

ICT in the Electoral Process in Africa

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ICT and Stages of the Electoral Cycle

- Polling Day
 - Electronic voting & Communications
- Count, Tabulation & Declaration
 - Counting Machines, Central Results Database communications.
- Closedown
 - office systems, HR, Finance & Accounting, Warehouse, Communications

Most important

- Communications
- Reliable Electricity
- Office Systems
- Finance & Accounting

Of course, the most important of all these good communications and reliable electricity supplies (without which nothing can happen) followed by Office Systems and Finance & Accounting Systems: there are more complaints about not being paid than about the elections being corrupt! We should perhaps recognise that the specialised registration and voting systems are of secondary importance after proper administration.

There are vendors waiting outside to sell these systems, and they promise that they will do everything. They will take complete responsibility so there is nothing left for the Electoral Commission to do except pay the bill: that is what is meant by 'Buyer Driven'! Except that we should know that the ICT component is only a small part of any system. Every one of the above stages has its own pre-requisites and problems.

Obviously, we do not have to use advanced systems for every stage. Demarcation does not require advanced GIS and databases: there are other ways to define constituencies and they may be more politically acceptable.

Thus, voter registration depends on clear rules on who is eligible to register, and the evidence which must be presented. If there is already a good system of civil ID cards the question is easy: the decision has already been made elsewhere. Otherwise the evidence must be reviewed by trained officers. If all else fails registration may depend on the decisions of local elders, which brings in political issues and challenges. These often blamed on the ICT systems, but are outside our technical control.

Biometric Systems

- AFIS- Automatic Fingerprint Identification
 - Requires good reliable fingerprints to be collected to a high definition
- FRS- Facial Recognition
 - Requires clear faces to be photographed, face to camera, good lights, no head coverings
- Iris Recognition

Advanced Voter Registration systems use search algorithms to identify possible duplicate registrations, often with specialist biometric applications like Facial Recognition (FRS) and Fingerprint Identification (AFIS) to match records and identify possible frauds.

These only work if the data, the fingerprints and pictures are clean and clear enough, which means they must be carefully taken by practised officers, with suitable procedures to validate and if necessary repeat them. With poor pictures the computers can search for ever and never find obvious matches.

But the computer will be blamed for the pictures, and the fraudulent register.

Somaliland

- Registration Failed (30% Fraud)
- Delayed Elections
- Poor Staff Training & Management
- ICT Badly Designed and Managed
- Set up a plan to rebuild Commission
- ERIS Experts, and teams of mothers/students
- Cleaned the register
- Rewrote Software, delivered data for election

I can illustrate this with the work we did in Somaliland in 2009 and 2010. To cut the story short, we were called in when an earlier Electoral Commission had been unable to organise elections because registration had failed, and the new commission needed to find an urgent solution. On visiting Hargeisa we discovered that there were two sets of problems, any which would have been fatal. On the technical side the voter registration system had been badly designed and implemented, the software was incomplete and data had been lost. On the human side the registration officers had not been trained or managed, and had clearly been pressured into letting large numbers of people to register multiple times. The result was a register with supposedly 30% fraudulent entries- a reasonable estimate- which could not process the data within it. In particular the AFIS and FRS data had been captured so badly that it was useless to identify duplicates- no matter what settings were used the system could not even find known cases when staff had registered several times to demonstrate the system.

We set up a plan for rebuilding the Electoral Commission, cleaning the register, and delivering elections. For this we brought in experts who had done similar work elsewhere, and started to work step-by-step. Teams of mothers checked the register to identify under-age registrants. Students scanned to identify the most obvious duplicate faces. And we ran data matching programs to find where documents had been recorded more than once.

Lesson:

The people are more important than the ICT

- Planning
- Procedures
- Training
- Good Practice
- Management

(But the computers take the Blame!)

Finally, there was a public display and new voter ID cards were issued. We rewrote much of the software and were able to deliver acceptable voter registers for what turned out to be a successful election. Of course the main defence against multiple voting was the indelible ink on the finger.

The lesson from this was that although “the database” was blamed, the real failings were human: failures in the analysis, design, procurement, development and implementation, followed by weak procedures, insufficient training and weak management. There were reasons for this. But the result was a registration process which produced such bad information that the computer never stood a chance. There was no technical solution possible. So we had to recruit teams of people and find new ways of working.

The above illustrates that, for voter registration, most problems can all be solved given enough work: advance planning, training and management. It is a question of balancing time and cost against what can be achieved. But Electronic Voting and Electronic Counting are more difficult. They can produce accurate results quickly and thus provide cost savings, but even with the most competent staff and rigorous controls it is almost impossible to demonstrate that the results are correct with any credibility.

Lesson 2

- An inadequate system was thrown away
 - Staff Dispersed, Experience Lost
 - Equipment Scrapped
 - Information Out of Date
- Next time do all the work and spend all the money again!

But if the different stages of the Electoral Cycle all have their own ICT systems, pre-requisites and problems, the biggest problem is the gap between elections. In the UK and countries where there is an election every year there is no problem: budgets are sustained, systems maintained, registers are updated each year and the electoral staff gain experience at work. But where there are elections only every 5 years, the problem is what the Electoral Commission is to do in the quiet years. We know what happens: budgets are unsustainable, and are reduced, experienced staff drift away, the voter registration is out of date, and the registration computers and polling equipments are locked away in a warehouse to gather dust. Then when the next election comes around, there must be new staff, new registration, new computers and possibly new software. So everything starts again from the beginning, and we spend all the money again.

The above work in Somaliland also illustrates the point also illustrates the point of sustainability. Their ICT was specified without any of the features required for a permanent voter register, and the only possible recommendation was to scrap it and start again for the next series of elections. All the investment was written off, all the experience dissipated.

Lesotho

- Running for more than 8 years
- Moved from OMR forms and Polaroid photos
 - Big processing problems
 - tens of thousands of problems
- To electronic capture and a central permanent voter register
- Faster cycle, better data
 - perhaps tens or hundreds of problems

Against this we can count the permanent systems developed and successfully run by small election commissions such as Lesotho. In the 10 years i have been working with them they have moved from a one-off system based on the old OMR forms and Polaroid photos, to the present permanent register based on the “suitcase” registration machines. Where under the old system they had temporary staff processing piles of registration forms (i remember finding 75,000 forms in a pile on the floor) they now have a smaller, permanent staff to keep the process under control. I leave it to my chairman Thoahlane and his colleagues to tell you how much costs have been reduced. What i will say is that the result comes from years of planning, management and detailed hard work, applying professional good practise not from buying ever more expensive equipment.

So the countries represented here today fall into two groups. On the one side there are those who can sustain a permanent Electoral Commission, with a steady core staff, and on-going systems, including a continuously updated voter register. They may build up their numbers for a national election, but the staff experience and the ICT systems roll on from year to year.

Sustainability

A permanent, Fully Featured System

- (Greater) Initial Costs spread over a long period
- Staff and Experience Retained
- Good Practice Established
- Problems resolved without pressure
- Capital Spending planned and managed
- **Better and less expensive in the long run!**

On the other hand, there are those who cannot sustain their budgets, and must revive their Electoral Commissions before each round of elections, with mostly new staff, having to replace their ICT and upgrade their systems. This means bringing in outside experts, finding donors and buying everything new, while trying to run a major project to specify, procure, install and implement these ICT. New procedures must be written and new staff trained, until the elections are complete and everything is thrown away.

This question of sustainability is perhaps the key question. I would argue that buying new equipment and building new systems and registers for each major election is more expensive and less effective than sustaining the systems from year to year. Certainly a one-off registration needs more management to design, procure and install the systems. A short registration campaign takes more teams and equipment sets than a continuous rolling registration. The problem will be greater with less time to solve them. A Permanent Voter Registration System will have greater functionality, and probably more reliable, than a one-off system, and the team can take its time to work through the problems and get everything right. Buying equipment and supplies over the years will normally be cheaper than emergency procurement. And experienced staff make fewer mistakes, and are less amenable to political pressure, than those suddenly recruited, quickly trained and dropped into the field.

Which is the best electoral cycle for your commission? That must depend on your infrastructure and sustainable budget levels. We would be delighted to talk to you about it.

Reasons to Conduct Elections with ICT

- Ubiquity of Communications Network
 - This is now the standard way of working
- Cheaper and more efficient to use ICT
 - In the long run, and if properly configured
- To impose central control over the process
 - But major decisions made by humans, outside ICT
 - Depends on policies, training& management
- ICT can apply checks not possible manually!
 - AFIS, FRS ,data matching (if data is good enough)

Origins of the recent Adoption of ICT in the Conduct of the Electoral Process in Africa.

There are perhaps 5 reasons to conduct elections using ICT in place of purely manual methods:

- Because everyone else does! The proliferation of communication networks across the world, the increased functionality and the reduced costs of computer equipment, means that e-mail, the internet and applications such as Skype, are now the preferred means of communication across the world. Tasks which used to take days of discussion by phone and mail can now be done in hours through the internet. It would be silly not to use the best advantage.
- Because properly used, it is cheaper and more efficient in the long run to use properly configured ICT than to adopt manual methods. The key phrases here are “in the long run” and “properly configured”. ICT always has the initial purchase and set up costs, and long term support costs, so it saves money only if it is set up properly, managed professionally and is used for long enough to spread these costs over many years or several elections.
- Because ICT is seen as a means of imposing central control over the process, reducing the opportunities for either human error or fraud. This again is true only to a point: once information is recorded then it can be validated, stored, transmitted and processed according to the pre-defined rules without error. But the sensitive decisions especially on voter registration are made outside the computer by human officers. These depend on the policies of the Electoral Commission and the training and management of these officers.

Dubious Reasons to use ICT

- Image and Public Relations
 - It looks good
 - Shows that we are modern and up to date
 - Warn of potential fraudulent voters
 - Looks good to donors!

- Because properly used ICT can process data in ways which are not possible by manual methods. Specifically, ICT allows AFIS, FRS and data mining to find potential duplicates. These are relatively expensive processes, in that they consume lots of processor power, and they work only with good quality data, but they are impossible by manual means.
- The other reasons are to do with image and public relations. Use of ICT shows a modern image, so show that the Commission is professional and up-to-date. It can be used to advertise to potential fraudulent registrants that they should not try to register illegally, because the ICT will detect them and consequences will follow. And ICT looks good to donors: it is a well costed package of physical aid, which can be delivered at one time, and which looks good in the photographs. (This may sound cynical, but it is based on experience!) But is that a good reason for wasting money?

Beware Spending without Planning!

- One-off registration systems
 - Thrown away after use
- “Laptops, Vehicles and Study Tours!”

ICT is a Tool!

- Needs Analysis, Design, Planning and Management over an extended period!
- To work Efficiently and Cost-Effectively.

Far too much money has been wasted buying the wrong equipment without good plans for how it will be used. I have already mentioned Somaliland, where millions of dollars were wasted on software which did not work and equipment which could only be used once. Then all the money had to be spent again! What were people thinking? And i know another electoral commission which i will not embarrass by naming, where i was sent in by the donors because the initial request was for “80 laptops, 12 four wheel-drive vehicles and a programme of study trips to Europe” without any credible plan for how it will be used. The current commissioners have now taken on board the need for proper planning and management, and now have systems which seem to be efficient and well suited to their circumstances.

As we have repeatedly said, ICT is a tool, not a magical solution. Like any tool it can be misused. It requires training and experience to be used properly. It depends on the proper design of the systems, including all the non-ICT procedures and activities. It requires steady long-term management to make it work efficiently and cost-effectively. And there is always an advantage to long-term, sustainable solutions over short-term, one-off systems introduced for each new election.

Usefulness of ICT in Electoral Process

- Does it make elections more:
 - Open
 - Transparent
 - Fair
 - Inclusive
 - Accessible to All?
- Yes
 - If properly used and managed
 - Depends on Trust by the Electorate

What has been the Usefulness of ICT in the Electoral Process in Africa?

The questions should be: does it make elections more open, transparent, fair, inclusive and accessible to all? Does it preserve equal and universal access? Does it ensure the secrecy of the ballot, but provide an honest, accurate and fair result? Does it help meet deadlines? Does it save costs?

The answer to all these questions is “Yes, up to a point!”

Clearly, properly organized ICT can speed up work, improve accuracy, and help meet tight deadlines. If this is carefully planned and managed it can cost effective, and save money. But this depends on the quality of the management- we are back to good practice again.

And ICT allows data checks to be run (AFIS, FRS data mining) that would not be possible by manual means (provided also that the data collected is good enough!)

So Yes! ICT has been very useful in the electoral process.

Engage with the Voters

- Civic Education
- Openness
- Engagement with the political culture
- Provide access and information

But the question of the elections being perceived as open, transparent, fair, inclusive and accessible is a question of how the voters perceive it, a question of trust. A public relations question! An ICT expert might claim that the election was more open, transparent, fair, inclusive and accessible, but most people do not have the technical background to know whether this is true or not. Which takes us back to the need for civic education, openness, and working with the political culture to re-assure people and remove their fears.

Most electoral commissions take steps to re-assure their voters about the effectiveness of their ICT. They allow inspections by parties and NGOs, or hold regular IT committees to review what the ICT has been doing. Some commissions such as Dr. Afari-Gyan in Ghana go further than this. They encourage NGOs and parties to send their own experts; they provide system specifications and source-code and allow inspections in detail. Information is issued on CD-ROM, and the commission provides the computers and software to read it.

ICT can be very useful in running elections, if properly managed, but it can be difficult to demonstrate to the average suspicious voter.

Does ICT Engender Trust & Credibility?

- Yes and No!
- Too much at stake
- Everyone should be suspicious
- Physical papers can be checked
- Most systems can be reviewed and audited

Has ICT increased Levels of Trust and Perceptions of Credibility of Elections in Africa?

Yes and No!

It depends on whether the Electoral Commissions and the Government are trusted, although in practice it is probably easier to corrupt a computer than all the people. It is routine to receive complains that the Voter Register is corrupt, full of duplicates, fraud or underage voters, that the voters roll excludes voters, or that the count is fraudulent. Personally i have been accused of setting up fake transmissions, of changing data in the computer and of using black magic to change ballot papers. (This latter by a Durban lawyer: there may be little that lawyers will not do).

There will always be complains because there is so much at stake: everyone is suspicious, and they fear what they do not understand. Every mistake is a deliberate fraud. Every fault must be sabotage. The parties and the voters suspect that commissioners are changing the data at the demand of their supposed political masters. As we have said, this is nothing really to do with computers: it is about local politics, and must be addressed by political means.

Systems can be Audited

- Voter Registration can be Observed and Audited
 - Receipt or card issued to Voter
- Counts can be checked with Parallel Voter Tabulation
- Financial Accounts can be Audited
- Electronic Voting can NEVER be audited

But to counter this suspicion, most ICT systems can be checked and audited. Registration can be observed and verified by the signatures of local elders and parallel reporting channels. Counts can be observed and parallel Voter Tabulations used to check the tallies. When anything is bought, sold or paid, a receipt is issued and recorded in the accounts. These accounts can be audited and errors, frauds or thefts, will be found. In the same way, when voters are registered, they are given a card or receipt that says they are registered to vote. They cannot be just removed without a reason, because the voter has evidence that he or she was registered. (But the problems arise when people are excluded before they are registered on the system, and voters can always be granted registration without proper controls.)

Systems & Security Audit

- Zanzibar Electoral Commission 2010
- Review of the process and procedures
 - Cross-reference with ZAN-ID Register
 - Internal Security and Communications
 - Physical Security of the servers
 - Database controls and security
 - Access controls
- Concluded that system was as secure and accurate as possible
- But main check is the physical receipt

As an example, last year I carried out a systems and security audit for the Zanzibar Electoral Commission, reviewing the security and accuracy of their voter register. Their systems and procedures were good, if a bit inflexible, and their security excellent. But there was no way to prove that someone could not attack the system from the inside. The only real safeguard was that receipts had been issued to registered voters, and the totals all balanced. We presented the results to the parties, and they seemed to accept my report. Did they believe me because of the scope of my tests, or because I went as an independent expert, or because the parties had known me the past 8 years?

So with sufficient political effort we can overcome the distrust of ICT when used for voter registration.

Electronic Voting

- Computer Systems cannot be certified
 - Too complex
- Too many problems demonstrated
- Too many routes to infiltrate and corrupt a computer at a polling station, or a network, or the central servers.
- Do we trust the technicians?

BUT: electronic voting is different- there is NO Audit possible. I also have links to a network of business investors and i have lost count off the number of complex devices which are proposed to solve this problem, using the internet or mobile phones and complex encryption. They do not work! Without the paper ballot, electronic voting cannot be audited and is not credible to the majority of voters.

There are schemes to add paper audit logs, or to keep physical tallies and there is an example outside, although these are not electronic voting machined but are only rapid counting machines. They count the paper ballots, and send the information to the centre by landline or mobile phone, so no parallel tabulation is possible. If the voters are close then the ballots can be re-counted by hand, and i suspect that there will always be calls for such recounts if the results are close. (And i would question whether the cost of purchasing these machines, setting them up, programming each with the details of its polling station, providing generator power and technical support, with stand-by-machines for when they go wrong, and blocking the parallel tabulation) is really worthwhile to produce results a few hours earlier!

Electoral Reform Services runs Electronic Voting

- Internal Security Checks
- Strong Encryption
- TRUST in the reputation of the Society over a century.

I must record that, notwithstanding the above, we, that is Electoral Reform Services, run hundreds of computerised elections every year. How do we justify this when we do not trust computerised elections for public office? The answer is that what we offer is Trust! We have been running elections for professional bodies and others for more than 100 years before computers were introduced, with a good reputation for professional work and honest results, and this trust has carried forward into the ICT era. Or perhaps it is just because a place on the Council of the Institute of Mechanical Engineers is less important than the Presidency of the Republic.

Obviously, the suppliers of computerised voting machines claim that they are 'certified' as correct. The problem is that it is impossible to prove that a computer system will work as intended. Not difficult, impossible. They are too complex. I have followed experts working to fix this problem for more than 50 years. Advanced methods allow programmers to show what a computer programme is supposed to do, but once a system is exposed to the outside world all bets are off. If i can prove that this machine is honest today, i still do not know of another machine will be honest tomorrow. If you want more evidence, look at the number of viruses circulating and how often Microsoft issues security updates.

Indian Electronic Voter

- Machines Trusted more than officials!

We can look at all the problems which have been claimed in the USA, where machines have been de-certified because of their poor quality. We can note that the Netherlands dropped electronic voting, or remember the Republic of Ireland, where voting machines were bought but could not be certified, and were eventually broken up because the Irish Army was tired of having that junk filling their warehouses. I am told there are about 20 countries which use electronic voting in some form. But the big contra-example is India, where we know that they have introduced electronic voting through a bespoke, sealed machine which appears to be trusted by the voters. But the unofficial word is that the machines are seen by voters as an answer to the distrust of local officials. That is not a strong recommendation.

Certifying a Voting Computer

- If i build a corrupt computerised voting system, you will not find how I corrupted it!
- If i build an honest computerised voting system, I can never prove it is honest!
- Once my system leaves my control, I do not know if it is honest or corrupt.

Trust Me!

As an old software designer and developer, i can offer 3 rules about computerised voting

- If i build a corrupt computerised voting system, you will not find how I corrupted it!
- If i build an honest computerised voting system, I can never prove it is honest!
- Once my system leaves my control, I do not know if it is honest or corrupt.

So Trust Me! Unless you think there is too much at stake, and you need to check and challenge.

And if we have concerns about electronic voting, what about voting at home, by post, by internet, or by mobile phone? Apart from the problems of intimidation (completing your ballot while your boss watches), impersonation (stealing your neighbour's vote, or the vote of your brother who is out of the country), or access (not everyone has access to the internet or a mobile phone) there is the threat to the secrecy of the vote. The same computer checks your identity and records your vote.

When we (Electoral Reform Services) do this there are security checks and strong encryption (like that used for electronic banking) so that no one, except the computer, sees the votes until they have been separated from the voter's name. But an insider or expert with time and access could easily break the security and produce a list of every voter and the way they voted.

We provide the trust: the guarantee that the count will be honest and that no-one will break the confidentiality of the vote. But do you trust your governments so much?

Future Potential for ICT in Elections

- No alternatives to using ICT in the modern world
- Only works effectively, only cost effective if:
 - Properly specified, installed and managed
 - With trained experienced staff
 - Following good practice over an extended period
- Short cuts lead to problems
 - Money and time to fix
 - Undermines confidence among the voters

What potential do ICT hold for future elections in Africa?

Obviously, ICT is spreading across the world and provides opportunities to deliver elections faster and cheaper than the old manual methods. It can process data and produce results which are not even possible through manual methods. There is no alternative to using it throughout future elections across the continent.

But: ICT is not a magical “Agent of Change”: it is a tool. ICT only works reliably, and is only cost effective, when it can be used properly specified, installed and managed following good practice over an extended period. Procedures must be well defined and the staff properly trained and managed. Systems installed in a rush and operated without proper training produce problems, which cost money and time to fix, and undermine confidence among the voters. It will always be blamed for the mistakes of the human operators, so must be designed to allow these to be trapped and corrected.

Must Do's

- Be open with voters and encourage trust
- Get the politics right
- Avoid wasting money on Hardware & software without a clear plan on how it is to be used
- Manage the installation professionally
- Keep staff and systems over several elections

The voters must be educated to understand the ICT and to trust it. Be open about what you are doing and how you are doing it. This is a political problem so deal with the politics.

We must avoid the temptation to spend money on hardware and software without a clear plan for how it is to be used effectively, in the real world and over multiple elections. It looks good, but it is a waste. And if it cannot be sustained past the point where it has recovered its initial costs, it is a double waste.

But ICT should not be used for the actual balloting. There is no reason for most voters to trust such systems, and with the more advanced systems there is the threat that voters could be intimidated or that confidentiality could be breached. This cannot be recommended.

Recommendations

- Keep things simple
- Start preparations early
- Design the system to match requirements
- Test it thoroughly
- Run it according to best professional practice
- Take the time to get it right
- Improve in small steps when you can

If there is one recommendation it is to keep things simple. Start early, design your system with care to match your requirements, test it properly. Run it accordingly to best professional practice, and take as much time as possible to get it right. Keep the voters fully informed and deal with all the political problems. Then take the opportunities to improve your performance when you can, so that when the election comes you are ready.