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The feasibility of electronic voting technologies in Africa: Selected case examples

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The use of electronic voting technologies (EVTs) presents hurdles to election management bodies (EMBs) and other election stakeholders in Africa. The constitutionality and feasibility of such technologies provoke several questions that are tackled in this article. A key question is whether voting technologies such as electronic voting machines (EVMs) comply with national election legislation. The article's methodology includes a review of the literature, official reports and policy documents, media and other articles, including public pronouncements on such technologies in Africa's elections. These are supplemented by case examples of interviewees from selected African countries, including Namibia, Kenya, Uganda, Nigeria, South Africa and Botswana. Its main contention is that African countries should evaluate the constitutionality and legitimacy of EVTs before their use. Finally, it will conclude that any use of voting technologies that does not meet constitutional and legal obligations will render the outcome of elections thereof flawed or dogged by irregularities, with questionable legitimacy, as seen recently in a few African countries.

Keywords: Electronic voting technologies; legitimacy; e-literacy; constitutionality; electronic voting machines; information and communication technology.

Introduction

According to one scholar:

> Few, if any, developments in recent decades have more profoundly transformed politics and civil society than the emergence of digital information and communication technologies (ICTs). Prominent among these have been the Internet; the sprawling blogosphere that it has spawned; the proliferating array of social media tools such as Facebook, Twitter, YouTube, and Flickr; and the galloping growth in access to these digital media through mobile phones. (Diamond 2010:ix, in Diamond & Plattner 2010)

The above observations by Diamond underscore the changes that have affected and now influence the political dynamics of contemporary societies, especially elections. Given such observations, it may be stating the obvious to proclaim that elections require constant innovations and improvements to be able to produce legitimate and accountable public representatives for all governance levels across the world. Such improvements and latest innovations include electronic voting technologies (EVTs), especially the electronic voting machines (EVMs) that some election functionaries increasingly resort to in order to address the problems they encounter in their work (Alvarez et al. 2013; McGrath 2011; Smith & Clark 2005; Tolbert & Mcneal 2003).

The advantages of election-related technologies have been widely documented. For instance, one study on the use of election-related technologies in South Africa found that '… participants favoured EVT over the current paper-based system because of …convenience of access, time saving, cost (transportation) and the effort it would take to vote' (Achieng & Ruhode 2013:9). Despite such advantages, users of such technologies have to contend with their related disadvantages. In the African context, such disadvantages include lack of infrastructure, costly foreign technologies, some of which may be linked to country bilateral or multilateral agreements that may be irrelevant to elections per se, and illiteracy, poverty and acute inequalities that may affect the use and effectiveness of election-related technologies.

Nevertheless, the contention of this article is that technical innovation is critical to election management in many ways, as will be explained below. The key question, though, is how far such innovations should proceed among the election management bodies (EMBs), especially in Africa, which experiences numerous technology-related problems such as minimal connectivity, low bandwidth, illiteracy and weak infrastructure. Drawing from the literature, Africa experiences Internet connectivity-related problems that make it almost impossible for the continent to take

advantage of the Fourth Industrial Revolution (Aker & Mbiti 2010). The question of low bandwidth also poses serious problems as ordinary Africans find it close to impossible to connect electronically to the world. Finally, research continues to point to problems of illiteracy and weak infrastructure, the twin troubles that immensely impede information and communication technology (ICT) development in Africa (Achieng & Ruhode 2013; Adesida 2001; Ajayi 2013; Aker & Mbiti 2010; Allers & Kooreman 2009).

Terms used in the study

Information and communication technology: the '[t]erm is so broad that any device like radio, television, mobile phone or iPad can be classified in the ICT arena' (Laverty 2012:1). Thus, terms such as voting technologies, EVTs, voting machines, ICTs for elections and so on are used interchangeably in this article. Constitutionality refers to the government of a country according to its national constitution and based on the rule of law, whereas feasibility refers to the extent to which something is possible.

Currently, in a few African countries, election officials, public officials and several election stakeholders opt to purchase such equipment before assessing their constitutionality and the legitimacy thereof. Even then, where this is done, it would appear that some public representatives are eager to promote the use of such technologies without relying on relevant research and scientific evidence that could justify their widespread use. It will be argued that electoral and legal reform should be undertaken to amend national constitutions and the related legislation specifically to accommodate the use of voting technologies within the national electoral legal framework. Based on the provisions of the African Charter on Democracy, Elections and Governance, electoral legal reform is critical for promoting democracy in Africa. However, it is but one of several factors being advanced as possible solutions for enhancing the credibility of Africa's elections. Others include assessing the ever-escalating costs of purchasing such technologies by the EMBs, comprehensive voter education and the timely piloting of such technologies and sufficient training of election officials long before those technologies are introduced in a country (Dunne n.d.:241). Ideally, comprehensive voter education should be jointly presented by the EMBs and civil society organisations (CSOs). However, the piloting of electronic technologies is a prerogative of the EMBs and their service providers (Adesida 2001; Ajayi 2013; Aker & Mbiti 2010; Allers & Kooreman 2009; Laverty 2012).

This article contends that legal and electoral reform should be accompanied by intensive public campaigns by CSOs. Such organisations will need to train communities and all stakeholders including people who live under the areas of jurisdictions of traditional authorities on how to exercise their democratic rights when electing public representatives using newly introduced voting technologies. The irony surrounding the introduction of EVTs is that very few countries question the essence of technological innovations.

The data collected from the respondents in this study also corroborate this. Yet, another dilemma facing some African countries is that EVTs are usually linked to foreign donor aid.[1]

Furthermore, some studies (e.g. Stephenson in Roseman & Stephenson 2005) show that younger voters prefer EVTs as they perceive them to be credible, transparent, quick in releasing results and reliable. While in the African context the lack of infrastructure, financial and other resources serve as impediments towards the adoption and application of such technologies, nevertheless the respondents in this study also supported such sentiments, as discussed below. The challenges facing African countries that seek to improve their elections through the use of technology are that not all the countries that sell technologies are themselves practising democracy. A case in point is China's role in producing election-related technologies for African and other countries. Yet, the quality of such technologies is also questionable and sometimes comes as part of trade or aid packages with such countries (Cheeseman, Lynch & Willis 2018). This clearly warrants serious interrogation, but this topic is beyond the scope of this study.

Stating the research problem

Africa's elections require constant innovations and improvements to deliver credible results that enjoy wider acceptance and universal legitimacy; yet the introduction of new voting technologies (including EVTs) is not widely accepted and remains a contentious subject among EMBs, politicians, voters and citizens alike. Some of these stakeholders either publicly oppose or promote the use of EVTs, although there are those who tend to adopt one of these two polarised positions based on the objective conditions and technology available in their countries. However, the thorny question that is normally very difficult to answer with a definite 'yes' or 'no' by the main role-players is whether such technologies can guarantee fool-proof security mechanisms that will counteract any hacking, double or multiple voting, and fraud, thereby safeguarding the secrecy of the vote. The research gap from the existing body of knowledge suggests limitations in terms of the use of technology, specifically ICTs, in elections (Adesida 2001; Ajayi 2013; Aker & Mbiti 2010; Allers & Kooreman 2009). A synthesis of previous related studies shows that African EMBs are slowly utilising technologies. This motivated the objectives of the present study, but with specific focus on the EMB officials who have first-hand experience in the running of elections in their countries.

Therefore, the focus of this study was on the relevance, security, acceptance, legitimacy and feasibility of EVTs as

1.One EMB election executive in West Africa in 2016, in informal discussion with this author, complained that sometimes they do not have much choice when the government enters into trade or economic deals with a foreign country, which, in turn, insists on selling the African country their election-related technologies as part of the deals. Previous research by International IDEA (2018) suggests that further studies are required. The value of the present study is that it is exploratory and therefore not prescriptive to the EMBs or African countries, while seeking to identify gaps in current literature and practice.

well as other ICTs in the enhancement of democratic elections in Africa. Another aspect of the research was to verify whether the use of EVTs and electronic voting gadgets that some countries are using or plan to use in their elections comply with their national constitutions and legislation. Currently in many African countries, a quiet, although discernible, trend towards enhancing elections through technology is emerging. However, this trend is not accompanied by clear public pronouncements by either the EMBs or national governments on practical policy and other steps that are being taken to effect any changes that are planned or envisaged. As a result, the introduction of some technologies, including EVTs in some countries, seems to be haphazard, unplanned and shrouded in secrecy; and in some cases results in rejection by the voters or prospective voters, including disagreements among political parties or leaders on the merits of EVTs.

Therefore, as part of probing the main research problem, this study's assessment proceeded as follows. Firstly, it examined the extent of the envisaged and desired changes regarding the relevance and introduction of EVTs and other technologies in the elections. Secondly, it analysed the nature of technologies deemed appropriate for enhancing the quality of elections in the selected countries; and thirdly, it solicited the respondents' views on whether the technological enhancement of Africa's elections was the 'silver bullet' or panacea for ensuring credible, internationally accepted election results that equally enjoy local legitimacy.

Africa's elections require constant innovations and improvements to deliver results that enjoy wider acceptance and universal legitimacy, but the introduction of new voting technologies (including EVMs) is not widely accepted and divides EMBs, politicians and citizens alike. There seems to be polarisation between the 'traditionalists' and 'reformists' or 'modernists'.[2] On the one hand, the traditionalists' view posits that African countries and EMBs should retain what they have been doing all along by maintaining manual ways of conducting elections. They argue that any introduction of technology in election management will escalate the costs of elections and compromise the secrecy of the vote through such practices as hacking, compromised passwords and falsified cyber login credentials, which will eventually undermine the legitimacy of the outcome. Some among this group also argue that EVTs are complicated, but still require human input and intervention. Thus, as they further maintain, human beings can falsify or corrupt even the best systems in the world, which means that there should be less emphasis on EVTs in election management in Africa. Some opposition politicians are also known to argue that the increasing use of EVTs is intended to cheat the opposition of legitimate votes, and thus ensure the continued rule of the incumbent.[3]

2. As used here, these terms describe opponents of election technology and those who want to use it, respectively.

3. This author was part of an election observer mission in Kenya in 2017 where opposition parties expressed such concerns.

On the other hand, the 'modernists' or 'reformists' state that African elections and EMBs cannot avoid the use of technology as it will revolutionise election management. In this group are the youths, sometimes referred to as the 'bbcs' (born before computers or cell phones), or the 'thumb generation' (following the ease with which they navigate cell phones and other electronic gadgets), who often express strong support for the introduction of more technological means of running elections in Africa. This is probably because of their habitual dislike of standing for too long in long queues, after which the results are also terribly delayed. Those who support the 'modernist' view normally argue that the problem is not increased but insufficient use of technology that makes elections problematic. Thus, the aim is to improve the EVTs, train those who use them timeously and equip them with the relevant skills to enable them to deliver elections that are legitimate and the results of which are produced within record time. In their view, they maintain, this will significantly reduce the margin of error and avoid undue human interference in the outcome (Struwig, Roberts & Vivier 2011).

Research questions

The following research questions informed the study's conceptualisation and data collection:

- Are EVTs constitutional and legal? The respondents were asked to comment on whether the constitution or any national law in their countries referred to or authorised the use of technologies pertaining to elections. (This was framed deliberately as a closed-ended question to elicit direct and not general responses from the participants.)
- How feasible and legitimate are EVTs? Here, the idea was to find out whether the use of EVTs was feasible in Africa. A related task was to examine whether their use was legitimate.
- What dynamics impede the use of EVTs to improve Africa's elections? This question sought to examine whether there were any impediments to the use of EVTs in Africa.
- What are the main gaps for EMBs in the use of EVTs? This last question helped the researcher to assess the gaps surrounding the use of EVTs through the questionnaire that was handed out to the participants.

Approach and research methodology

This article developed out of an exploratory study that relied on qualitative research techniques. The argument contained herein is based on a review of the related literature, a standard questionnaire that was handed out to participants and theoretical postulation that borrows from theories of democracy, democratic consolidation and electoral democracy.

A questionnaire containing a combination of 20 qualitative and quantitative (Likert scale) questions was distributed to

104 participants who attended the Management of Democratic Elections in Africa (MDEA) course that is offered by the Institute for African Renaissance Studies (IARS) at the University of South Africa (UNISA). The questions sought to elicit responses on participants' understanding and use of EVTs, including ICT in general.

The purposive sample of participants comprised EMB officials from 24 African countries: Angola, Botswana, Burundi, Cameroon, Democratic Republic of Congo (DRC), Comoros, the Gambia, Kenya, Lesotho, Liberia, Malawi, Mozambique, Namibia, Nigeria, Seychelles, Sierra Leone, South Africa, South Sudan, Swaziland, Tanzania, Uganda, Zambia, Zanzibar and Zimbabwe.[4] Each country was represented by at least two officials (male and female), according to the requirements of IARS of ensuring 'gender balance' among the trainees. However, a few countries were represented by more than two participants. The data collection process entailed explaining the nature, aim and ethical requirements of the study to all the participants before the commencement of the study, usually in a lecture hall setting at the end of their MDEA lecture, which was facilitated by the researcher. Thereafter, they were given assurances that the research was being conducted for academic research purposes, based on UNISA ethical principles aimed at protecting respondents in such studies. Furthermore, the participants were informed that they had the right to refuse to participate in the study, or to withdraw at any time during the study should they feel like doing so. The participants were also informed that they did not have to state their biographical information to avoid being identified in the study.

The data for this study were collected twice a year (March to April and June to July) continuously between 2015 and 2017 at the UNISA Sunnyside Campus in Pretoria, South Africa, where the participants normally attended lectures at the IARS. They were usually based in Pretoria for about 3 weeks before they returned to their respective countries. Among the participants were also a few representatives of CSOs such as media groups, human rights organisations and other interest groups from across Africa. An average class or lecture of the MDEA participants usually comprised 35–40 persons of different cultures, races, age groups, political orientations and world outlook. Each lecture lasted on average for about three hours of interactive sessions between the MDEA trainees and their various lecturers. Such diversity made the relevant discussions robust as they were characterised by active engagement on any election-related subject matter that was discussed.

The data analysis process entailed the manual counting of the questionnaires, and their categorisation into manageable bundles alphabetically according to country and date in which they were completed. Thereafter, the qualitative and quantitative questions were analysed separately to capture the views of the participants. All quantitative and qualitative

4.While the participants spoke French, Portuguese, English, Kiswahili and Arabic, the questionnaire was available only in English as the researcher was not conversant in these languages.

questions were grouped together (by date and country) before being categorised based on the questions or issues they addressed on EVTs. Although an attempt was made to distribute the questionnaire to as many participants as possible among the MDEA trainees, the results cannot be used to generalise the findings across the continent although they reflect various perspectives on EVTs across Africa. The respondents' comments are used to augment the literature and theoretical argument in the article.

Conceptually, the study is aligned to the theories of democracy, democratic consolidation. In terms of theories of democracy, it is argued in this article that the use of EVTs and ICTs cannot be isolated from the overall trend towards democratisation in many African countries. According to Bratton and Van de Walle (1997:12–13), democracy can be defined '…as a form of political regime in which citizens choose, in competitive elections, the occupants of the top political offices of the state'. Similarly, with the increasing use of technology in elections, such democracy is nowadays termed 'e-democracy', an '…umbrella term that covers many democratic activities carried out through electronic means' (Achieng & Ruhode 2013:1, citing Garson). Therefore, the use of technology to communicate or disseminate ideas between the citizens and such political offices of the state becomes a critical research question that is of theoretical relevance.

Similarly, democratic consolidation is about the entrenchment of democratic practices and trends in a country. According to Mthimkulu (2015:1), '[d]emocracy [*in Africa*] is not yet firmly anchored to withstand the strong currents that threaten it'. To this extent, democratic consolidation is critical and, among others, entails the need to ensure that the voters maintain their vigilance of keeping their public representatives accountable long after an election has taken place. This means the need to sustain regular communication and contact with their elected leaders, taking special care to ensure that they do not veer off their electoral mandate. For the public representatives, this will require not only spending public money according to the fiduciary obligations and legislative requirements, but also accounting regularly to the citizens through standard channels that are used in many democracies to hold politicians to account, including the relevant parliamentary committees (such as the Standing Committee on Public Accounts and Finance, SCOPA, in South Africa). In its simplicity, consolidating democracy means going beyond the formal and mechanical forms of democracy such as voting, listening to politicians on radio and seeing them on the television, where they remain aloof from their constituencies. On the contrary, consolidating democracy requires systematic engagements and regular and direct interaction of the public representatives with people in areas of their jurisdictions on matters that affect their constituents and citizens.

The study does not claim to be representative of the entire continent and neither does it generalise its research findings across Africa. However, it seeks to share the ideas of some of

the actors that are directly involved in election management about continental views on EVTs. These are the ideas of the experts that run Africa's elections, although their voices are rarely heard before each election. The subsection below outlines the rationale of the study.

Rationale of the study

This study rests on the assertion that African countries cannot avoid using technology in elections. Thus, the key question is: ''how far do African countries want to go in using technology to improve their elections?' The answer to this question is complex as it challenges the usual recourse of some countries to traditional or manual voting methods, especially when problems arise following the use of manual methods. The answer to this question depends on the views of a diverse range of role-players, such as political parties, legislatures, voters, CSOs and EMBs, among others.[5] A study that examines the contemporary examples and practices of technology use in the election management processes of African countries is warranted and should help the role-players to examine the different aspects of technological use. An international study on the impact of e-voting in India, Brazil, the Philippines and Venezuela notes that they '… are the only countries that have implemented e-voting outside the United States, which suggests that the use of these new technologies in emergent democracies should receive greater scrutiny' (Alvarez et al. 2013:117). While this study makes a case for the use of e-voting,[6] a much bigger case can be made for the use of other voting-related technologies.

Pertinently, one respondent in one questionnaire noted that ICT is the way to go for EMBs, if the election management is improved. This underscores the significant role new technologies play in enhancing elections in Africa. The respondents' comments in this study are augmented by review of the relevant literature in the next subsection.

Review of the relevant literature

The review of the relevant literature helped the researcher to analyse the respondents' views in a purposive sample, as stated earlier. Evidence from several studies elsewhere in the world suggests that the difficulties faced by African countries in the use of EVTs and other voting technologies are not new and have been researched extensively (Allers & Kooreman 2009; Alvarez et al. 2013; Enguehard 2008; McGrath 2011; Roseman & Stephenson 2005; Schaupp & Carter 2005; Smith & Clark 2005; Tolbert & Mcneal 2003). Such research highlights the roles of electronic voting (or e-voting), the effects of the Internet and other online technologies on

political participation, new voting technologies, use of new ICTs to monitor election violence and the use and effectiveness of mobile phones, including citizens' perceptions on the use of EVTs and ICTs for elections.

Further research evidence refers to '… developing countries where the use of e-voting has proliferated more quickly than in the established democracies' (Alvarez et al. 2013:117, citing Pomares 2012). However, such proliferation in the African context still needs to be clearly visible given the continent's infrastructure and other development challenges that usually impede technological advancements.

Overall, such research suggests that there are numerous issues to consider in terms of the use, relevance and improvement of technologies for elections. Such technologies are different in terms of reach, use, applicability, usefulness, reliability and transparency and so they may enhance or compromise an election, facilitate easier voting for the electorate or threaten voter turnout among some sections of the voters (e.g. the elderly; Roseman & Stephenson 2005:39). Similarly, there are cost factors, induction and training, piloting and many other dynamics that must be considered in the use of election-related technologies. In short, some of these dynamics include technical, financial, political or human resource-related hurdles; they can also have legal and constitutional implications, as argued in this study. Technical dynamics specifically refer to the ability, expertise and technicalities of using or applying election-related technologies, for which certain skills have to be acquired by the EMBs and their service providers. Financial dynamics include the money and funding needed to purchase the EVTs and election-related technologies, public budgets and budgetary allocations, and auditing and accounting mechanisms required to ensure sound financial accounting to legislatures and taxpayers in a country. The political aspects refer to the constitutional, political and legislative issues that all EMBs face to ensure that members of legislatures assist them to manage elections without any political hindrance or shenanigans. In terms of human resources, the major dynamics faced by the EMBs include recruitment, appointment, promotion and retention of the electoral officials as well as their ever-ballooning salaries, which require sustainable funding. Finally, EVTs or election technologies have legal and constitutional implications in the sense that normally no one can change apply such technologies in a country's elections unless the laws and constitution make special provision for such technology (the views expressed above largely rest on one-on-one and class discussions with the MDEA participants), as stated in the 'Approach and research methodology' section.

As some note elsewhere on e-voting:

> … there has been a number of important efforts in Latin America in the last decade to test and implement electronic voting, largely out of a desire to extend the franchise to citizens who might have trouble voting because of various accessibility problems (including geography and language) and to combat known forms

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5.The researcher is aware of the limitations of not interviewing political parties, governments and other public representatives as this would have yielded valuable responses to answer the research questions.

6.According to Smith and Clark (2005:514), '… e-voting and I-voting should not be confused. Essentially, e-voting deals with the electronic and automated technologies that try to minimise the human element in the vote collection and tabulation process. I-voting is the use of online information gathering and retrieval technologies to expand the reach and range of the potential voting population. I-voting cannot exist without the fully functional e-voting and related IT infrastructure to support online initiative'.

of fraud—thereby increasing voter confidence that their votes will be counted as intended, as well as perceptions of electoral integrity (Alvarez. et al. 2013:134, citing Hidalgo 2010 and Pomares 2012).

Even though this refers only to e-voting, it is clear that issues of accessibility, counteracting fraud and increasing voter confidence should be considered regarding extending the franchise to those who may be disadvantaged by the traditional methods.

In another study on the effectiveness of technology, media and political participation in the United States, McGrath (2011:41) cites one of the campaign proponents for former President Barack Obama saying that: '[*w*]e use online campaign tactics, media tactics rooted in technological tools to advance the political power of black people'. Arguably, such tactics might have boosted Obama given his popularity during his last US election campaign. In another study, Tolbert and Mcneal (2003) caution against the over-reliance of role-players on the Internet to increase political participation. They argue that:

> … it is difficult to predict which communication technology will be widely adopted by the public and even more difficult to anticipate the impact it may have on areas such as the economy and politics. (p. 175)

Election management bodies are said to play '… the most important role in the institutionalisation of democracy …' (Mangcu 2015:159), with reference to South Africa's Electoral Commission. Therefore, they play a critical role in the election management process. Globally, they are known to rely on the media and the Internet to disseminate information to the voters. Likewise, research evidence suggests that '[*t*]he media (both traditional and the Internet) can help increase voter participation by not only providing citizens with information to make informed decisions, but by stimulating interest in elections' (Tolbert & Mcneal 2003:176).

Available data from African countries (Achieng & Ruhode 2013; Ajayi 2014; Ofori-Dwumfuo & Paatey 2011) suggest that African countries still have a long way to go before they can address election-related technological challenges. In terms of mobile phones in particular, the spin-offs ripped by the continent on economic development have largely benefited elections as well because the mobile phone is increasingly cited by the respondents in this study as being extremely useful in their communication with their offices and stakeholders or the 'political marketplace' (Ormrod & Henneberg 2010:115; Vankov 2013). According to Aker and Mbiti (2010), while:

> … sub-Saharan Africa has some of the lowest levels of infrastructure investment in the world … access to and use of mobile telephony in sub-Saharan Africa has increased dramatically over the past decade. (p. 207)

Understandably, the original idea of introducing such technology was to enable 'banking [*for*] the unbanked' through what is termed 'mobile money', as in the Kenyan mobile money service (M-Pesa) (Aker & Mbiti 2010:220–221), but it has also extended the use of mobile phones in many of Africa's rural areas, ensuring that they are reached even during elections.

Yet another argument in the literature, presented by Callen et al. (2016:2) and based on data from Uganda, contends that: 'Irregularities plague elections in developing democracies. The international community spends hundreds of millions of dollars on election observation, with little robust evidence that they consistently improve electoral integrity'. This view suggests that the use of information and communications technologies will greatly enhance election management, and thus address these challenges.

Theoretical and conceptual framework

Theories of democracy generally focus on the extent, quality and essence of democracy (Held 2006). Theories of democratic consolidation refer to those theories that posit that democracy itself is insufficient but requires to be consolidated (Anderson et al. 2001; O'donnell 1996). Finally, theories of electoral democracy are about how elections contribute to democracy and democratisation. The rationale for selecting these theories, given the research problem identified, was to offer a conceptual framework but not theory testing because the sample size of the respondents was too small.

The above theories were selected based on the research questions as outlined in the 'Approach and research methodology' section. These research questions sought to address the following issues: whether EVTs were constitutional and legal, feasible and legitimate; what impedes their use to improve Africa's elections; and what the main gaps were for EMBs in the use of EVTs in the selected countries. However, these three theories were used to offer a conceptual and theoretical framework and therefore not tested or presented for theory testing or development.

Data report and findings

The data captured here emanated from the questions in Table 1.

The issues presented in Table 1 (points 1–20) are related to theories of democracy, consolidation of democracy and electoral democracy. For instance, the questionnaire sought to link issues of ICTs to those of democratic participation; the kind of electronic gadgets used; the EMB's approach to ICT matters; whether elections can be run effectively without ICT and the need for budgetary allocations from the public purse. Questions about the role and frequent use of ICTs and the extent of participation of the voters or use of ICTs by the EMBs, including the legislation, sought to assess democratic consolidation and extent of electoral democracy. Obviously, these are merely a few variables that are tied to the three theories, although many more could have been added to the list had a much bigger sample of respondents been possible. Moreover, these variables are used as understood by the respondents during the class discussions as well as in their

TABLE 1: List of questions asked and summary of responses.

Question number	Questions to respondents	Responses to questions (Questionnaire)
1	In your view, do information and communication technologies play an important role in Africa's elections?	More than 90% of the responses agreed (90% of the 124 that offered a response)
3	Generally, what do you understand about ICTs for elections?	Many respondents clearly explained what they understood of ICT for elections in Africa: in general, in terms of the theories in the literature, the answers showed that the respondents' perceptions were not too different from those in international studies (e.g. Diamond & Plattner 2010)
4	Which item(s) is and/or are part of my country's ICTs (examples given):	-
5	Is there any other ICT item used in your country that is not listed above. If so, please explain?	Fax machine; optical scanner; EVM; biometric kits; fingerprint scanners; solar panels; GIS mapping of voting stations; mobile registration units; GPS/GIS machine; smart readers Studies on the theoretical and conceptual arguments for electronic voting highlight the above instruments (e.g. Achieng & Ruhode 2013; Diamond & Plattner 2010; Laverty 2012)
6	Does my country's EMB approach ICT matter seriously?	A significant 93 (75%) (strongly agree and agree) responses confirmed that the EMB approached ICT matters seriously in each country with only 8 (6.5%) disagree and strongly disagree
7	TRUE or FALSE: We can run elections effectively without ICT?	Altogether 59 (48%) selected 'False', and 40 (32%) chose 'True'
8	Computer terminals needed to release/transmit election results or vital information from an EMB's central authority	A significant 36 (29%) chose 'it depends', whereas 23 (18.5%) chose '2–30'
9	In my country, budgetary allocations greatly affect ICT use for elections	Fully 65 (52%) respondents selected 'Yes', while 30 (24%) chose 'No' and 'Don't know'
10	The most critical ICT item (gadget) or instrument needed to run elections effectively in my country	Cellphone; registration kit; elector-voter ID device; cameras; GIS tablets; mobile registration units; radio; printers; server; computer; laptop; biometric equipment
11	How frequently used is ICT in your country's elections?	An overwhelming number of respondents stated that ICT was used 'frequently' in elections
12	What normally happens whenever ICT systems fail (or malfunction) during my country's elections (i.e. voting or election day)?	The majority usually 'resorted to manual system'; others said: It never fails Use Call Centre Experience crisis, panic attacks Use backup generators Use printed copies Experience frustration, confusion.
13	Role ICT ought to play in election management in an EMB?	Fully 90 (72%) respondents said ICT ought to play a 'prominent role', with only 4 (3%) saying that it ought to play a 'minimal role'
14	Are the current ICT changes taking place in your country's EMB?	Altogether 79 (64) felt that ICT changes were 'Far-reaching' and 'Significant'
17	'ICT use is important for my country's elections because…:' (Please explain)	(See discussion under 'data report and findings')
18	How many people, if any, have the officials mentioned in 16 above been trained?	(See discussion under 'data report and findings')
19	Is there any legislation or policy governing the use of ICT for election management in your country?	(See discussion under 'data report and findings')
20	Any other information	(See discussion under 'data report and findings')

Note: Responses to Questions 2, 4, 15, and 16 are omitted from the table as the relevant comments have been incorporated into the analysis in the text.

EVTs, electronic voting technologies; EVM, electronic voting machine; EMB, election management body; ICT, information and communication technology.

questionnaire responses. The data from this study suggest an overall optimism on election-related technology among EMB officials and civil society members who completed the relevant questionnaire as reflected above on Table 1 and below as follows.

Many participants were aware of the policies and legislation governing the use of election-related technologies, but only one specifically made reference to the country's constitution (research question on the legality and legitimacy of the EVTs). Surprisingly, the question of corruption, mismanagement and so on in the procurement of certain ICTs for EMBs was not mentioned by any participant, although this author knows that it remains a thorny issue that undermines the modernisation or upgrading of many EMBs' infrastructure. During class discussions, many participants cautioned about the use of certain EVTs, but omitted this in their questionnaire responses. Financial, procurement, quality control, monitoring and evaluation issues on EVTs remain constant problems for EMBs, but the respondents expressed different opinions on how to resolve them (research question on the dynamics that impede the use of EVTs). When asked

whether 'ICT plays an important role in my country?', more than 90% of the respondents gave a 'Yes' response. Of this number, many stated that ICT

- helps in communication across regions/districts/provinces
- minimises multiple registration
- is used to transmit election results
- was used recently in voter registration, mapping polling stations, to inform voters
- relays messages fast; and 'We live in a world of technology'
- helps in the production of the voters' rolls/registers
- encourages people (voters) to go and vote in large numbers
- disseminates information to citizens, information storage and sharing
- helps reach majority of citizens in rural areas.

In terms of the theories of democracy and democratic consolidation, the data above suggest that the respondents were aware that the electronic transmission of results; cross-regional or district communication; the need to minimise multiple voter registration as an aspect of election fraud; and speedy transfer of election-related data and results were

critical to the entrenchment of democracy among the voters. Moreover, the last four points about the production of the voters' rolls or registers; encouraging voters to vote in large numbers; disseminating information to citizens, storing and sharing it; and reaching the majority of citizens in rural areas are specifically relevant to theories of (participatory and representative) democracy and consolidation of democracy. Furthermore, many of the issues raised and concepts used by the participants to answer this question clearly suggest the presence and extent of electoral democracy in Africa, at least in those countries whose nationals participated as respondents in this study. Yet, given the nature of this (qualitative) study, the extent of applicability of these variables could not be quantified.

Overall, this data suggest that electronic voting is a complex issue in many African countries, although certain trends are discernible towards general preference to the use of ICT to enhance elections. The complexity arises from the following eight themes that arose in the study: firstly, EMBs need money to purchase ICTs for elections, but such money is normally underpinned by ambiguous political and (governing) party hurdles that impede the procurement of effective technology by the EMBs without political interference from the incumbent and opposition parties; secondly, a recurring theme in the study was when to replace outdated technology; thirdly, training of officials; fourthly, the dangers arising from ICTs in elections and how best to secure the secrecy of the vote; fifthly, Africa's infrastructure and broadband challenges; sixthly, the brain drain phenomenon; seventhly, the legislation and finally, many respondents acknowledged that ICTs are not the 'final solution' to Africa's election-related woes.

Dynamics and potentials of e-voting technologies in Africa

The relevance of EVTs and other election-related technologies for enhancing certain aspects of elections such as the quick release of results, reduction in vote tampering and fraud, simplicity of voting and improved turnaround times, among others, cannot be over-emphasised. In response to a question on the importance of 'ICT use … [*in*] my country's elections ...', the majority of respondents stated that it 'facilitates/helps election processes' (Sierra Leone, 16 July 2016; Sierra Leone, 22 June 2016; South Sudan, n.d.; Tanzania, 16 July 2016); 'improves information flow' (Sierra Leone n.d.; Malawi n.d.; Zimbabwe. n.d.); 'people will suffer without it' (Botswana, n.d.; Zambia, n.d.); 'helps produce voters' roll' (Zambia, 21 June 2017; Zanzibar, 21 June 2016; Botswana, n.d.); 'simplifies voters' situation and EMB staff' (Zanzibar, 16 July 2016; Zimbabwe, 16 July 2016; Botswana, 16 July 2016) and 'helps to conduct voter education easily' (Angola, n.d.). Furthermore, they stated that ICT was important to elections as it 'increased the credibility of the voters' roll (register)' (South Africa, 21 June 2017; Swaziland, 16 July 2016; Seychelles, n.d.); 'makes it efficient [*for EMBs*] to run electoral processes' (Nigeria, 16 July 2017; Liberia, 21 June 2017; The Gambia, n.d.); 'provides convenient data storage'

(Mozambique, 16 July 2016; Lesotho, n.d.); 'speeds up election processes and accuracy' (Uganda, n.d.; Lesotho, 16 July 2016) and 'enhances transparency and accountability' (Nigeria, 21 June 2017; Mozambique, n.d.; Kenya, n.d.; Zanzibar, 16 July 2016). Some also stated that ICT use 'helps to reduce suspicion by creating electronic files' (Zambia, 22 June 2016; Uganda, n.d.; Kenya, n.d.; Comoros, n.d.; Cameroon, n.d.), and further that 'data processing for voter registration cannot be done without computers'. (Malawi, 22 June 2016).[7]

Given the above views on ICT in the elected African countries, the idea is not to romanticise and praise such technologies, given technological failures such as that of the 2000 election in Florida which '…will be remembered as one of the biggest voting fiascos in the history of the USA' (Smith & Clark 2005:513; Roseman & Stephenson 2005). In addition, the respondents in this study gave mixed responses about the number of officials trained in ICT in their respective EMBs. Only 27 stated that between 20 and more than 30 officials were trained in ICT, whereas 58 chose 'less than 10' and 'don't know'. This might not suggest that ICT training is less important in the respondents' countries, but rather an acknowledgement that EMBs still struggle to train sufficient numbers of staff members in ICT. Question 19 (Table 1) probed '… legislation or policy governing the use of ICT for election management in your country' and showed 42 respondents (34%) confirming the presence of such legislation, whereas 28 (22%) said it was not there while 27 (22%) did not know (of the 124 that offered a response). While the mere presence of such enabling legislation cannot guarantee the adoption and implementation of ICT in a country's elections, this at least may give hope that eventually such legislation will boost EMBs' efforts at adoption and implementation.

Furthermore, despite the advantages of election-related voting technologies, one contention is whether these technologies can remarkably increase voter turnout (Vassil & Weber 2011:1336). However, other assertions suggest that there is a link between electronic voting and voter turnout (Allers & Kooreman 2009:159). Admittedly, the question of voter turnout falls beyond the scope of the present study as the participants were not asked any question related to turnout.

Reponses to question 20 (any other information) were notably very few as no respondents ventured further details on the legislation or any other aspect of ICT use in their countries. One respondent (Respondent from Kenya (3), pers. comm., 16 July 2016)[8] mentioned the constitution, election regulations and election-related regulations on the use of technology in the country. However, even so, this author was in Kenya in 2017 when the use of such technology fuelled huge controversies during the country's national elections to an

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7.All the respondents who consented to participate in this study requested anonymity in the Consent Forms, as a condition for their participation. Hence, only country names and date are used here and in the analysis of the findings.

8.Name withheld based on consent form signed by all the respondents who requested anonymity in the study. The number in parentheses indicates the order in which the respondents were interviewed (or submitted a questionnaire).

extent that such legislation and regulations were generally ineffective in helping to deal with those controversies. Another respondent (Respondent from Angola (3), pers. comm., n.d) stated that the country did not have any voting technology, but added that ICT was easier to use than to go without it. Needless to add, this country is among those whose elections have been problematic as they always returned one candidate (Jose Dos Santos) to power as the president, until recently when a new president was elected under the MPLA party. Another respondent (Botswana (3), pers. comm., 16 July 2017) argued that the use of ICT will require legislative changes to the country's Electoral Act as its current legislation catered only for the manual system of conducting elections. At the time of writing, Botswana was reported to be contemplating adopting the use of EVTs almost similar to those used in neighbouring Namibia, although there was apparently some resistance at the local (*Kgotla*)[9] level as some citizens felt that they needed further information on such changes before they could be implemented in the country's 2019 national elections. Another respondent from this country lamented the 'high illiteracy levels among the majority of the population which hinder ICT use in Botswana' (Respondent from Botswana (7), pers. comm., 16 July 2017).

Limitations of the study

The main limitation of this study is that it is not a continent-wide study that would have required a larger sample of participants from a diverse demographic profile such as the youth, women, urban–rural dwellers, age groups, persons with disability, political parties, policymakers from national governments, regional economic communities (such as Southern African Development Community [SADC], Economic Community of West African States [ECOWAS] and East African Community [EAC], to name but a few)[10] and continental bodies such as the African Union, including numerous CSOs in the different African countries.

Furthermore, the present study cannot claim to be comprehensive as it only examined a few aspects of such technological use in a few countries whose nationals and EMB personnel happened to attend the MDEA course for election officials. For instance, many respondents mentioned the critical importance of adequate budgets and financial allocation for technological innovation in the EMBs; however, this matter is merely alluded to in this study. Finally, this author acknowledges the fact that the selected countries in this study have differences in growth of democratic institutions and governments, which cannot always be compared. Despite few countries being presented in this study, their comprehensive socio-economic, political, financial and other details are not presented here, as the idea was to focus on election-related technologies as per the class engagements of the respondents that informed the study.

9. A village traditional court where the chief and village elders normally assemble to discuss community issues. Eventually, Botswana did not adopt EVMs for its October 2019 general elections.

10. Southern African Development Community; Economic Community of West African States; and East African Community.

Significance of technological innovations in elections

The significance and justification of enhancing elections in Africa using latest technologies have rarely been questioned. However, where the gaps have arisen is in terms of the legislation, including the constitution. The key issue here is whether any technologies are covered through relevant provisions in a country's legislation, which would ensure that whatever changes that are envisaged are legitimate and legally compliant. This is particularly in the light of the assertion elsewhere in the world that: '… the paper ballot is being replaced by technologically more advanced ways of casting a vote in many countries' (Allers & Kooreman 2009:159). Yet, some have noted political resistance to 'full-scale ICT transformation of governance in Africa' (Ajayi 2013:105). This probably explains why it is only in Namibia where a bold move has been taken by the country's EMB and political parties to adopt EVMs and subsequently held its first national elections using such technology in 2014. Others have adopted a very low key, which suggests that there is probably political unwillingness or citizen reluctance to adopt wholesale move to non-paper-based voting methods. Some governments, such as South Africa's, usually make public pronouncements in support of an 'e-literate society' (Cwele 2014), but what this will entail in terms of elections is hardly explained. This is despite the fact that this country is among those whose EMB is foremost in the use of election-related technologies such as online registration, use of the SMS messaging by voters to verify their registration status and the barcode scanners that South Africa's EMB has used to verify voters' identities.

Another key point that was highlighted in the literature is the effectiveness of I-voting on the Internet on voter turnout. As an observer noted, proponents of online voting:

> … posit that the Internet may make the voting process less intimidating to a demographic that is increasingly computer savvy and decreasingly inclined to vote (Schaupp & Carter 2005:587, citing Hall & Alvarez 2004; Done 2002; Eggers 2005; and Thomas & Streib 2003). Yet, Schaupp is quick to add that [*d*]espite its benefits, a potential to e-voting adoption is citizens' lack of trust in the security and reliability of the technology used to implement this innovation (p. 587).

This corroborates the findings of this study as stated in the respondents' comments.

This study did not conduct research on election observation, another fundamental phase of enhancing democracy in countries that undertake regular elections. However, evidence from Uganda suggests that the use of ICT can significantly enhance election observation through the combination of experimental design and ICT to monitor the impact of any illicit or fraudulent practices during elections (Callen et al. 2016:17–18). One author also cautioned against the dangers of an 'Orwellian scenario' whereby the use of ICT could lead to '… complete control by [*an authoritarian*] government'

(Adesida 2001:18) to violate citizen rights and undermine their freedoms. These fears may be justifiable given the abrupt shutdown of social media such as Twitter, Facebook and WhatsApp, including the Internet, during Uganda's 2016 General Elections that this author examined as an election observer. Such shutdown severely inconvenienced many citizens and observers during the election period. Finally, another issue that has been mentioned to this researcher in his interaction with some senior election management officials in Africa is the (adverse) effect of corruption in the procurement processes pertaining to such election-related technologies. Corruption remains a 'major obstacle in Africa' for the public and private sectors (Ajayi 2013:106). However, this issue was also not covered in the present study.

Conclusion

Information and communication technologies increasingly play a critical role in elections globally, and this innovation has not escaped many of Africa's EMBs. Thus, this study has examined the role of EVTs in Africa's elections and suggests lessons for its EMBs, especially regarding the effects and significance of EVTs in elections. Overall, there seems to be empathy and optimism regarding the use of EVTs in Africa, but there are equally worrisome constitutional, legal and policy issues that must be considered before the EMBs can implement election-related technologies, especially EVMs. Some national constitutions are either vague or lack relevant clauses or provisions to regulate the use of EVTs and other election-related technologies. Yet, even in countries with general optimism regarding the use of such technologies, such as South Africa, Botswana and Namibia, there is some caution or reluctance on the full-scale use of such technologies.

Currently, political, technical, brain drain, financial, infrastructure and many other problems impede the greater adoption and use of ICTs in some countries, but such impediments often arise from suspicions, or fear of hacking of EVMs that may compromise the secrecy of the vote. Data from this research also suggested a level of mistrust of ICTs or suspicion by some EMB leaders and some unscrupulous political leaders who apparently feared that ICTs would expose their biases or partiality whenever elections are held in their countries. Hence, one respondent commented that: 'Almost always, results are disputed [*in Kenya*]', (Respondent from Kenya, pers. comm., 16 July 2016); yet another stated that EVTs or ICTs are not a panacea and technology can fail. Thus, many opted for backup plans to anticipate problems in the relevant technology. In conclusion, therefore, any use of voting technologies that fails to meet constitutional and legal obligations will render the outcome of elections thereof flawed or dogged by irregularities, with questionable legitimacy as seen recently in a few African countries. Finally, Kwame Nkrumah once contended that: 'The independence of Ghana is meaningless unless it is linked up with the total liberation of the

African Continent' (http://www.ghana.gov.gh/). Arguably, such liberation will be unattainable without efficient, effective, legitimate technology for Africa's elections.

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