Elections and Technology

Results from An Inquiry into how EMBs Approach Technology to Affect Voter Confidence in Electoral Outcomes

Georgetown University Department of Government
Democracy and Governance Studies Program
United States Agency for International Development (USAID)
Electoral Policy Study Group
Report on Elections, Technology and Voter Confidence
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Saki Araida, Sofia Herrera, Marin Ping
Jeff Fischer, Faculty Advisor
Introduction

This research was undertaken in a study group comprised of graduate students pursuing Masters of Arts in Government, in the sub-field of Democracy and Governance studies at Georgetown University, in Washington DC. The course was led by a globally esteemed, expert practitioner of elections management, Jeff Fischer.

The course was entitled “Elections Technologies: Assessment of Public Confidence in Electoral Integrity.” The basic question the course sought to answer was: what factors increased or decreased citizen confidence in the integrity of elections when new technologies are introduced? And, somewhat more important in order to answer the previous question: how are these technologies selected and introduced?

We hope that the resultant report sheds a bit of light on the answers to these complicated questions, generated out of various political and economic contexts, but all in pursuit of better elections processes overall.

The Research Team would like to thank Professor Jeff Fischer for his support and guidance throughout the course of this investigation into the use of technology to increase the integrity of voting processes. And, for giving us the tools and the time to delve deeper into how these processes can be improved to increase the confidence of citizens in any country that their will has been carried out, and their democracy will be led by those the people deem most suitable.

-Saki Araida, Sofia Herrera, and Marin Ping
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Executive Summary

This report is comprised of three sections that seek to explore the implications of EMB decisions regarding electoral technology. The first section provides results from a global survey of EMBs about their main challenges to maximizing voter confidence, and how they can or will use technology to resolve those challenges. The second and third sections of the report provide in-depth case studies about the use of electoral technology. The first case study is a country-specific inquiry into the use of biometric technology in Somaliland to prevent multiple and underage voting. The study provides a system-wide example of how electoral frameworks, elections administrators, political parties, technologists, and citizens must coordinate to ensure accurate elections results – thus deepening the democratic values of an emerging state. The second case study is a technology-specific inquiry into the various uses of webcams in three different countries: Azerbaijan, India and Russia.

The Somaliland case study covers the voter registration exercise conducted in two different time frames with two different technologies. However, those two exercises seem to have opposite results. While the previous voter registration process with fingerprints recognition was a negative outcome, the current ongoing registration seems to be a positive one. This story tells us that the technology itself does not necessarily solve the problems in the electoral processes (in Somaliland case, it is multiple registration), but if it is implemented properly, technology can be useful to increase voter confidence in the voter registration process. Also, in this case, good preparation to identify potential challenges was the key new technology roll-out.

The webcam case study examines why and how webcams are implemented, the legal framework that permits their implementation, and the outcomes of webcam installation. The countries studied are Russia, India and Azerbaijan. These countries represent diverse political climates, public Internet access, and rationales for implementation. In the studied cases, webcam implementation aimed to improve voter confidence domestically, validate election results to external observers, or to serve as a deterrence mechanism against electoral fraud. Research demonstrates that the implementation of webcams is not an end-all solution for deterring fraud or increasing confidence in an election. The presence of a webcam does not eliminate the possibility of fraud. Vote buying and voter intimidation may still happen outside the camera’s purview. Democratic legitimacy cannot be contrived through the implementation of webcam. This legitimacy must arise through the construction of democratic norms.

Taken together, these inquiries establish a clear picture of the conditions and constraints that facilitate the adoption of new technology in the elections management process. The report seeks to establish from empirical evidence basic facts about the success of using such technologies, within particular country contexts. This is to aid subsequent considerations made by EMBs, or the Donors that support their development, to determine the transferability of technologies to other contexts. The report will provide insights into how institutions and technologies, and those that use them, may interact to bring about the ultimate aim of improving voter confidence.
Section I. Global EMB Survey on Elections Technology Use and Adoption

1. Survey Purpose

As mentioned, EMBs play an important role in advancing the institutionalization of democratic values by producing electoral outcomes consistent with free and fair processes. Every polity has its own unique legal and cultural structures in which elections must be designed and implemented; however, there is much to be learned from the goals and objectives of EMBs across the world with respect to the use of elections technology to improve the validity of results.

The objective of the survey is to establish a snapshot of current use of elections technology, challenges to voter confidence in electoral results, and plans to use technology to increase voter confidence given the stated challenges. Countries that are represented in the survey analysis can be seen listed below. This list excludes four survey respondents that were not country-specific, but rather elections management consultants that did not identify with a particular country’s EMB.

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2. Survey Design

To achieve this objective, the survey was designed with EMB staff as respondents. In addition, several electoral reform practitioners from private consulting companies and multilateral elections assistance bodies were included in the respondent list. In total, over 500 contacts were included in the initial round of survey distribution. The survey was distributed to the same contact list twice, over the course of five weeks, through an online survey distribution and data collection tool called Qualtrics. The survey format permitted respondents to present their responses as contingent upon one another, in turn permitting survey analysts to observe linkages between challenges to improving voter confidence, and the technologies EMBs thought might assist in overcoming them. The survey also permitted respondents to establish an order of priority for the technologies they wanted to implement in their electoral processes, and when.
The contacts were EMB officials from over 215 countries and/or autonomous regions, all were in attendance at the sixth annual Global Elections Organizations (GEO) Conference in 2013, hosted by the United Nations Development Program. Among the conference’s stated objectives were: 1) to share experiences and lessons learned between national and international election practitioners and assistance providers; and, 2) to showcase the latest in electoral knowledge, technology and initiatives.¹ For these reasons, the recipient list was assumed to reach a respondent pool with the highest degree of working knowledge about how EMBs make decisions pertaining to the use of new elections technology.

The target was to receive a response from 40% of all countries and autonomous regions contacted, or 86 responses. The actual response rate was 30%, falling slightly short of the target. A total of 65 responses were submitted; of those, 61 were attempted completions and 59 were successful completions. Thus, the total number of responses used for the comprehensive analysis was fifty-nine (n = 59). Valid responses included multiple submissions from the same country in 24 of 59 surveys submitted (Libya, Nepal, Netherlands, Nigeria, Pakistan, Romania, St. Lucia, Tunisia, Ukraine and Vanuatu). The research timeline did not permit an additional round of sending the surveys through the Qualtrics platform, but future surveys may consider building on the contact list used in this survey to expand the pool of potential applicants. Future surveys might also consider sending the survey to regional associations of EMBs, such as Asian Network for Free Elections Foundation (ANFREL).

Survey questions (below) featured a fixed checklist that permitted a respondent to select as many of the options provided, unless otherwise noted. Each option that was selected within the checklists provided for Question 1 through Question 4 led to the follow-up Question 5 through Question 7, per each type of technology indicated by the respondent. Question 3

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<td>1. What technologies does your EMB or electoral assistance program currently employ?</td>
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<td>2. What are the two biggest challenges that affect voter confidence during elections?</td>
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<td>3. How could these challenges be resolved through election technologies? *</td>
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<td>4. Are you currently using these technologies to address these challenges?</td>
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<td>5. When do you expect to implement the new technologies?</td>
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<td>6. Do you have a training and management plan to implement the new technologies?</td>
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<td>7. What is the estimated cost of implementing the new technologies, including equipment, EMB staff training, and raising public awareness of the new technology? ∞</td>
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<td>8. What are the estimated funding sources to use to implement new technologies? (%)</td>
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<td>9. How will the EMB educate voters to use the new technology?</td>
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<td>10. If relevant, what cultural factors are barriers to the adoption of new technology? *</td>
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*open-ended questions ∞ percentages provided

provided respondents with an opportunity to briefly (300 words) provide feedback on how a selected technology might overcome a stated challenge to voter confidence. If the respondent indicated that the technologies were to be implemented within the next two election cycles, then the survey prompted them to provide planning details such as cost and roll-out plans in Questions 8 and 9. Finally, Question 10 provided the EMB respondent with the open-ended opportunity to describe any cultural barriers that existed that did not offer clear opportunities for use of technology to improve voter confidence. For example, the question provided space for respondents to elaborate upon challenges that may include limited participation of women voters in predominately Muslim countries, where removing a veil to authorize voter identification proves problematic. The complete list of checklist responses can be found in Appendix A.

3. Elections Technologies Currently In Use

Respondents (n = 59) noted the current use of eleven different types of technology in their existing electoral processes. These included, in order of greatest to least frequency of use: registration databases (42), voter identity cards (34), GIS for boundary delimitation and districting (19), social media tools (22), biometrics (16), internet registration (10), digital display of voter registration at polling stations (10), electronic voting (6), internet voting (2), webcams (2), and optical scan technology (1).

Internet infrastructure is required for many of these approaches, particularly biometrics data storage in a central location, internet registration and voting, and in some cases vote tabulation for electronic voting. Countries currently using these technologies are features in the chart at right. In addition, South Africa is using optical scan technology, and some nineteen countries are using GIS for boundary delimitation. In addition, one of the most ubiquitously used methods of pre-election voter education was social media.

Survey checklist also provided for relatively low-tech elections management methods, many of which are in most frequent use across cases. This includes voter registration databases, which the survey did not further disaggregate by type of database, digital or otherwise. And yet, it is those countries that do not use a registry at all that are most of note, including: Afghanistan, Burma/Myanmar, Democratic Republic of Congo, Estonia, Libya, Maldives, Mali, Netherlands,
Slovenia, Spain, Vanuatu, and Yemen. Other high-tech methods with limited use were internet voting, drones, and webcams.

4. Biggest Challenges to Voter Confidence, and Cultural Explanations

Respondents noted their experiences grappling with twelve different types of challenges to voter confidence in the electorates for which their EMBs are responsible. These included, in order of greatest to least frequency: voter turnout rates (20), ballot counting (17), voter education (17), electoral violence (14), poll worker corruption (11), persons with disabilities participation (10), multiple voting (6), minority participation (3), voter impersonation (3), boundary delimitation (2), underage voting (1), and voter intimidation (1). Given the limited number of respondents per global sub-region, it would be difficult to make categorical trend statements about barriers to voter confidence on a disaggregated basis. However, there are some qualified patterns that emerged in the survey data at in the regions observed, namely Asia, Europe, MENA, and Sub-Saharan Africa. Respondents were asked to identify their top-two challenges.

In Asia, nine different respondents from six countries registered sixteen challenges to voter confidence, featuring electoral violence as the most frequent across cases. Poll worker corruption was the second most noted challenge across the region. Afghanistan noted that its top two challenges were multiple voting and poll worker corruption. Nepal respondents (2) agreed that electoral violence was the most pressing challenge, and also indicate that multiple voting and voter education were evident challenges in their country context.
In Europe, thirteen countries were represented by sixteen different respondents. The most frequently cited challenge on the continent was by far ballot counting, followed by participation by persons with disabilities and then voter education. If the geographic region is expanded out to include Eurasia (Ukraine), poll worker corruption becomes a more relevant challenge. This might suggest that a culture of corruption has emanated out from the bureaucracy and is affecting electoral systems.

In MENA, eight respondents provided information about challenges to voter confidence from five different countries, including Egypt, Jordan, Libya, Tunisia, and Yemen. The most common challenge noted was voter turnout rates. The remaining challenges were highly relevant to each country’s unique context, which is not surprising given the various levels of political freedom and violent conflict taking place across the diverse region. Tunisia had three respondents submit surveys on its behalf; the majority agreed that voter turnout rates were a pressing challenge. In addition, multiple voting, poll worker corruption, voter education and participation by persons with disabilities were cited as challenges to voter confidence in this newly consolidating democracy. In contrast, one of the region’s most terribly backsliding governments that are not embroiled in outright war, the EMB respondent from Egypt noted that the most pressing challenge was also participation by persons with disabilities.

Observation of the current context in Egypt, including the limited freeness and fairness of elections, underscores the limitations of assigning EMBs as the target demographic for survey responses. If there is a serious challenge of governmental legitimacy or the democratic performance of government institutions generally, this information provided for that country might reflect a response bias. Of course, this depends on the level of institutional autonomy the EMB respondents have, and whether or not they provide responses based on a purely technical assessment of the barriers that exist in the elections process to achieve voter confidence.

A limitation of the survey is that it does not provide space to discuss broader democratic weaknesses, and thus inherently eliminates the possibility that elections are used for non-democratic purposes. It is not clear whether or not this is the case for Egypt, or any other country.
here-noted that otherwise would fall under the Partly-Free or Not Free categories of the Freedom House civil and political liberties index, for example. Of course, it is outside the scope of this analysis to determine the legitimacy of elections themselves, and whether or not that is a technocratic or cultural determination.

In Sub-Saharan Africa, ten countries responded to the survey, with two respondents from Nigeria. Six respondents indicated that electoral violence was a challenge during their elections cycles, followed by poll worker corruption as the second most-frequently indicated challenge. None of the Sub-Saharan respondents listed boundary delimitation, participation by persons with disabilities, or minority participation as challenges in their elections processes.

Cultural factors present a potential barrier to the effective implementation of technology. Respondents were asked if there were any limiting cultural barriers in their countries. Twenty-one (21) EMBs responded to the question—indicating that cultural problems can stymie the successful implementation of technology. The top two barriers respondents cited to technological implementation was lack of trust and poor understanding of the technology.

Lack of trust manifested itself in two ways among citizens. Firstly, citizens believe that politicians will use technology to gain an unfair advantage and corrupt the elections. This indicates a low level of trust in the political process and in the candidates. The second form of low trust EMBs cited was in the citizen’s distrust in the technology, rather than the politicians. This suggests that the population does not understand the technology or believe that it can be effectively implemented. Both instances present major obstacles to making the installation of a new technology credible to the people.

EMBs frequently wrote that the citizen’s limited knowledge of the technology presented obstacles to its implementation. This challenge could manifest itself in the inability of people to know how to work the technology, or to train large numbers of poll workers to use the technology. Limited knowledge of the technology could also negatively affect the people’s trust in the technology, as mentioned previously. Apart from the top two barriers cited; respondents indicated that language barriers, pervasive corruption, and high illiteracy were culturally problematic.

5. Technologies and Tactics to Improve Voter Confidence

In order to understand the technology-driven methods used to address particular challenges, respondents were asked to describe how challenges were resolved by technology. The top three problems highlighted by respondents related to voter turnout rates, ballot counting, and voter education. As a result, the most content available for analysis fell under these categories. Below follows an overview of the feedback received from EMB respondents per category of challenges for the elections management process, and voter confidence.

It should be noted that within the scope of this survey, voter confidence is a concept defined as the willingness of the electorate to accept the results of an election as legitimate. This is predicated on the assumption that the process must be free and fair to produce such a result.
EMB respondents are assumed to understand the definition of the concept, and its operational implications in terms of elections results management, and public response to elections results. As such, the EMB respondents are in effect identifying the greatest barriers to achieving voter confidence through elections based on their anecdotal experiences with the voting process, versus explicitly consulting with voters themselves about their confidence in elections.

According to respondents, voter turnout rates present the greatest challenge. Technological solutions include Internet voting and online registration for eligible voters. These solutions make participation easy for citizens who do not want to leave the comfort of their homes to register. Voter education was another popular method of increasing the participation of citizens. Voter education—including through the use of social media—makes information on upcoming elections, location of polling stations accessible to citizens. Furthermore, social media can be used as a mechanism to encourage voting. Interestingly, EMBs from New Zealand noted that the relationship between politicians and citizens is the most important mechanism for rallying citizens to the polls. Citizens who feel enthused about their candidate are the most likely to make it to the polls.

Problematic ballot counting can hinder the legitimacy of election and harm citizen participation in future elections. It is important that citizens know that their vote is counted and that measure is installed to ensure that the vote accurately tallied. Electronic voting and electronic counting were ways in which EMBs combat issues of ballot counting. These methods reduce the risk for human error or corruption in vote counting. The EMB from Yemen stated that problems that combating the issue of ballot counting was about improving public confidence in the voting process—rather than implementing a technology to change ballot counting. This point relates directly to the importance of voter education.

Voter education was frequently cited as a problematic area in which technological solutions are implemented. Education can serve to remind citizens of the importance in participating and the logistical information relating to upcoming elections. Education can also serve to let citizens know about new technologies being implemented in the polling system, or any new processes they might expect. This outreach creates transparency that serves to foster trust in the electoral system and strengthens the democracy. Social media, mobile phone messages, phone applications were all methods by which EMBs aimed to improve voter education. E-learning systems and publishing information on the EMB website was other mechanisms implemented to improve voter education.

Besides these top three obstacles, EMBs frequently identified poll worker corruption, electoral violence, and persons with disabilities as areas that presented challenges. Electoral violence can present a major obstacle in to democratic elections because the fear of violence has the potential to keep voters away from the polls and dissuade them from political participation. Violence is curbed with help of technology in a few ways, according to EMBs. Social media provides citizens the ability to report electoral violence. This is useful in bringing attention to misconduct. CCTV or drones at or near the polling stations help ensure that perpetrators are dissuaded from committing acts of violence. Additionally, the presences of on-site security or mediators help deter perpetrators.
Poll worker corruption is problematic because it harms the legitimacy of the vote. Respondents indicated that biometric voter identification was a technological solution that ensures that voters are who they say they are. Other computerized electoral processes such as an electoral voting system or result management system helps ensure that poll workers are unable to corrupt the system. These methods guarantee to voters that the poll results can be trusted and are legitimate.

Inclusion of all citizens in the voting process is important to making the election as democratic as possible. Technologies implemented to ensure that citizens with disabilities were able to participate include Internet voting; telephone dictation voting, and mobile voting machines. Problems encountered minimally, with an N of one to six, included underage voting, voter intimidation, delimitation inequalities, minority participation, voter impersonation, and multiple voting.

6. Operationalizing ‘New’ and ‘Old’ Elections Technologies

The survey structure provided insights into how EMBs plan to operationalize use of proposed technologies to overcome the barriers to voter confidence that they identified. Below follow some examples of such plans to launch new elections management approaches in combination with a specified electoral technology.

In Asia, Afghanistan presented its central challenge for voter confidence as being the corruption of poll workers, and the multiple voting that results from partial oversight of polling stations. The EMB identified electronic voter ID devices as a potential solution, but raised the cost as a substantial factor in prioritizing this upgrade over other government spending. The respondent notes, “Technology cannot stop poll workers that want to cheat on elections, or at least if it can, it is probably at a financial cost that would be better spent on schools and hospitals.” As such, we see that implementing technology-driven elections management solutions might not actually resolve barriers to voter confidence where electoral institutions themselves are inherently weak. Pakistan also noted poll worker corruption as a central concern, as well as voter education and boundary delimitation. In contrast, the EMB reported that to resolve its challenges it will focus on better educating voter to increase voter turnout, at a rate of $6.25 per eligible voter, and an estimated total of $5 million. The EMB estimates that 60% of the text and mobile messaging initiative to achieve this objective will be covered by EMB funds, the other 40% by international donors. Therefore, it seems that Pakistan’s EMB has a stronger plan to decrease the effects of poll worker corruption by increasing the total pool of voters, and their awareness about the moral and legal issues with complying with bribery at the polling stations. Pakistan will use GIS technology to increase the fidelity of boundary delimitation.

In Burma (also known as Myanmar), the EMB reports it is preoccupied by threats of electoral violence and the ability of minorities to vote. An electoral risk management system is now in use to monitor outbreaks of electoral violence with computer software. The EMB claims that, “Through a better risk management system, the risk of low minority participation can be analyzed and mitigated.” The software is being tested now, for use in the next electoral cycle.
The software’s cost is estimated at $200,000, or per voter $.06. This represents a strong value for money, and perhaps explains the operational readiness of the EMB to use the technology in the next elections. This also reflects the high level of donor support already going into this fledgling democracy, to build its institutions, in fact 90% of the EMB budget for the project came from international donors.

In Europe, of the 14 countries that responded (including Ukraine), Romania is the only country that has plans to introduce a new technology ahead of an upcoming elections cycle (see general results for technology implementation at right). The challenges to achieving fair elections are multiple voting and voter education. An EMB poll worker training plan is crafted to educate poll workers to verify voter registration, and voters about multiple voting, through use of low-tech solutions including public service announcements and social media, combined with on-site trainings at polling stations for voters. All costs will be provided from national budget resources, though not directly managed by the EMB itself. This reflects the tendencies of countries with more-institutionalized democratic processes to use lower-tech solutions to shape voter behavior to overcome challenges that affect fairness, and thus voter confidence. Kosovo identified a ballot printing machine as a good solution to making elections fairer for disabled persons, but has no current plans to adopt the technology. A survey respondent from the EMB in Austria noted that voter impersonation is a challenge to voter confidence, in addition to ballot counting (the top challenge for Europe). In contemplating how technology can help resolve the challenge, the respondent notes, “[There is] no problem at polling stations, where an ID is required to vote. But, discussions [about this concern] when signing an affidavit on a postal ballot in the absentee voting process; ICT could only help in case of internet voting (through electronic signatures/eID) but there are no such plans in Austria.”

Ukraine is a country example that reflects a low degree of institutionalized democratic norms. The EMB respondents (2) note that a voter registry is maintained, but that poll worker corruption and ballot counting are top challenges to voter confidence in electoral results. Use of an electronic ballot scanner to manage elections results was suggested. No plans to adopt this technology are currently in place. Commenting on cultural attitudes to the use of technology in the elections process, the EMB representative notes that, “there is inherent suspicion of the vulnerability of new technology” given the pervasive corruption in Ukraine, and that the
country’s government remains corrupt even despite Donor contributions to shape norms to the contrary. Social media is used currently to increase voter education.

In Latin America, many types of technologies are already being used in the elections process. In Brazil, high-tech biometrics are in use, as well as electronic voting and registration databases. In 2014, Brazil introduced a biometric voting machine that reads fingerprints to identify and validate a voter’s ballot. The technology was successfully used by nearly 22 million Brazilians. The EMB sees demand-side challenges contributing to voter dissatisfaction with electoral outcomes, citing problems of voter education, and as a result of problems of voter turnout. The EMB notes that there are, “Creative solutions for voter education, such as social media, games, school programs, etc.” This requires use of relatively low-tech tools such as social media and public service announcements. These creative solutions are currently under development, and used on a rolling basis across election cycles.

In Costa Rica, the EMB now uses GIS, biometrics, and web-based voter registration and voter databases, as well as lower-tech tools such as voter identity cards and social media. It notes the main challenge is voter turnout, and aims to increase its use of social media to “inform citizens about citizenship” and “incentivize participation.” To address the generational gap, the EMB also uses public service announcements to reach those not using smart phones. These initiatives find all their financial support in the EMB budget. St. Lucia also responded to the survey (two submissions), and takes a similar approach to increasing voter confidence by raising voter awareness through social media.

In the Middle East and North Africa, there are a range of approaches to technology as diverse as the countries of the region themselves. Two elections managers from Libya responded to the survey, despite uncertainty about when the next elections will be scheduled. The EMB indicated that current technologies used in the elections management process include voter identity cards, internet registration and registration databases. Indeed, a voter registration that leverages SMS technology to register voters in a digital database was hailed by many onlookers as a success; over 1.5 million Libyans were registered. The Libyan High National Elections Commission (HNEC) is supported by the UN, and led the registration project, implemented by US tech firm Caktus Group. Use of this technology, however, did not translate into commendable voter turnout rates. In 2014, after using the SMS registration system, only 18% of eligible voters cast a ballot, according to BBC reports.

Tunisia provided three responses to the survey, and has current plans to improve its elections management, as it continues to consolidate the democratic gains of the Arab Spring.

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Internet registration and voter identity cards are in use, as is GIS for boundary delimitation and social media for communicating with the electorate. These approaches assist the EMB manage noted challenges such as voter turnout rates and voter education. However, Tunisia still sees poll worker corruption or multiple and underage voting as a challenge. Use of a single-use login for internet voting was a proposed solution; however, a low-tech solution may be more important, to equip polling locations to improve the wait time to cast ballots. Additionally, the EMB mentioned that setting up a call center to receive reports about fraudulent voting could also be an important method to address ballot box stuffing, and results management. A training management plan is under development to curtail poll worker corruption; it is not technology-driven. The budget for this training is expected to consist of 60% international aid, 20% EMB funds, 10% general government funding, 10% other funds (unspecified). The EMB will use public testing sites to raise voter awareness about elections technology now in use, as well as public service announcements and social media platforms.

The use of high-tech solutions in Libya and Tunisia are also used in Yemen, where the UN supported a pilot to use biometrics for voter registration in 2014.\(^5\) It was the first use of this technology funded by a Donor Basket Fund in the Arab region. Two years later, the Supreme Commission for Elections and Referendum (SCER) respondent reports that, “[Our main challenge of voter intimidation] is not an issue for technology, but rather one of societal views on government and participation. Neither government nor the international community chooses to address this.” In addition to the recent outbreak of intense general violence in Yemen, the SCER reported that ballot counting is a challenge for elections managers. No plans for future improvements were reported in the survey response. Jordan uses biometric registration to support its participation in the UNifeed program that gives food to refugees of the Syria crisis,\(^6\) and notes its use in the survey response. However, it has not adapted this experience to the electoral context, where it notes voter participation as the only challenge (indicator) of low voter confidence. No plans to remediate this are currently in place.

Oceania holds within it distinct electorates, defined by small geographic areas and voting populations. New Zealand was the largest island population that submitted survey responses,

<table>
<thead>
<tr>
<th>Identified Challenge</th>
<th>#</th>
<th>% Seeking Solution</th>
</tr>
</thead>
<tbody>
<tr>
<td>Voter Turnout Rates</td>
<td>20</td>
<td>100%</td>
</tr>
<tr>
<td>Ballot counting</td>
<td>17</td>
<td>20%</td>
</tr>
<tr>
<td>Problems of voter education</td>
<td>17</td>
<td>59%</td>
</tr>
<tr>
<td>Electoral Violence</td>
<td>13</td>
<td>61%</td>
</tr>
<tr>
<td>Poll worker corruption</td>
<td>11</td>
<td>55%</td>
</tr>
<tr>
<td>Persons with disabilities</td>
<td>10</td>
<td>20%</td>
</tr>
<tr>
<td>Multiple Voting</td>
<td>5</td>
<td>20%</td>
</tr>
<tr>
<td>Voter impersonation</td>
<td>3</td>
<td>0%</td>
</tr>
<tr>
<td>Minority Participation</td>
<td>3</td>
<td>100%</td>
</tr>
<tr>
<td>Delimitation Inequalities</td>
<td>2</td>
<td>50%</td>
</tr>
<tr>
<td>Underage Voting</td>
<td>1</td>
<td>100%</td>
</tr>
<tr>
<td>Voter Intimidation</td>
<td>1</td>
<td>0%</td>
</tr>
</tbody>
</table>

Total = 103

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\(^6\)Details on how the iris scan technology is used to distribute food and resources can be found here:
followed by Vanuatu, Samoa, and American Samoa. The unique geographic distribution of island populations suggests opportunity for high-tech elections management solutions, especially where multiple islands make up the country’s territory. In New Zealand, internet registration and databases are used to centralize voter data. Voter turnout is a significant challenge, and the EMB shares their insights on technology’s role in overcoming it, “Research suggests that providing additional methods for voting is ineffective in raising turnout. Engagement between voters and politicians has the greater influence. E-voting, like postal voting appears likely to provide a short-term increase in turnout as people try the new technology, but this increase is not sustained.” The country uses phone dictation to assist persons with disabilities to vote, at a total administrative cost to the EMB of $30,000. There is no plan in place to use e-voting methods. In Vanuatu, the EMB notes that any consideration of new technology would feature heavy consideration of environmental impact. Both Samoa and American Samoa see timely ballot counting as a challenge, and consider new technology, such as counting machines, to be potential solutions. Costs to adopt this technology are estimated at $50,000 – or approximately $.60 per registered voter.

In Sub-Saharan Africa, Zambia is the only one that delineated a comprehensive plan to roll-out a voter education campaign to address the dual challenges of limited voter education and electoral violence, through use of social media at an estimated cost of $100,000 with 80% funds from the EMB budget and 20% funds from international aid resources (donors). Despite this, the initiative is contingent on funding, and will not be complete before the next two elections cycles. Zimbabwe has plans that to implement new technology in its next election cycle, to overcome linked challenges to voter confidence, voter turnout rates and electoral violence, with social media; the launch plan is not yet scheduled. The EMB from Zimbabwe elaborated, “Voter education, which makes use of technologies, will be easier and safer to propagate and transmit. [Civil society is] not comfortable to deliver voter education that directly addresses violence and the dominant political party uses violence as a weapon when campaigning.” Zimbabwe plans to cover 30% of the initiative’s costs with EMB funds, 10% state funds, 25% international aid, and 35% from other, unspecified funding sources. Togo saw underage voting and poll worker corruption as top challenges to voter confidence in elections results. In 2009, the EMB piloted the use of 500 mobile biometrics stations to update its registration database with voter fingerprints.7

7. Alternative Perspectives and Survey Outcomes

Electoral management bodies are not the only entities that responded to the survey. Four consultants and elections management practitioners also provided alternative perspectives about the implementation of new technologies in electoral systems. The consultants were not required to provide an institutional affiliation, but did respond about country-specific programs.

One consultant provided feedback on implementing web camera technology in a country to overcome voter impersonation. The same consultant noted that ballot counting was a

challenge in the country of work, where poll workers were appointed by political parties. The consultant remarked that the webcams have yet to be implemented, but that professional poll workers managed by an independent EMB would remain necessary to ensure freeness and fairness in the process. The cost of such a program would be $5,000,000 ($2 per registered voter), suggesting that the country is quite large, and the program a vast undertaking for an EMB. Fifty percent of the funds will come from the EMB, 30% from international donors, 25% from other domestic government resources. However, the EMB workers have an insufficient knowledge of IT, and limited resources to manage the implementation process and maintenance. Another consultant working in a country facing electoral violence and multiple voting challenges noted that biometrics might be best suited to address the latter challenge, while an, “effective, non-partisan security force… a political party code of conduct, [and] training and deploying election conflict mediators,” is the way to address the former challenge. Other consultants (2) highlighted the importance of electoral reforms, in the legal framework, to address many of the challenges presented throughout this analysis.

In many ways, it is easier for consultants, as external observers, to remark on institutional and political dynamics that inhibit voter confidence. On average, the EMBs that remarked that the electorate foments most of the challenges for the elections process, including voter turnout (20 cases), voter education (17 cases), and improper voting (10 cases). The second most-noted challenge to electoral integrity was violence (14 cases) and voter intimidation in one case (Yemen). The highest-tech solutions, however, were not able to resolve these challenges, so much as those challenges directly within the purview of the EMB respondents, namely voter database management (in use in some form in 42 cases) and ballot counting (a challenge for 17 cases). It is technology that can augment the performance of these basic electoral infrastructures that was most often adopted successfully – success meaning rolled-out past a pilot phase, irrespective of impact on voter confidence during the first ‘live’ election test of the updates.

This survey provides a topical snapshot of EMB approaches to technology in the election management process. It also offers some context-specific commentary on the selection of technology, and its success or failure based on existing electoral conditions, including physical security and legal frameworks. Additional information established by the respondents to this survey can be found in Appendix B.
Section II. Country Case Study: Somaliland, Voter Registration and Biometric Technology

Producing a reliable and accurate voter registration list affects the legitimacy of a whole electoral process.\(^8\) To ensure the accuracy of the voter registration list, capturing biometric data is one of the solutions. Biometric is introduced into many elections all over the world for the voter registration.\(^9\) According to International IDEA, 52 countries out of 135 surveyed use any kind of biometric data.\(^10\)

This study focuses on the usage of new technology in the voter registration process of Somaliland. This section discusses advantages and challenges of the application of biometric in the voter registration process. Somaliland is a particularly interesting case because it has adapted iris matching system for the current voter registration exercise instead of the fingerprints and facial recognition system which they used in the last voter registration process. That gives us three interesting perspectives. First of all, compared to fingerprint matching and facial recognition, iris biometric has not been applied frequently.\(^11\) Therefore, the advantages and disadvantages of the iris biometric in the voter registrations can be discussed, which have not been studied much. Secondly, since Somaliland held voter registration exercises with high-technology twice and changed the types of biometric, it is interesting to see what they learned from the first experience and how it affected the second exercise. Finally, the voter registration process for the 2017 general election is ongoing. To summarize the current context and expectation seems to contribute to the assessment of it after the election finish in 2017.

In order to better understand the dynamic process of selecting and implementing high-tech solutions to elections management, let us consider the example of the independent republic of Somaliland. To produce a reliable and accurate voter registration list affects the legitimacy of a whole electoral process. To ensure the accuracy of the voter registration list, capturing biometric data is one of the solutions. Biometric is introduced into many elections all over the world for the voter registration. According to International IDEA, 52 countries out of 135 surveyed use any kind of biometric data. This study focuses on the usage of new technology in the voter registration process of Somaliland. This section discusses advantages and challenges of the application of biometric in the voter registration process. Somaliland is a particularly interesting case because it has adapted iris matching system for the current voter registration exercise instead of the fingerprints and facial recognition system which they used in the last voter registration process. That gives us three interesting perspectives. First of all, compared to fingerprint matching and facial recognition, iris biometric has not frequently been applied.

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\(^10\) International IDEA “ICTs in Elections Database”

\(^11\) It is not sure which county used iris matching system before. For example, in the ACE electoral knowledge website, several practitioners said that they did not know any other countries use iris biometric and one pointed out there was a pilot of voter registration exercise using iris recognition in Afghanistan.
Therefore, the advantages and disadvantages of the iris biometric in the voter registrations can be discussed, which have not been studied much. Secondly, since Somaliland held voter registration exercises with high-technology twice and changed the types of biometric, it is interesting to see what they learned from the first experience and how it affected the second exercise. Finally, the voter registration process for the 2017 general election is ongoing. To summarize the current context and expectation seems to contribute to the assessment of it after the election finish in 2017.

1. Population and Political Formation

Somaliland has undergone various electoral framework evolutions since declaring independence by popular referendum over twenty-five years ago. Somaliland is an autonomous region within the state of Somalia, which was established as the successor state to the British protectorate of Somaliland in 1960, following enactment of the Trust Territory of Somaliland act by Parliament in London. Independence was declared on the 18 May, 1991. However, this independence was never formalized, and is not officially recognized by the international community. The government has held democratic elections since that time, as it seeks to develop its political system. Development of the elections system has been fraught with political and logistical challenges. However, the ultimate aim to gain UN recognition as the Republic of Somaliland, with the capital at Hargeisa, continues to see high levels of support for sustained commitment to democracy by citizens and the government alike. There are still basic territorial
challenges: on-going border disputes with Puntland and portions of Awdal province threaten the territorial integrity of Somaliland should it achieve formal recognition. It also complicates the administration of elections across the consolidating democratic practices in Somaliland.

Population estimates put the number of Somaliland citizens at 4.5 million people (2013), within the 53,000 square miles of autonomous territory. The land is not officially recognized by Somalia’s constitution as a Federal Member State of that country, and so operates under its own constitutional system. In 1993, communities within the territory produced a constitutional development plan, which featured the 1997 ratification of a provisional constitution, working to develop a representative democracy framework to put to a referendum by 2000. This process largely proceeded as scheduled, shifting from a clan-based House of Elders form of parliament, to a multi-party election system (3 parties) in 2002. The House of Elders remained as the upper house of a bicameral legislature (the \textit{Guurti}), and the House of Representatives was developed as the lower house. The executive branch is populated by the president, a vice-president, and the non-elected council of ministers. The president and vice-president are directly and popularly elected.

An elections management body was initiated in the legal frameworks during this constitutional process, and finds its current form in the National Elections Commission (NEC). The NEC is responsible for setting election dates, registering voters, demarcating districts, setting number and location of polling stations, overseeing vote counting, announcing preliminary results, and adjudicating electoral complaints. To achieve this, the NEC elects an Election Monitoring Board (EMB) comprised of civil society members, elders, intellectuals and religious leaders to observe elections and ensure freeness and fairness of elections, as delineated by the Constitution of Somaliland. The EMB oversaw the signing of a Political Party Code of Conduct in 2012, to hold party leaders to similarly high standards to comply with the NEC’s regulations for campaigning and procedures for registering complaints throughout the election cycle.

The NEC, in coordination with the Ministry of the Interior, compiles the voter registry, a subject of focus in this case study, per the NEC’s multiple experiments with biometric technology. Below follows a short account of key elections cycles, and the general challenges they presented, to set the stage for an analysis of the institutional development required to successfully implement new technologies to overcome barrier to producing high-fidelity elections results in which the people of Somaliland could have a high degree of confidence.
2. Recent Electoral Cycles in Somaliland

This section will provide a brief overview of Somaliland’s electoral Law, institutions involved in elections management, and recent elections cycles.

<table>
<thead>
<tr>
<th>Somaliland Elections</th>
<th>Total Valid Votes vs. Registered Voters</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Election Cycle</td>
</tr>
<tr>
<td>2001 - Secession Referendum</td>
<td>1,183,242</td>
</tr>
<tr>
<td>2003 - Presidential</td>
<td>488,543</td>
</tr>
<tr>
<td>2005 - Parliamentary</td>
<td>670,322</td>
</tr>
<tr>
<td>2010 - Presidential</td>
<td>538,246</td>
</tr>
<tr>
<td>2012 - District Councils</td>
<td>810,858</td>
</tr>
</tbody>
</table>

2003 Presidential Election

The 2003 election was a watershed presidential election, held following Somaliland’s plebiscite to establish a multi-party democracy in 2001. The voter participation levels were an unprecedented five-hundred million citizens. International and local observers declared the process largely free and fair, with the caveat that the voter registry was not inclusive of all eligible voters. In addition, there were reports of enlistment of government resources in support of an incumbent party, voter intimidation, and procedural errors that led to the disqualification of numerous ballot boxes. Multiple voting was potentially a challenge, but not one sited by independent elections observers, possibly due to the incomplete register. Results were contested for 10 days, and public demonstrations were banned; the Supreme Court found the leader of the incumbent party the winner by 80 votes.

To consolidate the commitment to a multi-party state, elections observers recommended that Somaliland immediately set a date for parliamentary elections within 12 months of the 2003 election. To build the capacity of political parties (capped at 3 in the Constitution), public funds were to be given equitably to the parties to launch their campaigns. Observers also recommended that International Donors provide technical and financial support to the National Electoral Commission (NEC) to “remedy problems encountered at local and presidential elections,” and to design and build a satisfactory voter registration database.

2005 Parliamentary Election

Elections were delayed slightly beyond the recommended 12-month timeline for parliamentary elections, but the NEC finalized the schedule in 2005. Three parties participated in the elections, all constitutionally sanctioned: 1) Peace, Unity and Development Party (KULMIYE); 2) For Justice and Development (UCID); 3) for Unity, Democracy and Independence (UDUB). The system of allocation of seats in the parliament is proportional.

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divided across 6 regional districts. Prior to Election Day, complaints about unfair allocation of state media time for certain parties were registered. Also, women’s participation as candidates was severely limited by the clan-based voting system. For example, between 2002 and 2005, only two women were elected out of 379 total district counsellors.\textsuperscript{15} 

Despite these structural challenges in the early stages of the election cycle, the elections themselves were again deemed to be free and fair. Instances of underage voting, and attempted multiple voting, were observed across all districts, though the NEC claimed the effects of these challenges were not significant enough to affect vote outcomes. This was the determination despite an estimated 20-30\% of ballot officials failing to scan for multiple voting. Police arrested several voters that were found to be abusing the indelible ink system for monitoring ballot casting. Interestingly, a significant number of poll workers and elections administrators monitoring and enforcing the ballot-casting rules were women.

Use of indelible ink technology to indicate individuals that completed voting presented several pervasive elections management challenges: 1) ink was not prepared properly, and did not register under the ultraviolet light used to prevent duplicative voting. There were also cases at several polling stations (985 polling stations) where the ultraviolet lights themselves were not working. None of the international elections observation (IEO) unit recommendations focused on technology use per se; rather, it was recommended that the inking procedure itself be standardized across all voting districts. The IEO recommended that international donors support the development of a national registration database, to enhance the ability of elections managers to limit underage and multiple voting. This was the “most imperative” recommendation stated by the International Republican Institute (IRI), which observed approximately 10\% of polling places, supported by funds from USAID and NED\textsuperscript{16}.

\textbf{2010 Presidential Election}

A presidential election was scheduled to take place in 2008, to return a candidate that would replace the 2003 winner. Due to political party infighting associated with constitutional provisions for a three-party system, and voter registration challenges, the election was delayed until 2010. In September 2009, the parties came together and signed a six-point resolution that established a new National Electoral Commission (NEC) to permanently manage elections cycles (including voter registration), and implement a timetable for presidential elections the following year. Seven-hundred local election observers were trained to monitor for fraud on elections day, as were another six-hundred dispute mediators.

In consultation with these actors, IEOs determined the elections to be largely free and fair expression of the popular will. The NEC adopted a professional, impartial institutional orientation, and was seen as a successful development in the institutionalization of Somaliland’s democracy. The NEC inherited a voter registry that contained duplicate entries, underage voters,

and other invalid registrants. Prior to elections, they used software to eliminate invalid entries, and then posted public voter registration lists ahead of rolling-out new voter identification cards that included photos. Using a combined approach, the NEC and Electoral Reform International Services took palm and face scans ahead of elections to eliminate duplications in the registry.\(^\text{17}\) NEC estimated that this initiative reduced the vote error rate by 10%.\(^\text{18}\) And yet, according to the NEC’s assessment, there was still an estimated 30% of the registry that contained fraudulent or duplicative records that the software could not detect. The total number of registered voters in 2008 was 1.1 million, following the de-duplication it was reported that 1.07 million voted.\(^\text{19}\)

Ballots were uniquely numbered and linked to voter ID card numbers; the pinky finger was marked with silver nitrate (indelible ink) upon submitting the ballot to poll workers at each of the 1,129 polling stations. The IEO reported that the proper use of silver nitrate increased significantly from the 2005 election, the misusage rate dropping from 17% to 11% or observed polling stations.\(^\text{20}\) Despite a revised voter registry and diligent procedure to prevent multiple voting, attempts at voter fraud for both multiple and underage voting remained high across all districts. Most individuals under the age of 16 that attempted to vote had valid voter ID cards, signifying that they were either issued incorrectly, or passed over to the underage voter to attempt a vote. It was determined that unauthorized persons were distributing voter ID cards on elections day\(^\text{21}\).

Multiple voting by non-underage persons proved most difficult to detect. Where indelible ink was not properly administered (most likely by mistake, as opposed to intentional misuse), people were found to use bleach to remove the remaining ink to attempt to cast additional ballots. This most frequently occurred in the city of Borama, in the Awdal region, home to the incumbent candidate. The same three candidates for the presidency that ran in the 2003 race competed in the 2010 race; the eventual election led to a peaceful transition of power as the incumbent candidate lost, and transferred the executive branch to the winner in a manner consistent with constitutional provisions.

Nonetheless, the very same “political, economic, and technical challenges”\(^\text{22}\) that delayed the 2008 elections remained largely unresolved, and threaten the management of future elections in similar ways. This prompted the NEC to consider alternative technologies to address the voter registry, and multiple voter challenges.

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2012 Local Elections

District and council elections were held to return candidates to 379 seats country-wide; there were 2,368 candidates participating in the elections. NEC poll workers managed elections in 1,782 polling stations. The voter registry used in the 2010 elections was abandoned, and voters were free to vote at any available polling station, regardless of residency. The general environment ahead of and during Election Day was reported to be calm, and campaign regulations were largely followed. There was some indication that the incumbent party received unfair proportion of time to campaign on state-run media. As such, IEO reports declared the election results largely free, but not wholly fair. Fairness was most significantly impacted by the failure of the NEC to complete a voter registry ahead of elections, and the increasing inability of indelible ink to curb fraudulent voting practices. The technical challenges faced by NEC during Election Day, and the subsequent results management process, was exacerbated by political party disputes of the results that were issued through mass media, as opposed to formal channels for dispute resolution.

The 2012 local elections mark the first elections cycle where the inadequacy of the voter registry exercised measureable impact on voter confidence. Rates of multiple voting were substantially higher, and the IEO said this “may have compromised results” in some regions. This, combined with changes to the legal framework that permitted political associations to form outside of the three constitutionally permitted parties, made it difficult for NEC and the Registration and Approval Committee (RAC) to transparently determine the winning parties, and manage the announcement of elections results in a timely manner. This led to mounting tensions in the weeks following the election. In Sool and Sanag regions ballots from several polling stations were disqualified. The general frustration led to protests, property destruction and violence in Hargeisa. Finally, winners were announced in late December. Though all political parties and associations accepted the final results (excluding one political party association that continued to publically voice grievances). Delays inevitably caused political tension that sustained concerns about the integrity of subsequent elections absent a reliable voter registry.

From the 2015 Parliamentary to the 2017 General Elections

Parliamentary elections were scheduled in 2015 to elect a new House of Representatives; however, due to continued challenges in constructing a verified voter registry, among other technical challenges, the Guurti announced yet another deferment of scheduled elections. This not only extended the existing parliament’s term by two years, it rolled-in parliamentary elections into a presidential election, to schedule a general election in 2017. At the time, public reaction was that of concern for the NEC’s inability to prepare in time to hold elections, and small protests occurred in Hargeisa and other regions. However, in 2015 each of the three political parties selected their presidential candidates to run in 2017. The incumbent party, Peace, 23

Unity and Development party is led by Ahmed Mohamed Mohamoud, known colloquially as, “Silanyo.” When he announced he would not run again, this allayed fears of a sustained incumbent campaign, and derailment of further democratic consolidation under Somaliland’s constitution. The NEC aims to carry out the general election in March 2017.

The elections cycles here-described were underpinned by various adaptations to the elections management process, particularly to combat the clan-driven challenges of multiple voting, and to prevent underage voting. Next, an analysis of those decisions to adopt new technologies to address these challenges will be outlined. This above will provide the political context in which these decisions were made, to better understand the piloting and operationalization of methods to increase the quality of elections results in Somaliland.


**Background**

In the previous parliamentary election in 2005, the voter registration was not conducted. That hampered a smooth operation at a polling station, which could lead to the electoral malpractices. For example, it was reported that many polling stations were not supplied with enough ballots and other materials. The Somaliland National Electoral Commission (NEC) could not allocate ballot paper properly as they did not have sufficient information to estimate the number of voters in each polling station as NEC did not have sufficient information. Moreover, the International Republican Institute (IRI)’s observational mission report pointed out that multiple voting and underage voting were rampant. Therefore, making reliable voter registry was the most urgent issue for more free and fair electoral process.

Taking the lessons learned in the 2005 election into account, Somaliland NEC applied the biometric technology for the first time for its voter registration exercise in the electoral cycle for the 2010 presidential election to prevent the multiple registrations. Biometrics can be a useful tool to identify people who register twice by using the distinctive physical traits and make a fraud-free voter list. Fingerprints and digital portrait photographs were captured at registration stations. Only fingerprints were planned to be used to identify double registrations in the list by the Automated Fingerprint Identification System (AFIS).

However, after all, 50% of the registrants did not register their fingerprints of the index finger because local clan leaders urged young polling station workers to skip the process of taking fingerprints at the polling stations. The clan leaders sometimes claimed that shortcutting the process was to save time. It was said that the clan leaders regarded the voter registration

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exercise as a kind of census and tried to increase the number of people in their clans so that they wanted to show their clans were powerful than others.  

**Legal Framework for Biometric Technology**

The voter registration process in 2008/9 in Somaliland was framed by mainly the “The Voter Registration Law 2007, as amended in 2008 (Law No.37/2007)”

In the legal framework, the new technology has not been mentioned much. Article 8 indicates that the registration form should include the picture of a registrant as well as name, birth year, birth place, gender, the name of the polling station assigned, signature, registration number, reference number, and registration card number. Finger prints were added in the Amendment. In the Amendment, Article 3 b) defines that “**using laptop computers, the officers of the National Electoral Commission shall record the relevant details of the registrant, as set out in Article 8 of the Voter Registration Law, and shall also take an electronic scan of the finger print of the registrant, which shall be saved in the computer.**”

Also, the provisions of the technical committee which was formed to prepare and complete technology related matters for the voter registration process was in the Article 36 of the Voter Registration Law. It defined the formation, the objective, the term and the duties of the technical committee.

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Voter Registration Process

The Voter registration exercise was conducted from 14 October 2008 to the first week of February, 2009.\textsuperscript{28} The screening process started right after the registration exercise and it was followed by the display of the voter register started on 13\textsuperscript{th} May, 2010.\textsuperscript{29}

Registration was taken place in staggered method: region by region or at the two regions.\textsuperscript{30} Each region had 45 days for the registration period. The first 25 days were allocated for the preparation period and used to inform people about the upcoming registration and to distribute the registration forms for the personal information which eligible voters could fill out in advance and brought to the registration stations when they registered at stations.\textsuperscript{31} The registration centers were open for 5 days for the people to register (It was called core registration period). The registration center became polling stations and voters were required to vote in the same place where they registered. Additional 15 days were admitted as supplemental registration period. Though local registration centers closed in five days, in the supplemental registration period, people unable to register during the core period were allowed to go to the local district offices.

There were 380 registration kits prepared. The registration kit included a laptop, digital camera, fingerprint scanner, and printer. The registration team consisted of two staff representing the Ministry of Interior (MOI), two from the National Electoral Commission and one from the Appeals Court.

The registration procedures were as following: the citizen arrived at a registration station queue up and was checked whether one had indelible ink on one’s finger or not by staff. As all people were required to be marked by the ink at the end of their registration, people with indelible ink could not enter the registration centers again. The indelible ink was a mechanism to prevent citizens from registering for multiple times at polling stations. Then, He or she was identified whether he or she is eligible. The staff entered all information in computers as well as hard copy. After he or she had provided all data including name, birth date, photo, fingerprint scan etc., he or she checked that all information was correct with signature or thumb mark. Finally, NEC printed out and distributes the voter card.

Cost

The total cost of this new registration was said approximately 12 million US dollars. The cost per registered voter was approximately \$ 8.8. 80\% of the cost was covered by international donors and the rest 20\% was funded by Somaliland government budget.

\textsuperscript{30} There are six official regions in Somaliland: Awdal, Hargeisay, Saaxil, Sool, and Togdheer.
\textsuperscript{31} This template seemed to be introduced to save the time of registration process. People could register without the templates.
Although it is difficult to draw a conclusion on how much one should spend to create reliable a voter registration list, $8.8 per voter seems to be relatively higher. The table below shows the voter registration cost per voter of 9 voter registration projects reported in the study issued by EISA. $8.8 is the second highest among them. Of course, the cost is highly affected by the context in one country and it is hard to know whether this is a fair comparison. For example, whether a country has a periodic voter list or continuous vote list affects the cost of the voter registration a lot. As a periodic voter registration requires registering all voters in a relatively short time, one exercise for the periodic list costs more than that for the continuous list. Also, for Somaliland, this was the first time to introduce the electronic voter registration kits. The initial cost added to the basic cost.

### The Cost of Voter Registration by Countries in Africa

<table>
<thead>
<tr>
<th>Country</th>
<th>Year</th>
<th># of voters</th>
<th>Cost per voter</th>
<th>Type of VR</th>
</tr>
</thead>
<tbody>
<tr>
<td>DR Congo</td>
<td>2008-2009</td>
<td>60,000,000</td>
<td>$0.48</td>
<td>Periodic</td>
</tr>
<tr>
<td>Ghana</td>
<td>2004</td>
<td>12,800,000</td>
<td>$1.20</td>
<td>Periodic</td>
</tr>
<tr>
<td>Ghana</td>
<td>2008</td>
<td>12,800,000</td>
<td>$10.79</td>
<td>Periodic</td>
</tr>
<tr>
<td>Liberia</td>
<td>2005</td>
<td>1,350,000</td>
<td>$3.68</td>
<td>Periodic</td>
</tr>
<tr>
<td>Malawi</td>
<td>2008</td>
<td>5,870,819</td>
<td>$4.27</td>
<td>Periodic</td>
</tr>
<tr>
<td>Mozambique</td>
<td>2007-2008</td>
<td>9,000,000</td>
<td>$4.50</td>
<td>Periodic</td>
</tr>
<tr>
<td>Rwanda</td>
<td>2007</td>
<td>10,000,000</td>
<td>$1.80</td>
<td>Continuous</td>
</tr>
<tr>
<td>Senegal</td>
<td>2007</td>
<td>49,000,000</td>
<td>$5.00</td>
<td>Periodic</td>
</tr>
<tr>
<td>South Africa</td>
<td>2009</td>
<td>24,000,000</td>
<td>$1.35</td>
<td>Continuous</td>
</tr>
<tr>
<td>Somaliland</td>
<td>2008-2009</td>
<td>1,150,000</td>
<td>$8.80</td>
<td>Periodic</td>
</tr>
</tbody>
</table>

**The Process of Cleaning up and Finalizing the Voter List**

In the early February 2010, NEC started to clean the voter registration list, but it took them longer than they expected. The final voter list finally became available on 13th, May 2010.

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http://aceproject.org/ace-en/topics/vr/default


What took them so long? The largest problem was nearly 50% of the data lacked fingerprints. Fingerprints were supposed to be scanned electronically and be used to de-duplicate the list. However, as fingerprints data was missing, this process required screening by people, which was time-consuming. Also, given the lack of fingerprints images, technical experts advised NEC to use the facial recognition system to rescue the process. The NEC needed some time for introducing the new system, as well. Furthermore, the quality of some fingerprints images and digital portraits were not good enough to conduct de-duplications electronically. Especially, facial pictures were not expected to be used to identify multiple registrations and their quality was not critical when they were captured. This also meant that the NEC needed to do the forensic review. According to the NEC, about 100,000 names were discarded in this process and approximately 70,000 out of 100,000 were done manually. This number includes underage voters. After the screening process, the NEC issued and distributed new voter cards.

In spite of all the delay and effort made by the NEC, the result of the de-duplication exercise was not good. The NEC announced that possibly 30% of fraudulent and duplicate records were included in the final list.

Electoral Evaluation

Although the 2010 presidential election itself was reported generally peaceful and fair by several electoral observational groups as well as NEC, the registry list was not accurate. NEC announced that the final voter list contained the double registers, possibly 30%. All the mechanisms which were prepared by the Somaliland NEC to prevent and remove multiple registrations did not fully function.

First of all, the staff of Interpeace, the international non-governmental organization working for the Somaliland elections, answered our interview and said that the indelible ink was removed by people fairly easily. The Indelible ink could not stop multiple registration happening. Secondly, the automatic de-duplication failed because 50% of the data was not associated with fingerprints as described. This was partly and possibly because there was no will of people. They did not understand the importance of integrity of the voter registration process. Also, as local clan leaders are very influential in Somaliland, young registration staff were forced to skip the process of acquiring fingerprints. Possibly, the Somaliland NEC could have stressed the importance of the integrity of voter registration process and the fact that the voter registration was different from a census thorough educational campaigns. Finally, some experts pointed out that fingerprints recognition system had some technological disadvantages. In fact, the

practitioner from Interpeace answered in the interview that people in Somaliland often do manual work and their fingerprints were sometimes damaged. Therefore, it was hard to capture clear images.

4. Iris Biometric Voter Registration (2016)

**Background for Introduction of Iris Biometric Registration**

As described in the previous section, Somaliland introduced the biometric technology for the first time in 2008/9. However, it could not successfully produce the fraud-free voter registration list. NEC judged iris biometric was more effective to control technically and it could identify fraud and duplicates more quickly and accurately than the biometric using fingerprints. As explained above, fingerprints were sometimes damaged and could not be captured properly. Compared to that, irises are said to be very stable.\(^{39}\) Also, people tried to use different fingers to register themselves for multiple times in 2008/9 voter registration process. With irises, since there are only two irises compared to 10 fingers, it should be controlled more easily.

Therefore, Somaliland NEC decided to apply iris biometric for the next general election (Lower House + President) planned on March 27, 2017 (tentative)\(^{40}\).

**Technological Advantages of the Iris Biometric**

Irises are the colored parts of eyes. Their patterns are unique to the individual. Iris recognition can identify a person from another with irises images. Though finger prints are more common, some researchers argue that iris recognition is more powerful for de-duplication.

First, irises are more stable. They are not damaged by the daily lives as fingerprints are damaged by work with hands. Secondly, related to the first point, irises are more stable and less vulnerable to the environmental changes. Therefore, it is easier to capture the better quality of images without great expertise or training. Thirdly, while fingerprints might change over time, irises are stable for life. Finally, controlling two irises is easier than controlling ten fingers. The confusion over which finger to be registered would not happen with irises.

Moreover, the accuracy of the technology is very high, too. The theoretical probability that it can detect duplication correctly is more than 98%.\(^{41}\) Although fingerprints matching system can be accurate too, the difficulty in capturing fingerprints could be a problem.

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\(^{40}\) Somaliland Registration Law and Regulations (2016)

Therefore, iris biometric seems to have technological advantages in terms of controlling the quality of images. However, iris scanning is often said to be very expensive.\footnote{For example, see this webpage, Thakkar D. 2016. “Iris recognition scanners vs. fingerprint scanners.” https://www.bayometric.com/iris-recognition-scanners-vs-fingerprint-scanners/}

The First Field Trial of Iris Recognition with Notre Dame University

The NEC asked for cooperation to the Notre Dame biometric expert, Doctor Kavin Bowyer.\footnote{Gilroy, W. (2014). Notre Dame Biometrics Expert Is Helping to Ensure an Honest Election in Somaliland Accessed February 27, 2016. https://research.nd.edu/news/49903-notre-dame-biometrics-expert-is-helping-to-ensure-an-honest-election-in-somaliland/} The NEC conducted the trial of the voter registration with the iris biometric in 2014 in two regions and sent it data set to Notre Dame University. In total, there were 2124 iris images (1062 pairs). As a control feature, the NEC gradually asked some people to register twice at the different locations and included duplications into the data. Notre Dame team did not know the number of duplications in the data set and successfully detected 450 duplicates.\footnote{Gilroy, W. (2014). Notre Dame Biometrics Expert Is Helping to Ensure an Honest Election in Somaliland Accessed February 27, 2016. https://research.nd.edu/news/49903-notre-dame-biometrics-expert-is-helping-to-ensure-an-honest-election-in-somaliland/} The result was 0\% error rate.

This trial had several significant implications. First, even though iris biometric data was gathered outside of the laboratory, which means it was gathered by non-biometric experts and with the commercial iris scanners, the quality of iris photos were sufficient to detect all duplicates. The report from Notre Dame University said that only one image was invisible and a few of them are partially visible. Second, it was found that a few iris images had very unusual features and caused an error with the computer. Those errors were detected by the forensic review. However, the Notre Dame team suggests that it is possible to detect this type of errors, if there were several images per person. Lastly, the report made by the expert team tells the computer system can sufficiently detect the most of the duplications without the experts’ forensic review.\footnote{Bowyer, Kevin W. Estefan Ortiz and Amanda Sgori. “Trial Somaliland Voting Register De-Duplication Using Iris Recognition.” Notre Dame: University of Notre Dame, Department of Computer Science and Engineering. https://www3.nd.edu/~kwb/BowyerOrtizSgroiBWild_2015.pdf/}

The Second Field Trial

The second field test was conducted in 2015. This test was held more widely held, in all six regions. Details about this field test are not available. However, the Somaliland Nation News reported that the NEC included 12 people with different types of disabilities as a part of the field test.\footnote{Somaliland Nation News. “Somaliland: People with different impairments participate in V registration field testing.” http://www.slnews.com/2015/09/somalilandpeople-with-different-eye-impairments-participate-in-v-registration-field-testing/} Also, the interview with Interpeace revealed that this test helped people to understand the new technology is safe and reliable. The officer said that some people believed iris scanning damages their eyes.
Staff Training

With the support of the supplier company (ATAE and DAON) which developed the Biometric Voter Registration (BVR) system including both software and hardware, NEC trained master trainers. NEC developed translated user guidelines and manuals. Master trainers trained the rest of the registration staff. The all regional staff was recruited from the universities in each region. It ensures the certain level of educational background and expertise of the staff.47

Voter Education

The NEC answered to the interview and said that NEC had voter education campaign in each region in the cooperation with the government, political parties, traditional leaders, and local NGOs. They provided video shows, posters, radio programs and TV shows explaining the importance of voter registration, the process of registration and if the voter registers more than one time, they would lose their eligibility as spelled in the law. Also, as explained above, the field test conducted in 2015 helped people to understand the voter registration exercise as well as the new technology more. It is impossible to examine whether the voter education exercise was sufficient and effective because further details are not available, but the Somaliland NEC seemed to try to address the problems they had with local leaders through the voter education campaigns.

Cost

Estimated total cost was reported to be more than 11 million dollars. According to the NEC, it hopes to get 75% of the cost from international donors and 25% from Somaliland government. The total estimated cost is slightly lower than the previous exercise but it is still high-cost. It is important to see how sustainable this new technology and voter registration process will be.

Ongoing Registration Process

Interpeace and Somaliland NEC chose Daon and ATEA as partner to design, assemble, and deliver the voter registration kits with iris capture and matching functionality using Iris ID for the Iris acquisition cameras and

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47 Interview with Interpeace

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recognition technology. The role of Daon was to provide the software.\textsuperscript{48} 350 biometric voter registration kits were sent to Somaliland.

Somaliland Voters’ Registration Law –Law No.37/2007 (amended in 2014) defines the framework of voter registration process. According to Article 22, information of eye scan and finger-print shall be recorded in addition to their name, birthdate and etc.\textsuperscript{49} Voter registration period should be 28 days for each electoral region. After the registration process done in all regions, screening of the list will be held by the NEC.\textsuperscript{50} It is reported that the voter registration process successfully started in Somaliland January 21, 2016 in Togdheer region. The process seems to be peaceful and the sever electoral fraud has not been reported yet.\textsuperscript{51}

**Evaluation and Expected Challenges**

Though this voter registration exercise has not completed yet and it is impossible to conclude, Somaliland seemed to have a good start. The Somaliland NEC tried to address the challenges identified in the previous voter registration exercise in 2008 to 2009 and had a better preparation this time including the two field tests.

However, there are three concerns or expected challenges as well. First, as it is noted above, the cost of the introduction of iris biometric is high. It is not clear how much it costs to maintain the system but the cost effectiveness should be considered. Secondly, related to the first point, the budgeting is a challenge. Somaliland elections are highly depending on the international donor financially. In fact, the NEC answered in the interview that money for issuing voter ID cards has not been acquired and they need to ask money to the international community. If the NEC could not prepare for money, it would damage the entire electoral process vastly. Lastly, despite the fact that Dr. Bowyer suggested capturing several pairs of iris images per person to increase the accuracy of the de-duplication by the computer, only one pair of irises per person is captured. Although its effect on the accuracy is unclear, it may be concerned.


\textsuperscript{49} Jama, Ibrahim H. 2016. “Somaliland Registration Law and Regulations.”

\textsuperscript{50} Somaliland Registration Regulations (2016) Article 8

This voter registration exercise should be evaluated in detail after NEC complete the exercise. It can indicate the potential and challenge of the iris biometric voter registration. The next election cycle, the 2017 general election, will no doubt benefit from the cumulative learning that has occurred through the operationalization of the fingerprint and iris scan technologies to register voters and manage the voting process at polling stations. It will serve as a test of sorts, an opportunity for the NEC to demonstrate its sustained commitment to executing elections that follow clear and predictable processes outlined in law, and carried out by impartial poll workers with the tools and information to produce free and fair electoral results.
Section III. Technology Case Study: Webcam Use in Russia, India and Azerbaijan

1. What is a Webcam?

Webcams in polling stations are a form of passive monitoring. They are stationary devices intended to discourage individuals from committing voter fraud or intimidation.52 A webcam’s footage is broadcast online for the public to view via Internet. This differs from a video camera or still camera because the images and footage recorded by these devices are not intended for online broadcast.

2. Rationale for Webcam Implementation

The implementation of webcams is intended to increase voter confidence. Webcams accomplish this by including citizens in the monitoring process, reducing manipulation of votes, and preventing voter intimidation within the polls.53

The two major rationales for the implementation of webcams are to deter unlawful behavior, and to increase internal or external legitimacy. In theory, the occurrence of vote tampering, voter intimidation, and voter manipulation is reduced when criminals are forced to operate under the purview of a camera. This is because it is unlikely an individual will act unlawfully if there is a webcam recording his actions and displaying them on the Internet for thousands of people to see.

Furthermore, webcams demonstrate to the public that voter fraud is not occurring at the polls—thereby legitimizing the outcome of the election. In some instances citizens have the ability to report illegal behavior they see in the camera’s footage. In these instances, webcams implementation can create an avenue for citizen participation. This mechanism can serve dual purposes. It engages citizens in the voting process, and it helps authorities keep tabs on unlawful behavior such as tampering of votes, multiple voting, or voter intimidation. By affording citizens an election-monitoring role, the validity of the election results is legitimized. According to a representative of the Election Commission of India (ECI), Bidhayak Das, some limitations of webcams include the possibility of hacker interference; a hacker could interfere with file sharing. There are potential issues concerning the continuous flow of the webcast—which could be cut off by shaky Internet or other technological problems.

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3. Country Cases

**Russia**

The 2012 election was particularly controversial. Months before the election, large-scale demonstrations in Moscow erupted after a video circulated the Internet depicting voter fraud in the December parliamentary elections. Yegor Duda, a volunteer election observer, shot a video of a man furiously filling out ballots. Duda narrated the video, “This is a violation of the criminal code. The chairman of the electoral commission is filling out ballots.” He uploaded the video on YouTube, proving claims of voter fraud and sparking fury among voters.

The demonstrations continued throughout the winter in the lead-up to the election, revealing broad public discontent. On February 4—one month before the election—over 100,000 individuals took to the streets wearing white ribbons to show their opposition to the regime. In response to the accusations of voter fraud, the government promised to install webcams in polling stations for the 2012 presidential elections. This aim of this project was improve the election’s internal electoral legitimacy. Two cameras were installed at every single polling station. Cameras were required to face in specific directions. One camera faced the ballot box, while the other provided a general view toward the voter check-in table. Of all 95,000 cameras placed in polling stations, 91,500 were on a live-stream. This live-stream was posted to this government website [http://webvybory2012.ru](http://webvybory2012.ru).

In spite of the webcam, other forms of electoral malpractice took place. For example, of the sixteen candidates who wanted to run for president, only five were actually able to present themselves on Election Day. The Central Electoral Commission (CEC) disqualified the other candidates for ambiguous technical reasons. Political parties in the Duma nominated four of the five candidates—permitting them to participate. Candidates with no support in the Duma are required to gather two million signatures demonstrating public support in the month of January—a holiday month. Two of the three candidates who tried to acquire the two million votes were disqualified because by the CEC because five percent of their signatures were determined invalid. Given the blatant exclusion of viable political candidates, it is clear that electoral malpractice does not always occur inside the polling the station on Election Day.

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54 Boudreaux and Razumovskaya, “Putin Deploys Election-Cams.”
55 Schwirtz and Herszenhorn, “Voters Watch Polls in Russia, and Fraud is What They See,” (2011)
Freedom House ranks Russia as “Not Free.” According to Freedom House, President Vladimir Putin greatly benefited from preferential treatment by the media in the 2012 election. Cameras were implemented as a measure to regain public trust in light of the accusations of fraud. As a result of incumbent preferential treatment and unfair disqualification of opposition candidates, Putin won the election by 63 percent of the vote—a smaller margin than the 2004 election.60

Not a single criminal conviction of voter fraud resulted from the four million hours of video footage recorded.61 Webcams were hardly used by people to report incidence of fraud—rather they used the live-stream footage as a topic of discussion on social media.62 This is problematic because the purpose of the live-stream of footage was to provide citizens an opportunity to report suspicious activity and prove that the ballots were not tampered. Furthermore, the vast number of polling stations available for live-streaming made meaningful observation of any one station unlikely. Individuals were more likely to browse through various sites without truly scrutinizing any one location.63 Golos, an independent monitoring organization, reported that in most instances the footage was not accepted as legitimate evidence in fraud investigations. This is because the cameras’ were not installed as a mechanism to stop fraud. Rather, they were a quick fix to improve public confidence in the election in a moment of wide discontent.

62 Mills, “Caught on camera: Revelers filmed dancing and kissing at polling station... by webcam set up to tackle election fraud!” (2012).
India

India installed webcams in polling stations in 2010 for elections for the parliamentary election. This installation differed from Russian installation because cameras were not installed ubiquitously and were not installed with the aim of generating wide internal legitimacy within India. According to Das, the initial purpose of webcam installation was to create a deterrence mechanism to prevent political violence and in critical stations.

Critical stations are stations where in past elections 75 percent of the votes have gone to one candidate. Such a high percentage of support is considered improbable, and many of these stations experienced political violence on Election Day in the past. Das stated that cameras deterred illegal activities such as booth capturing, money distribution and bogus voting.

Laptop and tablet based webcasting of the polling stations were installed. The electoral commission stipulated that cameras be placed to record the voters in queue, in identification process, and during voter application of indelible ink. Large neon signs warned voters at the polls that they were being recorded by camera—in order to deter any malpractice. District Election Officers were required to ensure that stations had Internet connectivity through mobile broadband or landline Internet.64

India is the world’s largest democracy. Freedom House rates the country as free. However, there have been reports of ballot stuffing in the past—which may explain the government’s resolve to install webcams in suspicious polling sites. According to Bidhayak Das, “the goal of bringing in webcam technology to elections is to build secure online voting platform that will allow for greater election transparency.” Officially, the ECI has stated that webcams are used to reduce booth capturing, money distribution, broadcast the election process live, capture the faces of voters, and to encourage participation in free and fair elections.

Das stated that the public has not responded much to the presence of webcams, perhaps because they are not ubiquitously installed. Das claimed the installation of webcam technology

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64 Nadu, “Report on General Elections to Tamil Nadu Legislative Assembly 2011.”
was worthwhile because the technology contributed to the transparency of the elections.

Azerbaijan

In 2008, Azerbaijan’s Central Election Commission (CEC) announced that it would install webcams. It was the first country in the world to utilize webcams at the polling station. These webcams were set up in 500 precincts, or nine percent of the total. The cameras had no audio and did not provide views of the entire polling station. However, anyone with Internet access could watch the polling stations.\(^{65}\) The selection criterion for the installation of cameras in particular polling stations was not explained by the CEC. However, it seems that larger polling stations were more likely to have camera’s placed inside—perhaps to monitor the largest number of people possible with the fewest number of cameras.\(^ {66}\)

The CEC’s installation of web cameras was intended to improve transparency. In contrast to India, Azerbaijan can hardly be considered democratic. Freedom House rates Azerbaijan as ‘Not Free.’ Elections have been marred with complaints of severe fraud for past 20 years. The Aliyev family has held a dominant position in national politics since the Soviet period and does not have a democratic regime. Organization for Security and Co-Operation in Europe (OSCE) observers had cited issues with ballot box stuffing, voter list manipulation, biased CEC decisions, coercion and unfair campaigning practices.\(^ {67}\)

These complaints help explain the rationale for implementation of webcams. The regime sought to improve external opinions on the elections. The OSCE report of the 2003 Presidential election illustrated the numerous electoral violations. The OSCE wrote, “Overall, the presidential election was a missed opportunity for a credible democratic process. Progress toward democratic elections in Azerbaijan will now depend first and foremost on the political will of the authorities.”\(^ {68}\) The CEC’s inclusion of cameras in the 2008 election may have been an effort to improve the legitimacy of elections to outside observers. According to the World Bank, 30 percent of the population had Internet access in 2008. Therefore efforts to live-stream camera footage would not massively increase voter participation like in Russia’s 2012 election.

Unlike past presidential elections, the 2008 election presidential election was quiet. The main opposition parties formed the Cooperation Center of the Opposition (CCO). The CCO boycotted the elections in protest of the incumbent’s unfair electoral advantage. This boycott resulted in a notably peaceful campaign season. There were few rallies or protests, and President Ilham Aliyev did not participate in televised debates. While he did not directly address the public, the media positively portrayed him.\(^ {69}\)

Aliyev was elected with 88.7 percent of the vote and a 75.6 percent voter turnout.\(^ {70}\) The CCO estimated low voter turnout rates, however the OSCE reported this turnout to be higher.

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\(^{68}\) OSCE, Election Observation Mission Final Report 2003, 2.


than the 2003 presidential election. The OSCE report also stated that the election failed to meet some standards—primarily the lack of robust competition or political discourse, and a restrictive media environment. The outrageously high support of the incumbent may be due to voter fraud that occurred outside the view of the cameras.

After the 2008 election, OSCE recommended that the CEC determine some guidelines for the installation of cameras. In the 2013 presidential election cameras were used again, this time at about 1,000 polling stations. The election yielded similar results to the 2008 election—an overwhelming victory for the incumbent and numerous allegations of fraudulent activity such as repression of opposition candidates and media. It seems that in Azerbaijan, plenty of election malpractice occurs before Election Day, and outside of the polling station. This means that the installation of a web camera does little to resolve the main problems in elections.

Just months after the 2008 election, a referendum eliminated presidential terms. The future of Azerbaijan looks undemocratic despite the installation of webcams—which are supposedly intended to help preserve democratic elections. The installation of webcams does not succeed in improving the democracy of Azerbaijan.

4. Legal Criteria and Consequences

The installation of cameras at a polling station innately raises questions about the preservation of the secret ballot. Questions regarding the legality of the webcams have not stymied the election commissions of India, Azerbaijan, and Russia from installing webcams. This is because Azerbaijan and Russia have a weak judiciary that does not operate independently—and very strong executive governments, which operate without legal checks. Meanwhile, India has a higher standard of rule of law and the legal precedent for installing cameras.

In Azerbaijan, the decision to install webcams was not initially brought to the attention of the public. Cameras were installed in September 2008—a month before the election—without a public statement explaining their use by the CEC. On October 8, just days before the election, the CEC stated that the purpose of the cameras was to follow voting and counting procedures on the Internet, thereby providing greater transparency. This tardiness on providing information limited public discussion and attention given to the legality of cameras before the election.

Max Bader, Professor of Political Science at West Virginia University and Eastern Europe and Eurasia stated that, “There was some (discussion of the legality of the cameras), but Russia is not a democracy and there was no serious public discussion about the issue, let alone discussion that the regime would be attentive to... Apart from that, however, there seem to be no

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legal obstacles to webcams inside polling stations.” It seems that in both countries statutory law can easily be ignored by the regimes. Azerbaijan and Russia lack rule of law. Neither country has a strong judiciary—giving the government the ability to easily circumvent legal standards without much resistance.

Indian legal precedent was set for the installation of webcams. The Supreme Court suggested the implementation of cameras in the case Janak Singh versus Ram Das Rai & Ors in 2005 to stymie voter intimidation and vote tampering. The defeated BJP candidate Janak Singh filed a petition claiming fraud in the polls. The court dismissed the claim but suggested installation of micro-observers in vulnerable polls. The Bench of Justices stated, "Some cameras should be installed in polling booths to keep a vigil on the local staff on duty."  

The ECI justified the installation of cameras by publishing a formal memo to all Chief Electoral Officers on the Internet that clearly outlined how and where cameras would be installed. This document stipulated how cameras 9500 cameras would be positioned in sensitive polling stations. It seems unclear whether the presence of cameras violates the confidentiality of the vote—and the topic is certainly debatable. Das, and ECI, stated that the no webcam actually enters the voter’s booth—thereby suggesting the secrecy of the ballot remains respected.

5. Outcomes and Remaining Concerns

The rationale for webcam implementation is to deter fraud and increase voter confidence by improving transparency at the polls. This objective is not entirely achieved through webcam implementation because the presence of a webcam does not eliminate the possibility that other—more subtle types of fraud—occur. Vote buying, and voter intimidation may still occur outside the polling area. In both the case of Azerbaijan and Russia elections were considered to have serious flaws, regardless of the installation of webcams.

While webcams encourage citizen participation, this participation is limited to those with Internet. According to World Bank statistics, 30 percent of Azerbaijan had Internet in their homes in 2008, 15 percent of Indians in 2010, and 70 percent of Russians in 2012. For reference, current at-home connectivity in the United States ranges upwards of 87 percent.

These statistics demonstrate that only in Russia most citizens were able to participate in monitoring the elections. Keeping in mind that Russia installed the cameras to enhance the

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76 “Deploy force, install cameras inside booths” India Times (2005).
77 Election Commission of India, “Sub: Multiple measures to keep a watch on polling process” No. 464/INST/2014-ESP.
regime’s legitimacy to the citizens, this statistic makes sense. Meanwhile, in Azerbaijan, cameras were not a mechanism that improved internal legitimacy—therefore it did not matter that most citizens did not have Internet at home. The purpose of the webcams was to improve external legitimacy to observation groups. In India, the purpose of the webcams was to deter violence and fraud in the polling station, rather than legitimize the regime. Democratic legitimacy already exists. Therefore, it did not matter that many people did not have live-stream access to the footage because the purpose was not to improve their confidence in the election.

Web cameras increase the relative cost of fraud within the camera’s view. This incentivizes incumbent loyalists to attract votes by other means—outside of the camera’s purview. This could result in greater suppression or the press, voter-intimidation outside the polls, bribery, or restriction of opposition candidates. Live-stream cameras have the potential to create as many issues as they are intended to resolve.

Bader believes that Russian citizens those who think fraud was committed in the election are likely to continue to think that elections are fraudulent—regardless of placement of webcams. Similarly, those who support the regime and think elections are fair will see the installation of webcams as an additional guarantee of democratic elections. This suggests that the web cameras will not effectively sway public opinion. Ultimately, cameras cannot generate democratic legitimacy. This legitimacy must emerge organically from the system of democratic governance.
Section IV. Conclusion in Context: Technology, Elections and Democracy

For thirty years, Donor-driven democracy assistance programs have mainly focused on three broad thematic areas: rule of law development, civil society capacity building, and elections management. Democracy promotion professionals, or ‘practitioners,’ have noted that elections management become the most archetypal of all practice areas. This is because the requirements for designing and implementing high-fidelity elections systems presents the strongest opportunity for transferrable learning across country contexts. Legal frameworks, electoral management bodies (EMBs), electoral violence prevention, and other elections management components require similar inputs to maximize voter confidence that electoral outputs genuinely reflect the will of the people who are eligible to entrust individuals with the power to govern.

Electoral management bodies are the central institution of governance that regulate and implement elections. EMBs can be permanent or temporary, centralized or decentralized. They can be institutions with mandates independent of the government, or managed by executive branch authorities, such as the Ministry of Interior. Regardless of their power structure, all EMBs must be characterized by independent, impartiality, integrity, transparency, efficiency, professionalism, and service-mindedness. This serves to reinforce voter confidence that elections are conducted in a free and fair manner, and reinforces voter confidence in results. International IDEA, the institute for democracy and electoral assistance, accounts for the establishment of some 129 EMBs worldwide since the late 1970s. The processes of each country present learning opportunities to improve all elections management systems.

As such, there has been a systematic approach to developing inclusive, free and fair elections systems tailored to the needs of specific countries. Successful elections are a cornerstone of democratic principles; it is a necessary condition for determining whether or not a state is a functional democracy. Successive elections cycles offer iterative opportunities to expand the franchise, and develop political parties in the competitive arena. Ultimately, the refinement of elections processes directly contributes to the political development of a state, and in some cases has been observed to serve as a liberalizing force even where elections are used as authoritarian instruments. EMBs play an important role in electoral reform, as authorized by legal frameworks, and make operational decisions to improve elections management – including the selection and use of electoral technologies.

As a system, elections management has undergone the various technical evolutions that systems management has more generally with the advent of the internet revolution, and rapid development of technologies that support the electoral process. Yet just as use of elections are not a sufficient condition to bring about consolidated democracy, use of elections technology is

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80 For International IDEA’s complete list of EMBs, see: http://www.idea.int/vt/links_emb.cfm
not a sufficient condition to insure free, fair and consistent electoral outcomes. Technologies including biometric recognition systems for voter registration, drone use to monitor for electoral violence, webcams to monitor fraud at voting stations and mobile platforms for vote tabulation and transfer have been adopted by a range of countries, including Azerbaijan, India, Jordan, Lebanon, Nepal, Russia, Somaliland, and Ukraine.

But why did these countries choose to adopt such technologies? How did they integrate them into existing systems? What were the challenges of implementation? And finally, did these technologies improve electoral outcomes? The assumption of many EMBs is that the integration of technology into the process inherently increase confidence in elections outcomes. Yet there are many instance where flawed implementation has achieved the increased confidence deficit. Of course, results vary across cases, as this report will explain. One thing is certain, and should be considered prior to the technological adaptation of any electoral system: technology is not democracy.

Technology is a means by which to build institutions. This takes time, and operational capacity. Technology itself is often not the challenge, it is a human systems management challenge. Thus, it is important to consider the existing electoral institutions prior to adoption of technology, to determine what the specific changes are for delivering high-quality results, to right-fit technological solutions. Voter confidence will not be the outcome of the institutional development unless this is taken into account a priori, and appropriately, this study begins with the assumption that technology is not inherently a democracy-promotion tool. In many respects, electoral technology can both magnify institutional barriers to free, and fair elections, or can suppress voter confidence through misapplication – intentionally or not.
APPENDIX A – Global EMB Survey Questions and Checklists

Surveys were distributed by email over a three-week period, to over 250 electoral managers. A survey platform, Qualtrics, was used to distribute surveys and manage responses. The survey was available in Spanish, French and English.

1. What technologies does your EMB or electoral assistance program currently employ? Select all that apply.

[ ] GIS  [ ] Electronic voting
[ ] Biometric  [ ] Optical scan voting
[ ] Identity cards  [ ] Internet voting
[ ] Internet registration  [ ] Drones
[ ] Registration databases  [ ] Webcams
[ ] Voter registration display  [ ] Social media
media at polls

2. What are the two biggest challenges that affect voter confidence during elections?

[ ] Voter turnout rates  [ ] Voter intimidation
[ ] Voter impersonation  [ ] Problems of voter education
[ ] Multiple voting  [ ] Delimitation inequalities
[ ] Underage voting  [ ] Persons with disabilities participation
[ ] Poll worker corruption  [ ] Minority participation
[ ] Ballot counting
[ ] Electoral violence

3. How could these challenges be resolved through election technologies? Short answer

4. Are you currently using these technologies to address these challenges? Yes or No

5. When do you expect to implement the new technologies?

[ ] Next election cycle
[ ] Subsequent election cycle
[ ] Plans in development, date TBD
[ ] No plans in development

6. Do you have a training or management plan to roll-out new technologies? Yes or No

7. What is the estimated cost of implementing the new technologies, including equipment, EMB staff training, and raising public awareness of the new technology?
8. What are the estimated funding sources to use to implement new technologies? *By %*

[ ] EMB budget  [ ] Government budget  [ ] International Aid  [ ] Other

9. How will the EMB educate voters to use the new technology?

[ ] Public Service Announcements
[ ] Classroom/workplace/other public demonstrations
[ ] Public testing/enrollment sites
[ ] On-site training at polling stations
[ ] Social media
[ ] Skits/theater
[ ] Text
[ ] Other

10. What cultural barriers may affect the adoption of new technology? *Short answer*
APPENDIX B – Survey Results in Charts and Graphs

The below results charts and graphs provide a question-by-question summary of responses to the survey questions provided above. Data set is available for review upon request.

**Question 1**

<table>
<thead>
<tr>
<th>1. Elections Technology Now in Use</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Registration databases</td>
<td>42</td>
</tr>
<tr>
<td>Identity cards</td>
<td>34</td>
</tr>
<tr>
<td>Social media</td>
<td>22</td>
</tr>
<tr>
<td>GIS</td>
<td>19</td>
</tr>
<tr>
<td>Biometrics</td>
<td>16</td>
</tr>
<tr>
<td>Internet registration</td>
<td>10</td>
</tr>
<tr>
<td>Voter registration display media at polls</td>
<td>10</td>
</tr>
<tr>
<td>Electronic voting</td>
<td>6</td>
</tr>
<tr>
<td>Internet voting</td>
<td>2</td>
</tr>
<tr>
<td>Webcams in polling stations</td>
<td>2</td>
</tr>
<tr>
<td>Optical scan voting</td>
<td>1</td>
</tr>
<tr>
<td>Drones</td>
<td>0</td>
</tr>
</tbody>
</table>

Total = 164

Respondents noted all technologies that applied per country case.

**Question 2**

<table>
<thead>
<tr>
<th>2. Elections Challenges for Voter Confidence</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Voter turnout</td>
<td>20</td>
</tr>
<tr>
<td>Ballot counting</td>
<td>17</td>
</tr>
<tr>
<td>Problems of voter education</td>
<td>17</td>
</tr>
<tr>
<td>Electoral violence</td>
<td>14</td>
</tr>
<tr>
<td>Poll worker corruption</td>
<td>11</td>
</tr>
<tr>
<td>Persons with disabilities participation</td>
<td>10</td>
</tr>
<tr>
<td>Multiple voting</td>
<td>6</td>
</tr>
<tr>
<td>Voter impersonation</td>
<td>3</td>
</tr>
<tr>
<td>Minority participation</td>
<td>3</td>
</tr>
<tr>
<td>Delimitation inequalities</td>
<td>2</td>
</tr>
<tr>
<td>Underage voting</td>
<td>1</td>
</tr>
<tr>
<td>Voter intimidation</td>
<td>1</td>
</tr>
</tbody>
</table>

Total = 105

Respondents noted top 2 challenges that applied per country case. Where multiple respondents participated per country, more than 2 challenges may have been noted, but no more than 2 per respondent.

**Question 3**

Answers to this question were short-answer. Twenty-one answers were provided, of fifty-nine respondents. For more information on the cultural barriers, please refer to page 7-9 above.
Question 4

4. Technology to Improve Voter Confidence,

<table>
<thead>
<tr>
<th>Identified Challenge</th>
<th>#</th>
<th>% Seeking Solution</th>
</tr>
</thead>
<tbody>
<tr>
<td>Voter Turnout Rates</td>
<td>20</td>
<td>100%</td>
</tr>
<tr>
<td>Ballot counting</td>
<td>17</td>
<td>20%</td>
</tr>
<tr>
<td>Problems of voter education</td>
<td>17</td>
<td>59%</td>
</tr>
<tr>
<td>Electoral Violence</td>
<td>13</td>
<td>61%</td>
</tr>
<tr>
<td>Poll worker corruption</td>
<td>11</td>
<td>55%</td>
</tr>
<tr>
<td>Persons with disabilities</td>
<td>10</td>
<td>20%</td>
</tr>
<tr>
<td>Multiple Voting</td>
<td>5</td>
<td>20%</td>
</tr>
<tr>
<td>Voter impersonation</td>
<td>3</td>
<td>0%</td>
</tr>
<tr>
<td>Minority Participation</td>
<td>3</td>
<td>100%</td>
</tr>
<tr>
<td>Delimitation Inequalities</td>
<td>2</td>
<td>50%</td>
</tr>
<tr>
<td>Underage Voting</td>
<td>1</td>
<td>100%</td>
</tr>
<tr>
<td>Voter Intimidation</td>
<td>1</td>
<td>0%</td>
</tr>
</tbody>
</table>

Total = 103

This chart explains how many respondents indicated a technology might be able to resolve a stated challenge (voter turnout rates, ballot counting, etc.). Respondents were then also required to indicate whether or not there were plans to explore use of that technology to resolve the challenges. The percentages indicate those that said they did in fact have a plan to resolve the challenge through application of an elections technology. It was not required that the technology be specified, but Question 3 provided this opportunity. Results are detailed in Section One; Survey Results.

Question 5

5. Timelines for Technology Roll-Out

<table>
<thead>
<tr>
<th>Identified Challenge</th>
<th>1 Cycle</th>
<th>2 Cycles</th>
<th>TBD</th>
</tr>
</thead>
<tbody>
<tr>
<td>Voter Turnout Rates</td>
<td>2</td>
<td>1</td>
<td>6</td>
</tr>
<tr>
<td>Electoral Violence</td>
<td>1</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>Multiple Voting</td>
<td>1</td>
<td></td>
<td>2</td>
</tr>
<tr>
<td>Poll worker corruption</td>
<td></td>
<td>1</td>
<td>3</td>
</tr>
<tr>
<td>Ballot counting*</td>
<td></td>
<td></td>
<td>12</td>
</tr>
<tr>
<td>Persons with disabilities participation</td>
<td></td>
<td></td>
<td>8</td>
</tr>
<tr>
<td>Problems of voter education</td>
<td></td>
<td></td>
<td>6</td>
</tr>
<tr>
<td>Voter impersonation</td>
<td></td>
<td></td>
<td>3</td>
</tr>
<tr>
<td>Delimitation Inequalities</td>
<td></td>
<td></td>
<td>1</td>
</tr>
<tr>
<td>Underage Voting</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Voter Intimidation</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Minority Participation</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Cycle indicates elections cycle, 1 cycle meaning the technology was being used in the upcoming elections, and 2 cycles meaning the next elections after that.
Question 6

<table>
<thead>
<tr>
<th>Total</th>
<th>6. Electoral Technology Management and Education</th>
<th># With Plans</th>
</tr>
</thead>
<tbody>
<tr>
<td>16</td>
<td>Voter Turnout Rates</td>
<td>6</td>
</tr>
<tr>
<td>14</td>
<td>Ballot counting</td>
<td>6</td>
</tr>
<tr>
<td>14</td>
<td>Problems of voter education</td>
<td>9</td>
</tr>
<tr>
<td>11</td>
<td>Electoral Violence</td>
<td>6</td>
</tr>
<tr>
<td>10</td>
<td>Poll worker corruption</td>
<td>4</td>
</tr>
<tr>
<td>8</td>
<td>Persons with disabilities participation</td>
<td>3</td>
</tr>
<tr>
<td>4</td>
<td>Multiple Voting</td>
<td>3</td>
</tr>
<tr>
<td>3</td>
<td>Voter impersonation</td>
<td>1</td>
</tr>
<tr>
<td>2</td>
<td>Delimitation Inequalities</td>
<td>0</td>
</tr>
<tr>
<td>2</td>
<td>Minority Participation</td>
<td>2</td>
</tr>
<tr>
<td>1</td>
<td>Underage Voting</td>
<td>1</td>
</tr>
<tr>
<td>0</td>
<td>Voter Intimidation</td>
<td>0</td>
</tr>
</tbody>
</table>

This chart shows results about the number of EMBs that indicated they do have plans to use technology to overcome barriers to voter confidence.

Question 7

The responses to this question were not high in number; as a result, the data was not incorporated into a summary table. Data was insufficient to conduct any sort of comparative analysis across category of technology selected to overcome a barrier to successful elections management, as indicated throughout other sections of the survey. Some anecdotal accounts of cost are included in the narrative section, for specific country cases where technology has already been, or will be implemented within one election cycle of participating in this survey.

Question 8

The responses to this question provided case-by-case assessment of cost allocation for a technology, given budget contributions from the EMB, the Government, International Donors, or Other sources. Surprisingly, the data on this count was a bit more precise, but still too case-specific for aggregation or comparative analysis. See narrative section for case specific details.

Notably, no project finance details provided saw funding solely come from an EMB budget.
**Question 9**

<table>
<thead>
<tr>
<th>9. New Elections Technology Training Methods</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Public Service Announcements (PSAs)</td>
<td>28</td>
</tr>
<tr>
<td>Social media</td>
<td>27</td>
</tr>
<tr>
<td>Classroom/workplace/public demos</td>
<td>21</td>
</tr>
<tr>
<td>Public testing/enrollment sites</td>
<td>16</td>
</tr>
<tr>
<td>On-site training at polling stations</td>
<td>15</td>
</tr>
<tr>
<td>Performing arts engagement</td>
<td>9</td>
</tr>
<tr>
<td>Other</td>
<td>9</td>
</tr>
<tr>
<td>Text Publications</td>
<td>0</td>
</tr>
<tr>
<td>Total</td>
<td>125</td>
</tr>
</tbody>
</table>

Training is an important aspect of successfully operationalizing new technology. The training recipients are in two categories: the general public, and elections managers and poll workers. This chart does not disaggregate explicitly along those lines, but mass-media tend to be used for the general public, whereas on-site training and public testing are used for poll workers to engage with voters in a non-official capacity so that both can practice the interaction ahead of elections day.

**Question 10**

Answers to this question were short-answer. Twenty-one answers were provided, of fifty-nine respondents. For more information on the cultural barriers, please refer to page 7-9 above.
BIBLIOGRAPHY


"ICTs in Elections Database." International IDEA. http://www.idea.int/elections/ict/.


