have been exported to France, Germany and Ireland. Ireland has not used the machines yet, because of critical reports by a commission of experts.[2]

In the Netherlands, the Electoral Commission ("Kiesraad") was founded in 1951.[3] They seem to have a more traditional view on voting than the UK Electoral Commission, and argued that experiments in elections are not a good idea. They would rather see the phased introduction of proven technology [8]. Still, several experiments have been performed with voting via the Internet. During the European elections 2004, Dutch citizens living abroad were allowed to vote online as an alternative to postal ballots. Moreover, elections for two water boards have combined postal ballots with Internet voting in Fall 2004, with 2 million eligible people and a total of 120,000 actual online voters. In 2006, the experiment for expats was repeated in the national elections, now using the system designed for the water boards. Postal voting has not been allowed for others; liberal proxy voting is available instead.

In Fall 2006, a chain of events completely changed the e-voting status quo in the Netherlands. The people of the campaign wijvertrouwenstemcomputersniet.nl (wedonttrustvotingcomputers.nl), founded in July, managed to get hold of a couple of Nedap voting machines and took them apart. They made the results of their analysis public on October 4, with the general elections scheduled for

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[1]http://news.bbc.co.uk/1/hi/england/west_midlands/4406575.stm

[2]http://www.cev.ie/htm/report/index.htm, consulted March 16, 2007.

[3]http://www.kiesraad.nl/organisatie_kiesraad/virtuele_map/taken_kiesraad, consulted February 19, 2007.

November 22. Main problems were the easy replacement of the program chips, and the possibility to eavesdrop on the voting machine via a tempest attack: listening to radio emission from the display. Also, they found problems with the security of the storage facilities of the machines [3].

The minister responded to the findings of the pressure group by having all the chips replaced with non-reprogrammable ones (not really a solution, but the public bought it), seals on all the machines, and having the intelligence service (AIVD) look into the tempest problem. The intelligence service found that the emission problems of the Nedaps were repairable. However, they also looked into the SDU machines, and found that the tempest issue was much worse there. Someone outside the polling station might be able to reconstruct the whole screen from the signal. The minister then suspended the certification for this type three weeks before the elections, not because it did not meet the requirements, but because it would endanger the order on election day. This affected about 10% of the voter population, including Amsterdam.

One of the other concessions of the minister was the initiation of a commission of independent experts, who would look into the future of e-voting after the elections. The names of people in the commission were made public on January 19, 2007. They include technical, legal and political experts. The commission will report before October 1, 2007.[4]

3 Method

From each of the countries, 8 e-voting experts were selected from different backgrounds. Selection was based on availability and relevance. In each of the countries, we spoke to 2 government executives, 2 critics, 2 academics, 1 political expert and 1 technical designer. In the UK, these included:

- John Borras, member of OASIS technical requirements committee;

- Paul Docker, Department of Constitutional Affairs;

- Peter Facey, director of New Politics Network;

- Ben Fairweather, Centre for Computing and Social Responsibility; De Montfort University, author of a report on e-voting;

- Louise Ferguson, usability expert involved in e-voting;

- Jason Kitcat, technical expert and critic of e-voting;

- Peter Ryan, professor in the Centre for Software Reliability of the University of Newcastle upon Tyne and e-voting expert;

- Alan Winchcombe, Association of Electoral Administrators.

In the Netherlands, the following subjects were selected:

- Kees Aarts, Professor of Political Science (in particular Comparative Electoral Behavior), University of Twente;

- Esther Beneder, Ministry of the Interior and Kingdom Relations;

- Rop Gonggrijp, technical expert and e-voting critic;

- Maarten Haverkamp, Christian Democrat MP;

- Peter Knoppers, technical expert and e-voting critic, Delft University of Technology;

- Piet Maclaine Pont, designer of the RIES Internet voting system;

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[4]http://www.minbzk.nl/actueel?ActItmIdt=104026, consulted March 16, 2007.

- René Mazel, substitute director Constitutional Affairs and Law, Ministry of the Interior and Kingdom Relations;

- Berry Schoenmakers, cryptography and e-voting expert, Eindhoven University of Technology.

Our questionnaire was based on the theoretical framework of strategic niche management [7]. Main variables in this framework are expectations, network connections and learning experiences. For the purposes of clarity, we split the variable expectations into (positive) expectations and (negative) risk estimations. We performed the interviews either by phone or on-site in the period of October - December 2006. The interviews in the Netherlands were conducted by Robert van Haren, master student information science at our institute. The interviews in the UK were performed by the present author. Each interview lasted between half an hour and one hour, depending on the amount of information given by the respondent.

We performed a qualitative analysis of the interview data using the Weft QDA tool.[5] This way of analysing the data allowed us to make sure that we gathered all information about the variables, even if it appeared in different parts of the interview. It also allowed us to refine the main variables based on the data. We present the results below. The English translations of Dutch quotes are the responsibility of the present author. We used them only if deemed important; otherwise we summarised the remarks in our own words.

4 Expectations

4.1 UK

4.1.1 Turnout

Based on the interviews, we conclude that the most common expectation of the e-voting pilots in the UK was that they would increase turnout. The country experienced falling turnout levels, and there was a strong political motivation to stop or reverse this tendency. It was thought that making voting easier – by offering more convenient ways of voting – could help in achieving this goal. Opinions about whether this expectation has been met differ.

Not all of the respondents share the view that turnout was the main drive. John Borras argued that it is "a necessary development to keep voting up-to-date with people's daily lives." The government seems to realise that technical solutions are not enough to meet the expectation of turnout. Paul Docker states that increasing turnout "cannot be fully achieved by a single means."

What is significant is the number of text fragments covering the issue of turnout: in total 20 fragments, with at least one in each of the interviews. Compared to for example 4 passages in 3 documents on easier election administration, this seems to indicate a strong focus on turnout. Even if people do not agree that turnout is the main drive, they do mention it.

The strong focus on turnout in the UK made Andrew Gumbel write that turnout is the drive in all of Europe: "In Europe the prime motivation for e-voting has not been the elimination of fraud, but rather the hope that the growing problem of voter apathy can be stemmed by making the process quicker and more painless." [6, p. 313] The Netherlands are mentioned as a pioneer in this context, even though turnout does not seem to play any significant role in the discussion in that country.

Compared to both the US and the Netherlands, the British situation is different. Alvarez and Hall, writing about Internet voting in the US, are more positive about the experiments in the UK than those in their own country, and not only for the UK's more systematic approach to do research in combination with pilots. "Another key factor in the Internet voting effort in the United Kingdom is that it does have a clear goal, which is to increase voter turnout." [1, p. 145]

However, this clear goal is not appreciated by all of our participants, in comparison with the Dutch situation. Peter Facey: "There was a greater level of suspicion in the UK than in the Netherlands, although that has recently changed [due to the campaign in the Netherlands, WP].

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[5]http://www.pressure.to/qda/

What was being judged was different in the UK: the reason it started was the political question of turnout, which is a bad way of starting electoral modernisation. It is different from modernisation based on the process of election administration. [...] People tried to find a technical solution to the question "Why don't people participate in elections?" In the end, it was a political question, not a technical one."

Because of the expectation of increased turnout, the experiments in the UK have focused on making it easier for the citizens to vote. Electronic voting machines at polling stations are not expected to increase turnout, as both Peter Facey and Alan Winchcombe mention. Therefore, electronic voting machines at polling stations are not likely to be introduced in the UK. We can expect the UK to concentrate on remote electronic voting, and not adopt the type of voting machines in use in many other countries, such as the Netherlands. However, the critics of e-voting think precisely of e-voting at polling stations as the only possibly acceptable form. Louise Ferguson: "In remote e-voting, there is a lack of public scrutiny and a removal of checks and balances that we have accumulated over 150 years or so. There are no officials that can observe what is going on, nor can candidates observe, nor can other voters challenge, and social engineering can take place. Voting is taken away from a controlled place and done in a private place, outside the public eye. This may allow "relative voting". Also, Internet security may cause problems. [...] Remote e-voting should not be done with the knowledge we have now."

The same concern is phrased by Ben Fairweather and Peter Ryan. The government, however, is not planning to abandon remote electronic voting. Because postal voting is already in use, the leap to remote electronic voting is not that big. Paul Docker: "If you're doing remote electronic voting people have the perception that it is easier to fiddle that than to fiddle a paper vote. It is all about the security put in place and the testing of systems to see if they work. The principles tend to be the same; it is the mechanism and the processes that differ." Not everyone agrees that e-voting may improve turnout. Jason Kitcat: "If e-voting gets implemented, turnout will probably fall because people will lose faith in the accuracy of the system, as is happening in the US."

4.1.2 Administration, accuracy, lifeworld

Other, less pronounced expectations of the e-voting pilots in the UK include easier and cheaper election administration, improved accuracy and making voting fit in people's lives. Easier administration and improved accuracy have been the drive behind the introduction of e-voting in other countries, such as the US and the Netherlands. In the UK discourse, they tend to be seen as side issues. If they were major topics, electronic voting machines at polling stations might have been a more attractive option. Interestingly, the benefit of obtaining the result of an election faster has only been mentioned once.

A similar argument is that counting votes by a machine is more accurate than counting by hand. Acquiring this benefit does not necessarily involve full-fledged e-voting. E-counting can also be done with paper ballots that can be optically scanned. Peter Ryan: "The crucial aspect of polling place electronic voting systems compared with paper ballots is their ability to assure correctness of the counts. A mechanism is needed to give confidence in this. Cryptographic systems have strong guarantees, as opposed to for example the Diebold touch-screens." From the point of view of the citizen, increased accuracy can also be an advantage of e-voting. Interactive systems can prevent over- and undervoting, leader to fewer invalid votes.

People who do not believe in increased turnout for remote electronic voting usually offer the compatibility of voting with people's lives as an alternative. This argument has also been heard in Estonia. In the UK, 4 of our respondents mentioned this issue, although it applies to far less text than the turnout matter. Variants of this argument relate to the ability to inform citizens via the same channels that they can vote through. In a narrow sense, this amounts to linking to more information about candidates and parties, allowing people to make a better choice in the particular election. In a broader sense, this connects e-voting to the broader issue of e-democracy, the technology of which may offer people more ways to get information and participate in the political process. Some people are dependent on new solutions to be able to participate in voting, especially the disabled.

Another interpretation is that the pilots do not aim for concrete benefits. Instead, it may be an issue of prestige. Louise Ferguson states that the main goal of the government is modernisation, and that they "have a naïve attitude towards technology and do not see its social implications".

Still, we find four major expectations of e-voting in our data: turnout, administration, accuracy and lifeworld, of which turnout is by far the most important one. The lifeworld argument may be closely related to the turnout issue. Alan Winchcombe states that to make people vote, we have to fit voting in their lifestyles.

4.1.3 Multiple channels

In the UK, the quest for turnout has been translated into experimentation with multiple channels. The idea is that the more choice the voter has in selecting a channel that is convenient to her, the more likely she is to cast a ballot. Alan Winchcombe: "From our research – of which we have done quite a lot the last five years – it appears that voters want a choice. There are still voters who want to go to a polling place to vote there, there are people who want to vote remotely, and there are some who want to vote by post. So I think what will happen is that in the end, we will have a combination of everything, where people have a choice of voting channels, probably three or four." According to Alan Winchcombe, multiple channels can prevent the two main non-political reasons for people not voting: not being able to go to the polling station, or forgetting to go to the polling station. "Certainly with the electronic channels, we can use those to remind people through their e-mail address or mobile phone number to go to vote."

The use of multiple channels leads to different views on security. Multiple channels may both increase and reduce the risks. Ben Fairweather: "The use of multiple channels does not necessarily increase risk. On the one hand it may reduce risk, because there is no single point of failure. On the other hand, it may increase risk, because there are multiple ways to attack the system." Another issue that was raised is the balancing of security between the channels. This is a variant of the well-known equal access argument, stating that changing the voting procedures should not benefit certain groups in society more than others. John Borras: "E-voting should not be too secure. The security should be balanced among the different channels. If some channels are more secure than others, this leads to inequality, which is undesirable."

4.2 Netherlands

4.2.1 Accuracy and efficiency

Most of our Dutch respondents agree that voting machines in polling stations have advantages in terms of efficiency of the process and accuracy and prevention of errors by the voter. René Mazel: "In the paper voting system, there were about 5% votes that had to be checked afterwards because they had arrows and notes on them. 0.5% to 1% remained as invalid. With the voting computer, the number of invalid votes has been reduced to almost zero. On the other hand, the computerised process is much more central. If the programmer makes a mistake, this counts across the board."

Whether these benefits justify introducing electronic voting is another question. As opposed to the UK, there was no clear problem in the Netherlands that had to be solved. Even if turnout may have been slightly lower in some elections, this was not seen as a major problem. Rop Gonggrijp: "There is no need to automate the voting process." Both the turnout and lifeworld arguments hardly seem to play any role in the Dutch discussions.

4.2.2 Increased convenience for expats

Internet voting in the Netherlands is mostly seen as an addition to postal voting for citizens living abroad. The possibility for physically challenged people is also mentioned. Compared to postal voting, it is more transparent and more convenient, according to Esther Beneder. People can see if their vote has been counted, and people can participate on election day itself instead of in advance. Due to the focus on the comparison with postal voting, implementation for a wider audience is only considered hesitantly. Esther Beneder: "Internet voting [...] is mostly like postal

voting. Internet voting should therefore comply with the same rules as postal voting. It should be at least as reliable and accessible. Internet voting should therefore not be compared with other forms of voting."

The experiments are accepted, because for citizens abroad, postal voting has the same disadvantages. Whether Internet voting should be allowed for more people is "a political choice." Key problem in such a decision is the issue of secrecy. Kiosk voting is seen as a compromise. Still, this means that a nation-wide register of voters has to be implemented.

Piet Maclaine Pont mentioned an additional problem. "According to the politicians, the disadvantage of Internet voting is that people who are disinterested in politics will be more likely to vote." A similar remark is made by Maarten Haverkamp. Maarten Haverkamp: "Internet voting will indeed lead to higher turnout, because of convenience. However, the quality of the vote will not be better." Interestingly, no-one in the UK mentioned this objection against the possibility of higher turnout. Criticism was more oriented towards the lack of proof of increased turnout; not towards the desirability of increased turnout itself.

In the past, expectations of Internet voting were higher in the Netherlands. These opinions may have been influenced by the expectations of the pilots in the UK. Maarten Haverkamp: "People had exaggerated expectations of remote voting in the past, which were reconsidered later." The people of the anti-e-voting campaign think expectations are still too high: there is technological optimism. Rop Gonggrijp: "People have a temporary haze before their eyes at the moment. People believe too much in technology. This can also be observed from the Stemwijzer [online voting adviser, WP]. People unthinkingly accept the advice of the Stemwijzer. People are like 'it's a computer, so there must be higher maths behind it.'"

4.2.3   Usability and security

It is often thought, also by some of our respondents, that usability was the main expectation of voting machines in the past. That would explain why security appeared as an issue only recently. However, Kees Aarts has a different opinion. "Previous expectations of e-voting were also about security. Concerning usability, issues were mostly minor, like layout. With the SDU machines it is pretty serious that one first has to choose a party and then a candidate. This should happen simultaneously."

The latter is a particular feature of the list-based proportional system. In the UK, there is no need to discuss how to select one out of hundreds of candidates. So-called "phased voting" – first selecting a party and then a candidate – has been allowed by law in the Netherlands since 1997.

Key expectations of e-voting in the Netherlands are clearly separated between voting machines and online voting. For voting machines, the main expectations are increased accuracy and efficiency. For online voting, increased convenience for expats is the main drive. Both are not primarily seen as means to increase turnout. Some of our respondents even question the desirability of increased turnout.

Within the Netherlands, we find differences in expectations regarding the need for automation. Still, people at the ministry consider the differences in expectations not too profound. René Mazel: "All parties have the same expectations, all from their own perspective. Everyone wishes for safe and convenient elections."

4.3   Conclusions

The main drive behind the pilots in the UK is increasing turnout. This expectation has been translated into a vision of multi-channel voting, to make the experience as convenient as possible for the voter. Other expectations, like improving accuracy and administration and the lifeworld argument are also mentioned, but seemingly to a lesser degree than in other countries.

In the Netherlands, there was no clear problem guiding the implementation of electronic voting. Both the introduction of voting machines and the current experiments with Internet voting were based on benefits in terms of efficiency, accuracy and convenience. The idea that these benefits are important enough to justify e-voting is questioned by the opponents.

5 Risk assessment

5.1 UK

Generally, the insight has spread that electronic voting is a risky technology. Many of the participants indicate that they have become more aware of the risks during their involvement. Opinions differ about which risks are the most important. Alan Winchcombe: "[These] are probably the main two risks: failures of the system and the accuracy of what they are doing. Then there also is the risk that because you are doing it in an unsupervised location the voters themselves may not actually be the persons that cast the ballots. That is the same risk as with postal voting. This appears to be acceptable to the politicians in this country." From this text, we can identify the security goals of availability, integrity and authenticity, respectively.

Peter Ryan: "The main risk of e-voting, if implemented naïvely as capture-and-count, is the difficulty of verifying the correctness. The system is a black box, and you can't have real confidence in the accuracy. There is more feel for the safeguards in the paper system, such as observers." In voting, integrity comes with the additional requirement of verifiability.

According to John Borras, unlikely risks can be used to express reluctance to change. "Politicians are more old-fashioned with respect to e-voting. It may be a threat to their way of life: they need to adapt to stay in touch with the electorate. This also holds for electoral administrators: they are reluctant to change the process. They will use exceptional cases to argue against e-voting, by saying that these complex cases cannot be implemented in technology."

We will cover the aspects of verifiability and authenticity in more detail, since these seem to be the most important ones in the discussion. The analysis of the authenticity discussion will be combined with considerations on the secrecy of the ballot.

5.1.1 Verifiability

John Borras mentioned undetected intrusion as the main risk. What can happen? Peter Facey: "The problem for the voter is that the voter can't really see what is happening, as opposed to putting a ballot in a box. It is hard to see that the vote is counted in the way they intended. That is the big problem of e-voting. You can put all kinds of safeguards in place, but the voter has to have faith in the process. The advocates of e-voting have not been able to do that, and recent incidents make this even more difficult."

Even though these considerations are well-known in other countries, the discussion on verifiability in the UK seems to be different, notably from the US and the Netherlands: Louise Ferguson: "In polling place e-voting, the most important technical problem to be solved is the provision of confidence that an individual's vote is cast in the right way, without the vote being revealed. The one way this has been arrived at so far is a voter verified approach. This concept has led to discussion in other countries, but not in the UK: no-one in authority has mentioned it or expressed a view on it."

Ferguson refers to a so-called "paper trail", in which each individual vote is kept on paper next to the machine counting [10]. It is fairly easy to explain why the paper trail solution is not that popular in the UK: because the UK wishes to increase turnout, the focus is on remote voting, and in remote voting, a paper trail is impossible.[6]

The discussion on verifiability is closely linked to the discussion on the relation between system security and voter confidence. Generally, there is a consensus that remote electronic voting should be at least as secure as postal voting. However, many people judge perception of security to be important, as opposed to reality. Peter Facey: "Perception in elections is equally important as reality. In the UK, the perception is that polling station voting is secure, safe and reliable. The reality is you could walk into my polling station, say that you're me, be given a ballot paper, and vote. There is no proof of ID or mark that you already voted. Perception is that it is secure and we have confidence in it. The problem with new ways of voting is that even if it's more secure, perception may be different and there may be a lack of confidence."

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[6]Because "[t]he voter is not at the point of vote summarization to examine a receipt." [13, p. 211].

Because of these issues, security requirements of electronic voting systems may be stricter than those of traditional voting methods. Peter Facey: "A higher threshold of risk is often applied to e-voting or remote voting than to traditional methods: the security of e-voting should be "beyond doubt", whereas this is not the case for the polling station paper system." The DCA seems to be pragmatic with respect to such requirements. Paul Docker: "The risks of e-voting boil down to systems and perceptions. There is no system that is ultimately secure and safe. People can always find a way to subvert things if they want to. In any system, one needs to take account of what people may try and do. If something comes up within a system that is already there, such as happened in postal voting, one has to make sure that that is addressed and stopped. Perceptions are a big thing, and it is a challenge to overcome, to get people to understand how processes can work and what security can be built in, and develop levels of trust in it."

Thus, the discussion on verifiability appears to be seen as a discussion on voter confidence. Specific measures like paper trail and open source are not mentioned often, if at all.

5.1.2 Secrecy and authenticity

Jason Kitcat: "The secret ballot evolved for very good reasons. We are not that far away from the corruption and bribery that made it necessary. In the 19th century, they estimated that at least 50 % of the votes were bribed or bought." An important issue in the e-voting debate is the secrecy of the ballot. People mention these issues both from the perspective of machines being able to link a vote to a voter and in connection with remote, i.e. unsupervised voting, in which the authorities no longer force a voter to cast a vote in a private environment. Alan Winchcombe: "Having said that, we have done remote electronic voting twice, and our research suggests from the responses we have had that the average elector is not concerned unduly about having to cast their vote with other people present when they are voting remotely from home or in their office. Only a very small percentage – in our case 3 percent – had any concerns about casting their ballot in secret."

The proponents of e-voting quote figures from research indicating that the problems with unsupervised voting are small. The critics are much more sceptical, and find remote voting unacceptable for this and other reasons. Still, the positive view on being able to address the coercion issues is quite different from the consensus in the Netherlands. One of the explanations may lie in the wider allowance of application-based postal voting in the UK in the past. Since 2000, no reason has to be given for requesting a postal ballot. Some pilots used all-postal voting. Concerns about remote voting have been oriented more towards personation than to coercion or family voting, which can be observed from the various interviews. Alan Winchcombe: "I think the system risks and the security of the systems, the system suppliers are happy that they can address those, but I think the biggest problem is still voter identification. Certainly that is one of the things that have to be tested out in different forms, and we may well be doing that next year, in 2007."

Both from the UK's history of weak authentication mechanisms, and from the incidents with postal ballots (such as in Birmingham), it seems reasonable that personation is a major concern in the UK. The importance of the personation issue seems to equal or even outweigh that of the family voting / coercion problem. However, as in other countries, critics do address the secrecy and coercion issue, especially in relation to human rights treaties. Jason Kitcat: "The legal problem is that remote e-voting and postal voting break the various human rights treaties (UN, Europe, UK). They do not meet the secret ballot requirement. The government is aware of this – it is now being investigated by the Council of Europe – but they do not seem to care about treaty obligations. Moreover, the British system is already problematic with respect to this requirement, because of the vote tracing possibility. This has been in place since the introduction of the paper ballot in 1872."

Here, we find another peculiarly British phenomenon. Indeed, the secrecy of the ballot in the UK can be broken by court order. There is a sequence number that can be used to trace the relation between voter and vote, although the physical separation of registration and votes does not make this an easy task. Peter Facey and Ben Fairweather are concerned that keeping the vote

tracing requirement in e-voting makes it too easy to trace, and thus invites breaking the secrecy.

Even though the vote tracing requirement leads to these complications in e-voting, it also influences the discussion on secrecy in remote voting. If remote e-voting does not conform to the treaties, neither does the current British system, and no one is aware of legal challenges to that practice. The vote tracing option may be one of the reasons why the British are less concerned about the requirement of the secret ballot. Indeed, the government does not see any legal problems here. Paul Docker: "The Council of Europe and the Venice Commission have looked at remote voting and e-voting and feel there is no legal issue with that."

5.2   Netherlands

In the Netherlands, the activists have not managed to persuade the government to abandon the existing voting machines. Berry Schoenmakers states that "risk is a calculated property of on the one hand the vulnerabilities and on the other hand the probability of exploitation. [...] The vulnerabilities in voting computers are big, but chances of exploitation in the Netherlands are minimal. That's why we can cope with the risks at this point."

The argument here is that the *context* is important for the security of the voting systems. In the Netherlands, recent experiences with fraud in elections are nearly absent. There was a small case of someone being an observer in a polling station and having an improbable number of votes in exactly that district.[7] Apart from that, people do indeed seem to have confidence in the limited likelihood of vulnerabilities being exploited. This may be a feature of the Dutch multi-party system: no single party will get a majority, and if they do, people will be *very* suspicious. Besides, there seems to be good cooperation in working towards a solution. René Mazel: "We can cope with the risks at this point because everyone has the same interest when it comes to voting computers: they should be fast and reliable."

Of course, the campaign people don't agree, and Gonggrijp apparently declined an invitation to join a committee of advisers. Even if people have the same expectations – there seems to be more consensus in the Netherlands than in the UK – that does not mean that they agree on how to manage the risks. René Mazel: "Everyone has their own specialism, and judges the risks from that role."

5.2.1   Verifiability

Beneder, Schoenmakers, Knoppers, Gonggrijp and Maclaine Pont mention the issue of lack of transparency in voting computers. Haverkamp and Aarts seem to be more subtle in their judgements. Kees Aarts: "The differences between the voting computer and paper voting mostly reside on the process level. With voting computers, the relation between the actual vote and the result is less obvious." Maarten Haverkamp: "The paper system is not transparent either. In a polling place 25 people walk around during the counting."

Within the Ministry, the transparency of the RIES Internet voting system is seen as proof that better voting systems can be built. However, opponents of the present voting systems mainly focus on open source and the paper trail solution. Kees Aarts: "The ideal voting computer will need to be open source, and certainly also have a paper trail for recount purposes." Rop Gonggrijp: "Voting computers can only be used in the future if a paper trail is added. Open source software is also a good initiative, but one will have to be able to guarantee that the right software version has been installed on the voting computer."

Generally, the discussion on the verifiability of voting computers seems to be almost completely separated from the discussion on the quality of transparency in the RIES Internet voting system. Apart from the projects being run by different people, there is no clear reason for this to be the case, and if voting in any polling station is the future goal, this separation may not last. In that case, polling place voting will become much more like Internet voting, because authentication and retrieval of local candidates will be done through network connections. Also, paper trails are much

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[7]http://www.security.nl/article/13917/1, consulted February 19, 2007.

harder to recount then, especially when people vote for local elections in a different district than their own.

5.2.2   Secrecy and authenticity

The recent discovery of the possibility of tempest attacks on the Dutch voting machines made the secret ballot appear on the agenda with full force. Contrary to the expectations of the campaign, the main issue in the media was not the verifiability, but the secrecy of the votes. The tempest issue became dominant in the discussion and public perception. The issue of secrecy is also prevalent in the discussion of Internet voting. Maarten Haverkamp: "You don't have freedom anymore as a voter. Everyone can watch: family voting. This is the most important risk of Internet voting." Esther Beneder: "Ensuring a secret ballot is a great concern. It is not possible to verify that people are not being coerced. Through a clear instruction, people are told to keep their polling code secret, to vote in a quiet environment, etc. This risk is seen as acceptable, because otherwise citizens abroad wouldn't be able to vote."

Still, the lack of secrecy makes people hesitant to expand the use. It is seen as impossible to solve the secrecy problem in remote voting, even when allowing for example overriding a previous vote. Esther Beneder: "The Estonian solution is not complete either." From our interviews in the Netherlands, it appears that the secrecy of the ballot is not particularly associated with human rights treaties.

5.3   Conclusions

In the UK, the most pronounced risks of e-voting are the lack of verifiability and the problem of authenticating the voter. As opposed to other countries, the verifiability discussion does not concentrate on a paper trail. In the UK, authenticity problems are often referred to in terms of personation, whereas family voting and coercion are dominant abroad. This can be explained from the UK's history of weak authentication in elections. The acceptability of remote voting under human rights treaties is questioned. Verifiability is mainly discussed in terms of voter confidence. The issue of perceived security strengthens the security requirements of the systems.

In the Netherlands, verifiability is considered an issue as well. Open source and paper trail are mentioned more often than in the UK. Secrecy is associated with tempest attacks on voting computers on the one hand, and family voting in remote systems on the other. Personation concerns are not that big, although Gonggrijp mentioned vote gathering. This may be due to a lack of experience with postal ballots *within* the country, although proxy voting would also allow for personation.

6   Cooperation

6.1   UK

6.1.1   Local and national

Because of the district-based voting system, there can be a close cooperation between the local authorities, the local candidates and the local electorate. In the UK, the local authorities have the initiative to propose a pilot for a local election. Together with a supplier, they apply to the central government. At the central level, advice is given by the Electoral Commission. There are some limitations to what the local authorities can do, as determined by the central government. They select the companies that the local authorities can contract. Some people are critical about this approach. Peter Facey: "Different approaches were chosen by different authorities. They chose their own supplier, without a clear set of standards that voting systems should meet, which can be dangerous. The suppliers were allowed to bid. This made possible a wide range or experimentations, but the elections were real elections."

The decentralised approach of proposing pilots is different from the centrally steered experiments in the Netherlands. Because there is no postal voting in the Netherlands except for expats, the only acceptable experiment with remote e-voting is for citizens abroad. As for electronic voting machines in the Netherlands, a certification system is in place. If a system has been certified, local authorities are free to use it. There is no need for experimentation, even though risk concerns may change over time, as has been shown.

6.1.2   Technical expertise and certification

The issue of certification turns out to be a real bottleneck in the UK pilots. On the one hand, the central government states that the pilots are run precisely to make clear what kind of requirements should be included in the certification process. On the other hand, critics argue that doing experiments without proper certification of the systems being used is asking for trouble. In the Netherlands, certification for voting machines has been in place since 1997, but this indeed meant that the list of requirements turned out to be incomplete or underspecified many years later.

The differences in opinion in the UK can partly be explained from attitudes towards and trust in the suppliers. If one believes the suppliers are competent enough to deliver reasonably well-designed systems, the need for a certification procedure is less strong than if one believes the technical expertise of the suppliers is insufficient.

According to Louise Ferguson, the vendors have basically been able to present what they want. Ferguson does not think there is any real certification process. She has been in contact with one of the suppliers. She was asked to speak to the team, because they did not know anything about usability. "And these are the kinds of people selling e-voting systems to the government. Not only is there no certification, I think there is a complete lack of knowledge about what they should be buying, what they should be designing, how it should work and how it should be tested." Ferguson points to the US, where many more organisations and commissions are involved. Both she and Peter Facey think the vendors have too much power in the UK.

The local authorities realise that they are dependent on the vendors. Alan Winchcombe: "I'm not a technical person; that's the problem; we have to rely to a certain extent on – you know, we explain what we want to happen – to a certain extent you are totally reliant on the suppliers' technical people being able to deliver and prove to you that what you're asking them to do they are capable of doing."

Some of our respondents suggest that there is strong central steering of the pilots. This does not exclude the initiative being with the local authorities, but the landscape sketched looks different. John Borras: "The Department of Constitutional Affairs sets the agenda for e-voting, and they are responsible for decisions on e-voting systems and projects. The Electoral Commission gives advice. The certification process still needs to be implemented. Suppliers of pilot systems were asked to comply to the guidelines set by the OASIS TC, but there was no formal obligation to do so. The pilots were allowed by special arrangement. The future certification process will be based on the requirements set by the TC."

Even if there is no certification, the government should be able to judge which pilots to accept. Do they have the technical expertise to do that? Louise Ferguson: "They do not have a risk management approach. They do not see it as risky: the technologists will deliver. There is not much appreciation of the chaos that could occur, or what it might mean from a democratic perspective. [...] The technical requirements are expressed in a simplistic manner, or insufficiently expressed. I spend a lot of time in requirements engineering, and I do not think there really are requirements here. If there are any, they are like 'not sms', or 'must fit in with government plans'."

With the DCA, the opinion is that enough technical expertise has been acquired to ensure the quality of the pilots and the ability to set up a certification procedure in the future. Paul Docker: "Specialised organisations were hired to do the quality assurance of the systems, before and after the use. They were mostly procured by the government to assure independence. A formal accreditation system is planned; the pilots should reveal what it is that needs to be accredited and how that process might work. A system security consultant is helping with this. Also the people within government working on system security are involved. Nothing will be introduced

on a mainstream basis without having an accreditation system in place."

6.1.3 Academics

Some of our respondents suggest that the government has rewritten a critical report by academics they hired. It is clear from the different interviews that this concerns the "Technical Options Report" written by Ben Fairweather and Simon Rogerson of the Centre for Computing and Social Responsibility of De Montfort University, Leicester. As we have seen from the interview, Fairweather is very critical about (remote) electronic voting. Since the government is much more optimistic, they may have had an incentive to present the results a bit milder than they were presented by Fairweather and Rogerson. Whether this indeed happened will not be investigated here.

The interesting point of discussion is the role that scientists have in such matters. Does a scientific report constitute evidence, or is it just another voice in the discussion? And what does this mean for the way in which the government should handle such a report? Inevitably, this question will be answered differently by different actors. This also frames the opinions on how seriously the government takes scientific results, and how much influence the latter have. As we have seen, critics have been disappointed in this regard.

Some people are milder in their judgment of this particular issue. Peter Facey: "There has been some impact on the pilots by some reports of academics in the UK, making it more difficult to go ahead. There have been groups of academics that have been very opposed to the process. Most of the research in terms of the practicalities has been done by the EC rather than the academic community."

An interesting question to ask here is whether it is a good division of responsibilities to have the Electoral Commission do the practical research, and consult the academic community only for more fundamental questions. What does this division mean for the opinions of the actors in the network? It can be suggested that such an approach tends to polarise opinions in the academic world, whereas the Electoral Commission is encouraged to adopt a more pragmatic point of view.

It seems that the interest is higher among computer scientists than among political scientists. Louise Ferguson: "E-democracy academics are usually neutral about e-voting in their official pronouncements e.g. published reports. Most academics (including e-democracy ones) think it is not particularly interesting, because it is not an academic problem. Some computer science academics think that the government is making a major mistake." Paul Docker is pleasantly surprised by the number of people working on the cryptology aspects, and the number of conferences. Jason Kitcat suggests that cryptologists are primarily interested because the problem is challenging, without the social responsibility associated with other fields of science.

Even though the motivation of the technical scientists may be considered dubious by some actors, the results can be useful. Both Docker and Ryan state that the DCA is very keen to use scientific results. Ryan also helped with the bids by providing ingredients for the proposal. It seems that there is a strong connection between the DCA and the academic world (of computer science) through this link.

6.1.4 Media and activists

On a local level, there seems to be good cooperation with the media. Alan Winchcombe: "The local media help us very good with free publicity. Our feedback shows us that the local media is a significant source of information on what we're doing in this local area, and that is what I hoped they would do, and that they would be positive about it and get the message across. [...] We tell them what is going on; if there is a problem, we will tell them. If they find out afterwards that there is a problem we haven't told them, then they tend to make more of it than if we told them in the first place."

However, most of our participants are critical about the coverage in the national media. It seems that only the local media are interested, because the pilots are run on a local level. National media are only interested in major events, which usually means problems. According to Jason

Kitcat, "the media barely report on the e-voting issue. They are not interested until there is a problem." Similar remarks were made by John Borras, Peter Facey, Louise Ferguson and Paul Docker.

The media may contribute to a wider debate in society. This has not happened in the UK until 2006. People seem to be expecting something like that, in light of national and international developments. There is more communication among activists within the country, and campaigns have been started in other countries such as the Netherlands. A question that may be asked is why the debate has not been stimulated, particularly in light of the recommendation in the 2002 report: "[...] it seems likely that the issue of public opinion around secrecy needs to be opened to a full and frank public debate in which all interests are encouraged to voice their opinions." [12, p. 64]

Even though there is no campaign, people like Jason Kitcat and Louise Ferguson do seem to have some influence. Paul Docker "Some people expect e-voting to create havoc, and all sorts of expectations need to be addressed. The negative people are concerned about hacking, the system being a black box, tampering with the results. We have to acknowledge that those concerns exist. They do not come from uninformed positions. There are also issues about things that may or may not have happened in other places. These concerns need to be addressed." Louise Ferguson: "[The government] think of me and Jason Kitcat as a kind of fringe activists. We're a pain in the backside for them. This is different though depending on the level of government. There is more appreciation at the electoral administrators' level, even though these people may not understand the technical details. They deal with problems in many elections, and are more likely to accept that new problems may occur."

6.1.5 Law

Apart from the possible problems with human rights treaties mentioned before, the law plays an important part in the pilots. John Borras: "The change in voting practices will require many changes in legislation, for example concerning time of voting and the possibility to override a vote. These changes are realistic, and future generations will simply demand them." Peter Facey: "There is no legal framework for remote e-voting; the concentration has been on making postal voting more secure. If e-voting is to be used, the legislation for postal voting has to be translated." Paul Docker: "There will always be the need for legislation and changes to support implementation. A piece of legislation is created for each pilot: a pilot order. That is a way of helping to develop what will be required in case of mainstream e-voting."

6.2 Netherlands

6.2.1 Local and national

The local authorities in the Netherlands are free to decide which voting equipment to use in polling stations, as long as it has been certified by the Ministry. Internet voting experiments have strong central steering. The Beverwijk local authorities were not allowed to pilot with Internet voting in the 2006 local elections, officially because the law could not be adapted in time.

The two main suppliers, Nedap and SDU, have different marketing strategies. Nedap/Groenendaal sells machines (made by Nedap) with accompanying result calculation software (made by Groenendaal, a one-person firm). SDU offers the elections as a service: they install the equipment and run the process; the local authorities do not own any of the equipment. When the certification of the SDU machines was suspended, the financial consequences mainly hit the company itself. Obviously, this would have been different if the same thing had happened to the Nedaps, because the authorities would have owned the machines.

Due to the proportional voting system in the Netherlands, the candidate lists for national elections are more or less the same all over the country. Because of arrangements that provide for voting in a different polling station and for proxy voting, postal voting is not available for citizens within the country. This explains a larger perceived gap between Internet voting and the present system.

The Electoral Commission has not played a major role in the discussion in the Netherlands. Kees Aarts: "Involved in the decisions were the Ministry of the Interior and Kingdom Relations, commercial partners and the Electoral Commission. The Electoral Commission has always been a bit too silent; they regret that now."

6.2.2 Technical expertise and certification

Opinions about the technical expertise in the Dutch process are very different, even among critics. This concerns both the technical expertise of the suppliers and that of the government. Rop Gonggrijp: "There is no technical expertise with the suppliers at the moment. They have not done any research for years. Nedap's voting computer is based on hardware from the '80s, and nothing has been changed since. At SDU, they just bought a computer with embedded Windows and ran a voting program on it." Peter Knoppers: "The suppliers have enough knowledge about voting computers and their limitations. However, the problems with voting computers have been underestimated for a long time. Issues like transparency have never been thought about, such that this knowledge has not been turned into technology."

The developers of the technical systems are supposed to understand what they are designing. In this context, we find a type of criticism that we recognise from the UK discussion. Maarten Haverkamp: "Suppliers don't consider the social and democratic risks. They view the development of a voting system more as a challenge." Kees Aarts: "The suppliers have a blind spot for free and secret elections. They are too much focused upon the technical solutions."

This is not the only blind spot that occurred in the e-voting discussions in the Netherlands. The current suspension of the certification of the SDU voting machines is not due to a failure to meet the requirements; rather, the requirements were judged to be incomplete.[8] Piet Maclaine Pont: "Nedap and SDU have always complied with the requirements posed by the Ministry." Maarten Haverkamp: "The roles have been reversed: now the suppliers have to prove that their systems are secure." Rop Gonggrijp "I don't expect anything of the suppliers. They are angry and don't see what's wrong with their systems. They are convinced of their own products, and they view the pressure group as a bunch of hackers. Based on such an attitude, nothing new can be expected from them."

Next to the expertise of the suppliers, expertise is also required with the government and the politicians. Some of our respondents think that such expertise is increasing. Maarten Haverkamp: "There is enough technical expertise at the moment, considering for example the involvement of the AIVD [intelligence service, WP]. If there were any more problems, we would have known by now. However, three months ago [August 2006, WP] this expertise had not been attracted. Things were underestimated back then. Questions that were answered then turned out not to be completely disposed of."

Others are less convinced. Peter Knoppers: "Politicians have no understanding of computers, and therefore no understanding of voting computers." Kees Aarts: "The past seven years, politicians have been parroting the opinion articles of the papers. Only few of them have enough expertise."

A generally acknowledged view is phrased by Rop Gonggrijp: "The government has slowly lost control over the elections, giving control to the vendors. The expectation is that the government will make the elections its own task again and that the vendors will only have an executive role." The recent involvement of the intelligence service proves that the government is taking a more pro-active role, and that they no longer take the existing requirements and the suppliers' expertise for granted.

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[8]For example, the requirements state that the secrecy of the vote should be retained in the storage of the vote. They do *not* state that the secrecy should be retained in the process of casting. Therefore, the tempest attack does not lead to a failure to meet the requirements.

6.2.3 Academics

Nationally and internationally, anti-e-voting activists spread the view that most people agree on the paper trail solution. Although they do not seem to have succeeded in the UK, the paper trail notion is more prevalent in the Netherlands. Rop Gonggrijp: "Opinions about the voting computer are diverse. However, scientists and activists mostly consider a paper trail."

Some cryptologists think that there are better solutions. Berry Schoenmakers: "Politicians have introduced many organisational security measures for voting computers, instead of cryptographic measures." However, cryptographic systems should be more advanced than the present ones. "Initiatives like RIES are insufficient: they were made by a master student. But means of authentication like DigiD [Dutch username/password-based authentication system for public services, WP] are not up to the mark either."

The Electoral Commission seems to have a role in acquiring academic expertise for the voting process. Esther Beneder: "On a higher level, the Electoral Commission have visited various conferences. They look at the topic of Internet voting from a more abstract and long-term perspective." This is in stark contrast with the role of the British Electoral Commission, which is responsible for the evaluation of all local pilots.

Kees Aarts suggests that the current modesty of the experiments in the Netherlands may be due to influence from science. "Developments in science are being followed carefully. If not, we would see even more of exceptional and diverse experiments." However, he also thinks that the role of science can be improved. "As for the process, social scientists should cooperate more with computer scientists (technical people). [...] Also, the consumers of this knowledge should cooperate more."

6.2.4 Media and activists

Peter Knoppers: "Nowadays the media represents the facts adequately. This has been different in the past. I offered to NRC and De Volkskrant [two Dutch quality newspapers, WP] a critical statement, but they wouldn't hear of it." Apparently, the media have been sensitised to the issue by the campaign. As in the UK, most of our respondents are critical about the media's ability to cover the whole process. René Mazel: "The media only pick out the problems as they appear now, without looking to the past or the process around e-voting."

Most people in the Netherlands agree that the anti-e-voting campaign is a good thing, if only for the fact that they made people sensitive to possibilities to improve the system. Kees Aarts: "The pressure group of Rop Gonggrijp is a good initiative. They are critical people who have a lot of expertise in these matters. What they can be blamed for is the fact that they only started criticising the voting computers after they were introduced in Amsterdam, while they had been accepted for a long time in the rest of the country. They build up a good knowledge database, preventing a too one-sided coverage." Esther Beneder: "It is a good thing that there are pressure groups like wijvertrouwenstemcomputersniet.nl in society. They make a good contribution to the developments. They see aspects that the government doesn't see. However, voting computers cannot be compared with Internet voting."

Again, Internet voting is seen as a completely different matter. Piet Maclaine Pont thinks that the campaign may be beneficial for the Internet voting efforts. Piet Maclaine Pont: "The verifiability as demanded by Gonggrijp can be made a reality by RIES. In this sense, wijvertrouwenstemcomputersniet.nl has positive consequences for RIES." The pressure group does not agree that electronic means of verification are good enough.

6.2.5 Law

Piet Maclaine Pont: "The Ministry easily gets nervous if systems don't meet their expectations. They look very much from the point of view of the Election Law, and RIES has to conform with the law in detail. At this moment, the Election Law stands in the way of Internet voting. The Election Law regulates the voting process even on a practical level, particularly concerning polling stations

and transport of ballots or data carriers. Obviously, the process will be completely different in case of Internet voting."[9]

The water board elections did not have to face the requirements of the Election Law. When it was decided to use the RIES Internet voting system in voting for expats as well, security became even more important. External security companies checked the voting system, but certification agencies are not involved.

Maarten Haverkamp: "There are no direct legal obstructions to Internet voting, otherwise it wouldn't be possible now. However, there are political impediments. As the largest governing party, the CDA [Christian Democrats, WP] are against." What we can realise from this quote is the importance of the Dutch system of proportional representation and many different parties. Because of the multi-party system, no single party will ever have the opportunity to implement its ideas about modernising the voting process without having to agree with other parties. The modernisation initiative by the Labour party in the UK would not have been possible in the same way in the Dutch system.

6.3   Conclusions

In the UK, the initiative for the pilots is local, and there is currently no framework for certification. In the Netherlands, local authorities can use voting equipment that has been certified, but they cannot experiment with different methods of voting. The only available "niche" for experimentation are expats. The UK has the advantage that in a district-based system, elections are local by definition.

Judgements about technical expertise are very different in both countries. In the UK as well as the Netherlands, the government is criticised for lacking the necessary knowledge. The same holds for the suppliers. However, in both countries other respondents are much more optimistic about the levels of available expertise. The differences may partly be explained from the level of influence that the people had on the developments themselves. The Electoral Commission of the UK has been much more involved than its counterpart in the Netherlands. The UK Electoral Commission is responsible for evaluating the pilots, whereas the Dutch "Kiesraad" only studies the processes on a more abstract level. This may explain the more conservative attitude of the Dutch council.

In the UK, academics have been heavily involved in the process, mainly on a theoretical level. On the one hand, this ensures that there is a level of acceptance within the academic community, if their points of view are taken into account. On the other hand, if the results presented by the scientists do not coincide with the government's point of view, these have to be reconciled, which will probably leave some parties unhappy. The division of responsibilities between academics (theoretical research) and the Electoral Commission (practical research) may have had influence on the actors' positions in the debate. In the Netherlands, academics have mostly followed the developments from the sideline, although some were invited to participate in testing and evaluation.

In both countries, coverage by the media is appreciated, but they are said to be missing the process and the bigger picture. Apart from the secrecy issue and the human rights treaties in the UK discussion, the law is not seen as an insurmountable obstacle.

The contribution by the anti-e-voting campaign in the Netherlands is acknowledged by the various actors. Similarly, the UK government realises that the criticism is well-informed and has to be taken into account.

In both countries, the vendors are said to have too much power over the process. However, government steering seems to be much stronger in the UK than it has been in the Netherlands until the launch of the campaign.

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[9]The need for adaptation of the law was acknowledged by the OSCE report on the parliamentary elections [11].

7 Learning experiences

7.1 UK

7.1.1 Learning from the pilots

Paul Docker: "The pilots met the expectations of those who put them in place. The pilots happened and they were successful. There are no cases of pilots that collapsed or elections that did not happen or results that were hacked. They tested out if people would want to use the different voting processes, which they seemed to want to do. They tested out processes that could be used. They provide a basis for going forward, and for looking at things like accreditation and quality assurance. [...] The DCA seeks to identify all the issues and risks, but if some are exposed by actually piloting, this is part of what the pilots are for."

Thus, the pilots seem to have met the expectations of the government. It is not clear from the interviews if any concrete issues were identified. Even if none of the pilots collapsed, there may be interesting points of improvement. Many participants are critical about the ability of the government to learn from the pilots. Peter Ryan: "My expectations are that the government will run a bunch of trials, and the result will be more or less successful, because there will be no particular problems. This also means that we won't learn a lot. I hope that pilots are run that we can learn something from, but it is not clear how the evaluation will work. It would be interesting to see someone hack a weak system." Jason Kitcat thinks that experimenting is "brave for a government to do, but they don't seem to learn the lessons; everything has to be reported as a success."

Louise Ferguson criticises the pilots consists for mainly three things:

1. the government has not learnt from the pilots: they just run another pilot like the last pilot;

2. the reports of the pilots were very constrained, and problems were not mentioned in the published reports (only mentioned informally, in private conversations);

3. there is still insufficient time allowed for the roll-out of the new pilots: prospectus gives 4 weeks for proposals, then 20 weeks from proposal acceptance deadline to actual elections.

In an evaluation of the 2002 pilots, the Electoral Commission [2] already advised to give more time for the procurement process. Three of our respondents criticise the government for not addressing this issue. A complicating factor is the lack of fixed election dates in the UK. This makes it difficult to plan the process of developing systems. In the Netherlands, there was a similar problem in 2006, since the elections, planned for May 2007, were advanced to November 2006 because of problems within the governing coalition.

The DCA does not see any problems in doing more of the same. Paul Docker: "The future e-voting pilots are about doing more of the same. They are about refining the process and what we are seeking to learn. The big point is piloting for learning that informs how we go about, what we need to address, whether people want it. If people don't want it, it does not make sense to go ahead, but they seem to want it [...]. Future pilots will help to refine to process, help develop it and to get to a place where a decision can be made on whether to bring this in or not." Apart from identifying issues, there also seems to be a clear educational goal in running pilots. What is needed to implement e-voting on a larger scale is people who understand what is going on. According to Alan Winchcombe, both political and technical expertise are improving because of the pilots.

That the pilots were successful in local elections, does not mean that they scale to national ones without problems. Ben Fairweather: "In the previous experiments, the risks were very small, because the context was the local elections. In a general election, additional attacks are to be expected: there are higher benefits, more hackers will be interested, and they will put in more resources. Also, there will be more points of attack." The same issue is mentioned by John Borras.

In general, the critics blame the government for not managing the process properly. The same criticism can be heard in the Netherlands concerning voting machines, but these had already been

introduced on a large scale, and the government apparently had the impression that the project was "finished".

Some people think that learning experiences have made the government decide not to pilot in 2004-2005, and to have only limited pilots in 2006. Many of our participants think that the government stopped the pilots because of new insights in the risks. According to the government, as quoted before, the simple reason is that they were not allowed to pilot in combined elections. In 2006, indeed, the focus was on postal voting because of the incidents in Birmingham 2 years earlier. John Borras: "There are political reasons for not continuing faster. This has mainly to do with the problems with the postal voting trials. First, the problems with postal voting have to be solved before e-voting pilots can be continued."

7.1.2 Learning from other countries

The UK government is adopting a more subtle approach than some other countries. Paul Docker: "India and Estonia run national elections with e-voting elements or using e-voting machines. You see that happening. Back in the days of early piloting, 2000-2001, people's expectations were that it would take a long time for people to get comfortable with things, and that it would happen on an incremental basis. When you see other countries going for it in a big way, and doing it on a national basis, you think: OK, there are other people taking different approaches. That is not causing us to suddenly leap forward. That just does not suit us in our environment. Still, all of that sort of changes people's expectations as they see it happening in other places or a larger scale or on a more consistent basis. You also hear of risks and challenges in other countries, issues that people have in other countries, and that helps you to refine your thinking about the common issues and people's perceptions."

Other participants also point to the influence of discussions in other countries on the UK situation. Alan Winchcombe: "We have had a look at what has been going on in other places, and it seems to become more and more widely expected. [...] With more and more people coming on to do this, it gives you more confidence that you are going in the right direction." Jason Kitcat: "Possibly events in other countries have made people in general more wary: the level of support by technologically knowledgeable people dropped. You don't really think through the implications unless you understand why it is a difficult problem. Generally support has fallen, but this is not public."

Thus, developments in other countries are seen both as *increasing* expectations and as *decreasing* expectations. Proponents will focus on positive experiences abroad, whereas opponents will stress the problems.

7.1.3 Changed expectations

Once pilots had been run, expectations of people involved changed, notably the voters, and the local authorities that had put a lot of effort in getting the voters ready for the new technologies. Alan Winchcombe: "Certainly, when we had not done e-voting for two years because we weren't allowed to we had to do a reverse education program and go back to the voters and explain to them why we couldn't do it. We got a lot of feedback from voters who were very unhappy having been able to e-vote for two years in succession and having to go back to a polling place again."

Paul Docker: "Where local authorities have said "right, we'll have a go at this" and some of them have said "you know, we're sort of a positive go ahead type of organisation that wants to be trying things out," those ones are constantly coming back to us saying "please, please, please, can we do it again?" I think it has been a bit frustrating for some of them they haven't been able to pilot since 2003. [...] On a general level, administrators and electors now think and expect that this thing is coming. That is a change in expectations: people are expecting things to happen. The younger generation is growing up in an environment where things are accessible to them electronically, and research indicates they say "yes, give me the opportunity to vote electronically."

These remarks suggest that experiments are not just neutral means of assessing benefits and risks. Instead, the experiments lead to expectations on the continuation of similar services. The perceived benefits in terms of improved service are then more visible than possible long-term consequences, such as increased attempts at rigging and hacking in more important elections, as the critics would have it.

It seems that the main aspect of learning is the consciousness of the importance of the security of the systems. The consciousness of security threats often increases with the knowledge of the intricacies of electronic voting. Peter Ryan: "I am not exactly sure whether views on electronic means have changed: the government always had a very cautious view. New tenders stress the importance of security a bit more than previous ones: the government seems to be more aware of security dangers."

Peter Facey: "In the beginning of my involvement, I was less worried about security and more about the potential benefits of the system in terms of making it easier to participate. At the end of the process, I have come to recognise that unless we deal with security and perception of security, the impact on people's willingness to vote will be negative instead of positive. The changes in expectations of others reflect my own, but may go a bit too far in the sense that there is a perception within the political community that security has to be the sole reason for doing it and that is has to be 100% secure. I think there is no point in having a system that is 100% secure if it is so difficult to use that no-one uses it, or the other way round. There needs to be a balance."

Whereas some of our participants stressed the importance of balancing the different requirements, some think there is no good solution there. Both Louise Ferguson and Ben Fairweather do not have a lot of confidence in the future of e-voting. Ferguson: "Something has to go wrong in a country before people do anything; they have to have a disaster to realise their mistakes." Fairweather: "The technical problems are very big, and I do not see much will to solve them."

Alan Winchcombe is much more optimistic about the experimental approach of the government. Alan Winchcombe: "My expectations have not changed. We are probably getting to where we wanted to be: trying to improve turnout, giving people more choice, and that's what we started out to do. We are probably getting better at that: we're increasing choices, the technology has moved on. The risks are still there, but we are getting better at managing those, as we learn from one pilot to the next. You just build on what you've experienced before." John Borras: "I am confident that the general introduction of e-voting is a question of 'when' rather than 'if'.

7.2 Netherlands

7.2.1 Learning from the status quo and experiments

In the Netherlands, as we have already seen, it took a campaign to initiate large-scale learning in the domain of voting machines. As for Internet voting, the government will probably learn most from a comparison between the 2004 and 2006 experiments. Quite different systems were used. Of course, this hardly provides as much material as the British Electoral Commission has available. Compared to the British situation, the focus on learning appears to be less strong in general. It is mentioned far less often, if at all.

7.2.2 Learning from other countries

Some of our respondents are quite confident in their opinion that issues abroad do not really influence the process in the Netherlands. René Mazel: "Developments in other countries do not affect the process in the Netherlands, because they have different voting systems there. For example, Ireland uses a GPRS modem because the result is calculated at a central location. For this reason, lessons from the developments in other countries are minimal." Maarten Haverkamp: "Apparently, there is no cooperation with other countries, otherwise the reactions would have been different to the Irish rejection and the fact that the Nedap machines had to be adapted for German use."

Others have quite different views, and see results from other countries as helpful. Peter Knoppers: "The Irish rejection was a particularly useful development." Kees Aarts: "The US elections in 2000 have woken up Dutch politicians. The various experiments in the UK are being followed with great care too. The current experiments with Internet voting are a consequence thereof. Also, the Irish rejection slowed down the process in the Netherlands."

As for knowledge of technology, foreign companies may contribute to the now completely Dutch market. Berry Schoenmakers: "From the point of view of cryptography, the experiments are bad at the moment. In the future, more foreign companies should be involved."

7.2.3 Changed expectations

International developments, among other things, may lead to improvements in the Dutch voting equipment. René Mazel: "There is a gradual improvement of the voting computer. However, we are facing new leap now, partly because of the recommendations of the Council of Europe and the "energy" of Rop Gonggrijp. Because of the recommendations, people started thinking about a new generation of voting machines." Kees Aarts: "Yes, there are changes. With the voting computer, security has recently become an issue. With Internet voting, changes have been going on for a longer time. People have become more and more critical towards the context of Internet voting as opposed to the technology itself."

As for Internet voting, it is generally agreed upon that expectations have been reduced with respect to some years ago. Still, expectations about the future of e-voting are quite diverse. René Mazel: "The future of e-voting is certain, because society can't do without computers." Peter Knoppers: "I expect the voting computers in the Netherlands to be a fading phenomenon, since transparency for the ordinary citizen cannot be guaranteed." Rop Gonggrijp: "I expect (and hope) that the paper ballot will return. But if another generation of voting computers arrives, they will most probably be equipped with a paper trail to enable manual recounts." Maarten Haverkamp: "I am afraid that in a mood of "we have to do something" people will again choose for Internet voting in order to attempt to increase turnout. However, changing the means of voting is not the way to get people involved in politics." Kees Aarts: "In the future, people will be able to vote in any polling station by means of a voting machine. No Internet voting for the ordinary citizen."

7.3 Conclusions

In the UK, the pilots were set up with the explicit goal of learning. Extensive evaluations have taken place. Some of our respondents are not satisfied with the learning curve of the government, especially when it comes to the time scale of the pilots. People have all kinds of explanations for why there were no pilots in some years, but the government states they were simply not allowed to pilot.

In the Netherlands, not much has been learnt since the electronic voting machines were introduced on a large scale, and since the requirements were specified in 1997. In terms of Kuhn's philosophy of science [9], the "paradigm" has remained largely unaltered, even though there were some "anomalies", especially the Irish rejection. After the launch of the campaign, a strong demand for new learning has emerged, which can be called a "revolution" in thinking about electronic voting. Until now, this revolution has not led to spectacular technological changes. The solutions implemented to solve the problems are considered ad-hoc, and based on the existing paradigm. The commission that has been initiated may change this.

As for Internet voting, the experiments in the Netherlands seem to be very careful, and the implications have been understood before anything was implemented. There does not seem to be a discontinuity in this development. There is more consensus in the Netherlands than in the UK about what future e-voting will look like. Most of our respondents do not see Internet voting happen on a large scale. In the UK, the government has the expectation of having an e-enabled general election around 2010, which will include remote voting.

8   Conclusions

From our study, we can conclude the following:

- In the UK, increasing turnout is the drive for experimenting with electronic voting. In the Netherlands, this is not an issue. Because electronic voting machines in polling stations are not likely to increase turnout, most actors in the UK do not see a use for those in their country;

- In the UK, the experiments are about offering voters a choice. There is no intention to select only one of the possible channels. It is argued that this has security benefits as well. In the Netherlands, electronic voting machines have almost everywhere *replaced* the paper ballot, and there is no indication that the approach will be different in the future;

- In the UK, postal ballots on application have been available for everyone. In the Netherlands, postal voting was only allowed for citizens staying abroad during the elections. The Dutch are much more hesitant in broadening the scope of remote forms of voting;

- In the UK, piloting is *only* allowed in local elections; in the Netherlands, it is *not* possible to pilot in local elections, since expats are only eligible in national or European elections;

- The UK Electoral Commission was created together with the pilots in 2000; in the Netherlands, the Electoral Commission (Kiesraad) exists since 1951, and may therefore be more traditional with respect to the voting process. They explicitly stated that they do not like experiments in elections [8]. The role of the British EC is more practical (evaluation of pilots);

- In the UK, the discussion on the verifiability of voting machines is seen as a discussion on how to provide the voters with confidence. In the Netherlands, this discussion has a more specific focus, namely paper trail and open source;

- One of the problems with remote voting is the lack of control over the voting environment (unsupervised voting). Some actors indicate this leads to problems with authenticity, others refer to coercion. This indicates a difference in perception of the way in which fraud may take place. Personation seems to be the main concern in the UK (which makes sense in the context of history), whereas coercion (family voting) is dominant in the Netherlands;

- In the UK, the notion of the privacy of the vote is strongly linked to the ability to trace votes on court order; in the Netherlands, the notion is now linked to tempest attacks (detecting votes from radio emission of the device);

- The initiative for experiments in the UK is strongly decentralised, as opposed to the Dutch situation. This may be explained from the voting system: in single-member constituencies, an election is local *by definition*. This provides more niches for experiments, also in general elections;[10]

- In the UK, the government already seems to have the initiative in e-voting matters, even though critics argue that the vendors have too much power. In the Netherlands, the government is expected to take back the initiative;

- In the UK, there is no certification yet, because the government is not sure about what the requirements should look like. In the Netherlands, there are requirements for voting machines, but these have not been updated since 1997;

- In the UK, various actors criticise the government for doing "more of the same" and not learning from the experiments. The government indicate that they wish to learn precisely from repeated experimentation. In the Netherlands, it took a campaign to initiate learning;

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[10]In the Netherlands, local elections might also be used as niches. Still, the fact that elections are *perceived* as local matters in the UK *amplifies* their suitability as niches (cf. [14]).

variable	dimension	UK	Netherlands
expectations	drive	turnout	modernisation/administration
	channels	multiple	single
risks	machine verifiability	voter confidence	open source & paper trail
	authenticity concerns	personation	coercion
	privacy concerns	vote tracing	radio emission
network	remote voting	on demand since 2000	postal for expats, liberalised proxy
	experiments	local elections	general & European elections
	Electoral Commission	2000	1951
	steering policy	decentral	central
	current steering	strong	weak
	legal embedding	pilot law only	pilot law + certification
	requirements	none	from 1997
learning	time	gradual	campaign
	future	general election	no explicit plan

Table 1: Summary of results of the data analysis.

- In the UK, there is an explicit expectation of having remote e-voting in a general election; in the Netherlands, it is only meant for expats, without any explicit expectations for the future.

We summarise these results in table 1. The results of our comparative study on e-voting indicate that conceptualisations of e-voting may differ between countries. It was shown that the differences in discussions on e-voting in the UK and the Netherlands can be partly explained from expectations, cooperation and learning experiences, which again are related to cultural and historic differences. If e-voting is seen as an issue of turnout, then remote e-voting is key, and a paper trail is not interesting. If voting computers and Internet voting are seen as different issues, then methods of verifiability in Internet voting are not discussed in the context of voting computers. If authenticity has been an issue in elections, then it will be even more so in e-voting, and possibly more important than coercion.

Such cultural differences imply that systems developed for use in a particular country may not meet the requirements in another. Requirements are specified in a discourse in which distinctions are made based on culture, rather than a universal frame of reference. This confirms our thesis that there is no meaningful distinction between "actual security" and "perceived security".

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