

Appendix 5A

Comparative Assessment: Comparison of Additional Criteria

Introduction

In addition to the secrecy and accuracy attributes discussed in *section 5.2. of Part 5*, the Commission has identified other important attributes without which any comparative assessment of both systems would be incomplete.

These attributes have accordingly been considered as part of the Commission's work but, as they do not relate to the secrecy or accuracy of either system, they have not been included in the Commission's analysis for the purposes of its comparative assessment in *Part 5*, nor have they formed the basis of the Commission's conclusion thereon.

Comparison of Additional Criteria

AC.1: Deliberately Spoiled Votes

As has already been indicated in *section 5.2. of Part 5*, it is a strength of the chosen system that it eliminates the possibility that voters may spoil their votes accidentally. Correspondingly however, by eliminating the casting of invalid ballots, including those ballots on which all preferences are left intentionally blank or on which the voter writes or makes other marks which render it knowingly invalid, the chosen system also significantly limits the option offered by the paper system for voters to deliberately spoil their votes and to have that fact recorded in the ballot paper accounts.

Approximately half of the 1.6%⁷⁸ of all ballots cast at elections and referenda in Ireland since 1985 that were invalid are believed to have been deliberately invalidated in this way. While this is not a matter that can directly affect the accuracy of the result of an election (as such votes are not counted under Irish count rules but they are reported in the ballot paper accounts), it nonetheless limits the freedom of expression that is currently available to voters.

AC.2: Anonymous Blank or Null Votes

A closely related difference between the two systems also exists in the case of voters who wish to cast a blank or null vote anonymously under the chosen system, corresponding to the act of anonymously placing an unmarked or otherwise spoiled ballot paper in the ballot box under the paper system.

As it is not possible to press the cast vote button and have a blank or null vote recorded by the chosen system (other than in a limited way in the case of a multiple ballot as discussed below), such voters must walk away from the machine and leave it activated. The fact that they have not expressed any preference or cast a vote will thus be revealed to the election official, who must reset the machine for the next user, and this will also be revealed to any other observer standing nearby. Although the reset of the machine will be recorded in the accounts of the machine (and the fact that a voter turned out to vote but did not express any preferences will thus be officially known) the manner in which this occurs under the chosen system means that it is not possible for persons to do this anonymously as in the case of the paper system.

⁷⁸ Source: Official election results supplied by the Department of the Environment, Heritage and Local Government.

While it has already been recognised in the Commission's previous reports⁷⁹ that the right to secrecy of such voters is not beyond question, particularly in the context of elections that are determined on the basis of only those votes cast which actually contain preferences, this issue nonetheless represents a behavioural difference between both systems and, for those voters concerned, it does limit their ability to cast a blank or null vote anonymously under the chosen system. The issue could be resolved by the addition of either an abstention button as an alternative to the cast vote button or the introduction of a "none of the above" preference on each ballot.

AC.3: Consistency in Allowing Spoiled Votes

A further related issue is the behaviour of either system in allowing and handling ballots which are invalid due to being left blank, whether accidentally or deliberately. Under the paper system, the possibility of casting such a vote is available uniformly to the voter, including at multiple simultaneous elections, in that they may choose not to mark one, more than one, or all of their ballot papers and/or may choose whether or not thereafter to insert any one or more of such ballot papers in the appropriate ballot box or boxes.

Under the chosen system, the possibility of casting an apparently blank ballot in this way is more limited. In the case of a single poll, it is not possible to operate the cast vote button unless at least one preference has been recorded on the ballot paper whereas at multiple simultaneous polls it is possible to express preferences in one or more ballots and to operate the cast vote button while leaving other ballots blank. The behaviour of the chosen system is thus inconsistent in allowing blank ballots.

AC.4: Transparency and Voter Trust

As noted in *section 5.2 of Part 5* in the context of audit, it is important that the conduct of elections not only fulfils the objectives of secrecy and accuracy, but can transparently be seen by everyone to do this. A voting process that is in fact secret and accurate is of little value if it is widely perceived not to be so, and if its secrecy and accuracy cannot be demonstrated. The issues of transparency and voter trust are thus closely linked because, while it is in theory possible that voters would trust, and find legitimate, a system that cannot be shown to be secret and accurate, they are far more likely to trust a system whose secrecy and accuracy can transparently be demonstrated.

With the paper system, it is necessary for voters to place great trust in senior election officials, since corrupt election officials have it in their power to undermine an election. Neither the paper ballot nor the chosen electronic system will be trusted and perceived as legitimate by voters if there is no trust in senior election officials.

Subject to this caveat, voters in Ireland have clearly come to trust the existing paper voting system. The paper system is also transparent in that, at all stages of the process (except when ballot boxes are in the custody of election officials en route from the polling station to the count centre, when the theoretical opportunity for malpractice is at its greatest) the process of casting and counting paper votes is under direct public scrutiny. The legitimacy of the current paper system in Ireland has thus been solidly confirmed; there is no sense whatsoever in which the move to electronic voting in Ireland was motivated by public distrust in paper voting.

⁷⁹ First Report of the Commission on Electronic Voting, December, 2004: Part 2 p.34; Part 3 p.46; Part 5 p.67.

Any new system of voting, including the chosen system, must be able to establish at least the same levels of trust as exist for the system being replaced. In this regard, any voting system based on computers has something of an uphill task, since most members of the public who have used computers will have experienced some form of computer failure or computer-related loss of important electronic data. Even those who do not use computers may well have encountered some incorrect occurrence in the course of their daily lives that is subsequently corrected and attributed to a “computer error”, by which is almost invariably meant an error on the part of a human computer operator or programmer.

A problem for many electronic systems, including the chosen system, in establishing trust among sceptics is that it does not transparently translate what voters do in the polling booth into an election result. Voters enter their preferences into a voting machine, it is processed with other votes in the computer and an election result is declared. Two related features that might enhance voter trust in electronic voting are absent from the chosen system, as currently proposed for deployment. The first is parallel running, the second is a voter verifiable audit trail.

Parallel running involves running the existing paper system and the chosen electronic system in parallel for one or more national elections, to demonstrate that both produce identical results. This is standard practice in the introduction of many mission critical computer systems, since it is important to demonstrate that the new system produces the intended results. This is demonstrated by showing it produces the same results as an existing tried and tested system designed to do the same thing. Parallel running of two systems for counting votes sounds attractive in theory but in practice generates some more or less intractable problems. The main problem is to ensure that the two systems running in parallel have identical inputs, in terms of votes cast. If, on the one hand, voters are asked to vote twice – using both paper and electronic systems – it is almost certain that some voters will vote in different ways on the two systems. If, on the other hand, either human keyboard operators or optical scanners are used to translate paper votes into electronic data files, at least some level of error is also almost certain. Even if the two parallel systems do indeed do exactly the same thing, it is likely that they will have somewhat different inputs and thus produce somewhat different outputs.

The meaning of a voter verifiable audit trail (VVAT) was discussed in *section 5.2 of Part 5*, in the context of audit as an accuracy consideration during vote recording. In the context of public trust in electronic voting, the availability of a VVAT creates a situation in which paper and electronic voting systems are in effect run in parallel. Even if the paper system is almost never used, voters know that it *could* be used to check any electronic result. Having approved the paper printout of the vote in the polling booth, and knowing that those paper printouts can be used to check the result of any electronic count, the voter knows that the existing trusted paper system can be brought to bear in situations where there is some doubt about the result. The desirability of a VVAT in this context was perhaps the most pervasive point made in all of the public submissions⁸⁰ made to the Commission in the context of its previous reports. Under the chosen system, with no VVAT, there is no independent way of resolving any doubt in an electronic voting result. Should such doubt arise, this creates the potential for the legitimacy of the system to be undermined.

Taking all of these factors into account it is clear that voter trust in the existing paper system has long been firmly established. Although public trust in electronic voting generally might well be enhanced by the use of an alternative system incorporating a voter verifiable audit trail, public trust in the chosen electronic system as currently proposed remains to be established.

⁸⁰ First Report of the Commission on Electronic Voting, December, 2004: Part 3 and Appendix 3.

AC.5: Ease of Use by Voters

Most indications from ordinary Irish voters who have actually used the voting machine in a real election suggest they found it easy to use when it was deployed in three constituencies on a trial basis in the 2002 Dáil election. This trial, however, involved a single poll being held on election day, rather than multiple simultaneous polls. The Commission's findings, reported in *section 3.2.1 of Part 3*, suggest there may be usability issues with the use of the voting machine at multiple polls, given the possibility that voters may inadvertently not vote in all desired polls, or not express all desired preferences in some poll.

The Commission has also identified categories of persons, namely those with disabilities and some elderly or technophobic voters who may find using a voting machine more difficult. On the other hand, it is likely that voters with literacy difficulties will find using the voting machine easier than reading and marking their preferences on ballot papers and that this may ultimately lead to increased voter participation.

AC.6: General Vulnerability to Malpractice

When considering malpractice, a distinction must be made between three cases: malpractice by election officials or other service providers at the highest level of the system; malpractice by a maverick individual with authorised access from within the system; and malpractice by an unauthorised person trying to "attack" the system from outside.

As worldwide experience has shown, no electoral system is proof against malpractice by election officials or service providers operating at the highest level. However, even with the existence of independent external observers, the possibility of undetected malpractice by such persons is greater under electronic voting in general since so many crucial functions are carried out away from public scrutiny.

For the same reason, there are opportunities under the chosen system for malpractice by a maverick insider with authorised access – particularly given the ease, noted in *section 3.3.2 of Part 3*, with which election data (including votes) can currently be accessed and edited. The opportunities for a single maverick insider to manipulate an election are fewer under paper voting.

There is very little possibility for an unauthorised outsider to attack a paper ballot in an undetected way. For example, if a skilled attacker were to gain undetected access to the location where ballot boxes are stored between elections, there is nothing much that he or she would be able to do. Attack of the chosen system by an unauthorised outsider is also very difficult though, as reported in *Part 3*, it is not impossible. Thus, if a skilled attacker were to gain undetected access to the location where voting machines were stored between elections, the potential consequences are more serious.

AC.7: Speed of Counting

The single transferable vote system used in Irish elections is a complicated voting system that takes a long time to count by hand. It is not uncommon for such counts to take more than one day. Counting such votes electronically takes a matter of minutes, most of which involves the computer waiting for inputs from a human operator. While speed of counting lies beyond the scope of the

Commission's work in relation to secrecy and accuracy of the chosen system, and while it may also have a low priority for voters, it is nonetheless useful to include it in any comparative assessment because it is such an obvious point of difference between the two systems.

AC.8: Inspection, Publication and Anonymity of Counted Votes

It is proposed that interested parties will be able to obtain a copy of the electronic file containing all of the votes cast at a particular election using the chosen system. The publication of the ballots in this way is intended to compensate for the loss of transparency during electronic counting and to demonstrate its accuracy by allowing interested parties to verify the result, including by the use of alternative electronic implementations of the count rules. This feature of the chosen system was also offered as a substitute for the practice of tallying as described above.

It has already been noted by the Commission in its interim report⁸¹ that publication of the counted ballots under electronic voting as proposed could theoretically operate to diminish the secrecy of the ballot if it were possible for a voter to prove how they had voted by recording a unique "signature" in the sequence of their lower order preferences. This can be avoided if only the higher order preferences of each vote that were necessary to carry out the count under the chosen system were published, thus rendering the electronic ballots anonymous. The Commission has further noted that secrecy of the ballot in this context must now be preserved in accordance with section 30(2) of the Electoral (Amendment) Act 2004, enacted following its interim report.

The proposed publication of multiple copies of the electronic ballots in this way also appears to represent a departure from the current position under paper voting whereby the unique paper ballots are retained as confidential election documents, amenable to inspection by a court only in circumstances of an election petition and required to be destroyed after a prescribed period of time.

AC.9: Scalability

The potential of the chosen system to deliver significant economies of scale in terms of vote gathering are unlikely to be realised in an Irish context unlike, for example, India where the gathering of votes using paper ballots involves great logistical challenges of scale. The chosen system can, however, bring meaningful benefits to Ireland in terms of its capacity for counting. These benefits are in addition to the simple criterion of speed of counting already discussed.

The manual counting of paper ballots is a time consuming and labour intensive process. Moreover the time and manpower required both to conduct and to count a paper ballot are to a large extent functions of the number of ballots cast and the number of polls taken at the same time. This is because every ballot cast in every poll must be manually manipulated. In contrast, while an increase in the number of voters and the number of polls conducted simultaneously will add somewhat to the time and labour needed to run an election under the chosen system, this need will not rise anything like as rapidly as it does under paper voting.

⁸¹ Interim Report of the Commission on Electronic Voting, April, 2004: Part 4 p.22.

AC.10: Reliability

Reliability in this context is interpreted as susceptibility to system failures, with effects that might range from a minor delay in the count to a major disruption, even negation, of an entire election. This is thus an issue treated in greater detail in the risk analysis in *section 5.3 of Part 5*. The paper voting system has the property that all activities are widely dispersed and are not interconnected. This restricts the possibility that individual failures will propagate themselves throughout the entire system. With the proposed electronic voting system there are certain failures, an error in the software for example, that could propagate throughout the entire system. Other failures, a faulty ballot module or voting machine for example, may be easy to detect and remedy, and will not propagate. The paper system appears to be more susceptible to small localised failures arising from human error. The chosen system appears to be more susceptible to a failure, the probability of which may be remote, but which if it arises may propagate widely throughout the system.

A related matter concerns the ease with which system failure can be detected. Since most aspects of a paper election take place in the open, subject to public scrutiny, most system failures are likely to be immediately obvious. Most aspects of an electronic election are not open to meaningful public scrutiny, although many types of system failure may be self-evident – computer crashes or voting machine failures, for example.

AC.11: Cost and Flexibility

Because it is time consuming and labour intensive, the counting of paper ballots is also a costly process. It was projected by the Department⁸² in the context of adopting the chosen system that, having depreciated the cost of the initial investment over an appropriate period, and taking account of the costs of running, maintaining and upgrading the chosen system, it may, in the long-run, be cheaper to operate than the paper system of voting. However it will never be possible to determine this question without running both systems in parallel for a significant number of elections.

On this basis also, and since a substantial part of the cost of the chosen system will be the sunk cost of the initial investment, the introduction of the chosen system, once this investment has been made, may enable subsequent polls to be taken at lower cost. This also potentially introduces a greater flexibility in that more frequent, and more complex, polls can be taken should the need be felt during the projected lifespan of the chosen system.

The potential for the achievement of economies in terms of cost and flexibility is thus clearly present to some degree in the chosen system but is highly dependent on the timing of its first use after it is acquired and on the frequency of use during its actual lifespan thereafter. However, the necessary evidence to support the Department's projections in this regard has not been reviewed by the Commission as it lies somewhat outside its terms of reference in regard to the secrecy and accuracy of the chosen system.

It is clear that the projected savings associated with adopting the chosen system in substitution for the paper system have not been proven. It is also unlikely, in the absence of parallel running over an extended period, that the chosen system will be proven to cost more than the paper system.

⁸² See Sixth Interim Report of the Committee of Public Accounts (April 2006) on the 2003 Report of the Comptroller and Auditor General at http://www.oireachtas.ie/documents/committees29thdail/pacdocuments/6th_Report_2003.pdf.