The adoption of digital technology for South Africa's 2021 municipal elections, and prospects for the future

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Abstract

This article / study reflects on the digital technologies and online processes adopted for conducting South Africa's 2021 municipal elections, and the degree to which this encourages the future use of additional digital technologies. It utilises theoretical perceptions of politics and technology to analyse the perspectives of politicians, IEC officials and voters. It discusses the Independent Electoral Commission's (IEC) use of voter management devices (VMDs) and online voter facilities, which resolved the perennial challenge of double voting. It shows that, due to COVID-19, voter apathy and possibly manual voting, the voter turnout was low. It argues that technological progress made during the 2021 municipal elections should be used to suppress fears over the consequences of electronic voting. Limited access to the internet and electricity blackouts continue to limit the use of digital technology and online process in managing South African elections. However, the IEC could adopt parallel e-voting and manual voting processes, as it did successfully for voter registration during the 2021 municipal elections.

Keywords: municipal elections, digital technologies, web 2.0, voter management devices (VMDs), e-voting, positive will

Introduction

This article analyses the opportunities and challenges presented by the digital technologies and online processes adopted for conducting South Africa's 2021 municipal elections. Digital technologies and online platforms have eased the participation of citizens in electoral processes (Lee 2003; Xenakis and Macintosh 2008). Among others, they have been used for conducting censuses, voter registration, counting votes, and facilitating other huge tasks that can take days to complete if done manually (Xenakis and Macintosh 2008). It is clear that digital technologies, including cell phones, the internet, and various computer-based systems, can significantly enhance democracy. Thus Debra et al (2017: 1) point out that 'the application of information technology (IT) in a democracy can promote efficient organisation, processing, communication, storage and retrieval of information needed by election management bodies'.

Due to the Covid-19 pandemic, South Africa adopted online voter registration and other digital electoral processes for the municipal elections conducted in November 2021. Voter management devices (VMDs) were used to register voters and build the voter's roll. This article analyses the challenges and opportunities presented by the digital processes used by the Independent Electoral Commission (IEC) for South Africa's 2021 municipal elections. Based

on these experiences, it further examines the potential for electronic voting, or e-voting, which the IEC wants to pilot. The adoption of innovative electoral systems and methods (including e-voting) is a topical issue, worthy of close analysis. Thus this article also discusses socio-political factors that may hinder the adoption of new technologies for managing elections in South Africa, as well as its potential for bolstering sustainable democracy.

South Africa's 2021 municipal elections

The 2021 municipal election differed from previous elections due to challenges posed by the COVID-19 pandemic. Among others, the elections were meant to take place in October, but were postponed to November. The IEC had to innovate to ensure the elections could be successfully conducted. New measures included online voter registration, candidate nominations, and special vote applications. The IEC also introduced voter management devices (VMDs) which were used to monitor live voting and avoid double voting. The municipal elections involved 4 468 ward elections, 205 proportional representation (PR) elections in local councils, 8 PR elections in metro councils, and 44 district council elections across the country (IEC 2021). At the local government level, South Africa uses a mixed electoral system in terms of which half the councillors are elected at the ward level, and the other half via a closed-party proportional representation (PR) list system (Mathe 2021).

For the 2021 municipal elections, the IEC aimed at testing innovative tools such as the VMDs and online processes. It also wanted to test e-voting, but this proposal was rejected by the parliamentary portfolio committee for home affairs, citing fears such as hacking and insufficient budgets. The portfolio committee stated that all stakeholders should be involved in the decision-making because voting methods were a policy matter that could not be decided by the IEC alone.

However, the ongoing discussions of e-voting at the parliamentary level indicates that digital voting is foreseeable. After rejecting the e-voting proposal, the portfolio committee stated:

'The truth of the matter is that technology is upon us and preparation must be started to ensure that we have both the legal framework and the technical experience that will ensure that elections are secure if a decision to vote through e-voting is taken' (Parliament Communication Services 2020).

This means that Parliament acknowledges the need to embrace new technology, but has reservations over about the legal framework for implementation. However, Parliament decided that e-voting should only be piloted, rather than being fully rolled out in the 2021 municipal elections (IEC 2020) This points to the fact that social dynamics may promote or derail innovation. The relevant factors in South Africa include distrust among politicians, and fears of electoral fraud, hacking, and the rigging of election results (Mathe 2021). South Africa has enormous digital inequalities due to huge inequality and class differences, as well as the disparities between urban and rural areas. In January 2020, internet penetration in South Africa through mobile phones and computers was estimated at about 62% (Fokane 2021).

The portfolio committee recommended that the IEC should further clarify its frameworks and procedures, especially in respect of piloting e-voting. It stated that a pilot was needed to ensure that fears around the security of e-voting were allayed (Parliament Communication Services 2020). It also asked the IEC to provide case studies of countries where e-voting was successfully implemented. There were speculations in the media that the IEC would launch

an e-voting pilot in July 2020. However, in September 2020, the IEC acknowledged that the planned pilot had been hampered by budget constraints (Fokane 2021).

Thus the 2021 municipal elections were conducted without any innovations besides online voter registration and nominations, and the use of VMDs. This article examines the challenges and opportunities presented by the adoption of these measures. It further examines the feasibility of e-voting in the light of the experiences during the 2021 elections.

Digital technologies in electoral processes

South Africa is not the first country to embrace technology and innovation for electoral processes. There is a large literature on the adoption of digital technologies for managing elections in various countries as a means of addressing various challenges, including double voting and low voter turnout. It is noteworthy that voter turnout in South Africa has been declining, due to voter apathy (see Mathe 2021; Schulz-Herzenberg 2019: 463). Schulz-Herzenberg (2019: 463) notes that the previous municipal elections in South Africa were marked by 'higher abstentions, individual-level vote shifts, vote splitting, and later-than-usual vote decisions as evidence of a decline in partisan loyalties'. Apart from the growing lack of trust in the political system, low voter turnout has been attributed to poor preparation by the IEC, lack of voter education, long queues at the voting stations, challenges surrounding the voter's rolls, and, more recently, bad weather and COVID-19 (see HSRC 2021; Mathe 2021; EISA 2019).

From 2019 onwards, the IEC has been working on ward delimitation and increasing voting stations in order to reduce long queues, hoping that this would increase voter turnout (Mathe 2021). This article argues that low voter turnout should be attributed to several factors, including manual voting itself. The traditional ballot box in South Africa has also been flawed by allegations of double voting, slow vote counting, delays in the distribution of election material, and expensive ballot papers (EISA 2019). The case of ballot stuffing at Dihlabeng Maluti Hoogland School voting station during the 2016 municipal elections where party agents had to intervene over unsealed boxes of election material is one example of manual voting challenges in South Africa (EISA 2019). Traditional ballot box voting starts with voter registration (compiling and correcting a voter's roll). On election day, it proceeds with voter verification at the polling or voting station, the ticking of the voter's details, marking a fingernail with indelible ink, issuing the ballot papers, marking the ballot papers in a cubicle; and casting the ballot paper into a sealed ballot box (Alam et al 2020; Power et al 2021). While many countries still use the traditional ballot box voting method, it has been criticised as slow and insecure. Moreover, according to EISA (2009), the costs of printing ballot papers in South Africa have generally been very high.

While some countries have hesitated to adopt new methods such as e-voting, largely due to hacking fears, literature shows that the ballot box voting system is also prone to vote rigging, especially in Africa (Alam et al 2020). Mozaffar & Schedler (2002: 5-6) argue that this system is prone to technical and administrative errors resulting in defective ballots, incomplete and inaccurate voters' rolls, the exclusion of registered voters, inaccuracies in counting and tabulating of votes', resulting in disputed elections. Although disputed ballot box elections are not unique to Africa, literature shows that most deficient manual elections have occurred in developing democracies in Africa (Schaffer 2002: 69). Allegations of and disputes over irregularities have occurred in Zimbabwe, Republic of Congo, South Africa, Mozambique, Malawi, and many other African countries (Mozaffar & Schedler 2002; Debra et al 2017;

Mathe 2020). However, election rigging is a common problem in every democracy in the world -- hence the need to devise a more efficient and more accurate voting method. Recent studies suggest that the solution lies in electronic voting (Mozaffar & Schedler 2002; Achieng & Ruhode 2013; Debra et al. 2017; Alam et al. 2020, Mathe 2021). However, this does not mean that electronic voting does not have potential problems of its own.

Some studies argue that e-voting has the capacity to increase voter turnout, especially among the growing digital generation (Achieng & Ruhode 2013). Some countries in Europe, Brazil and India have piloted and implemented e-voting. In 2005, Estonia piloted internet voting (i-voting) in its national elections. Voters logged in on the online voting system with their identity cards, but their anonymity was maintained. In 2017, Estonia stated that internet voting had saved the country 11 000 working days (Power et al 2021). In the early 2000s, the United States also piloted internet voting for military personal abroad. Today, various forms of e-voting are in use in state elections. Among others, voters receive e-ballots electronically, vote manually, and post them to local election centres. Power et al (2021) argue that 'the experience of the USA is a reminder that e-voting is a broad concept which does not always refer to casting a ballot electronically'.

In 1996, Brazil also implemented e-voting for more than 200 million people. With simplicity as its primary objective, the voting machine accomplishes three steps -- voter identification, secure voting and tallying -- in a single process, eliminating fraud based on forged or falsified public documents. However, for security reasons, the voting machines were not connected to the internet. In 2005, Germany implemented e-voting for two million people who cast their votes electronically, although the Constitutional Court later ruled that the e-voting machines were unconstitutional (Power et al 2021). In 2014, Namibia adopted electronic voting machines from India, which were prone to technical glitches such as slow responses to verify voter's details (Alam et al 2020). According to the Electoral Commission of Namibia (ECN), some voters turned away due to the slow voter verification process (ECN 2014). Diamond (2010) argues that, while not exempted from possible challenges such as hacking, e-voting promotes democratic participation.

Other technological opportunities adopted by some African countries include biometric technology that halts double voting. Ghana used the biometric system in 2012 for voter registration and verification. Debra et al (2017) notes that the biometric system promoted high voter turnout and confidence in the electoral process. The biometric system acted as a 'forensic measure against election fraud such as impersonation and multiple voting' because it captured the voter's fingerprints and other personal features (Debra et al 2017: 1). Biometric technology identifies and verifies voters' physiological features such as human traits, identity, fingerprints, ear shape, face, hand vein, retina and voice (Wayman 2000; Rhodes 2003; Jain et al 2004). However, in Ghana, numerous problems were experienced with the biometric system, such as the slow verification of voters, human error, and other irregularities due to manipulation by polling agents (Debra et al 2017). In 2015, Nigeria used biometric card readers for 'direct data capturing for the revalidation of the voters' register, accreditation of eligible voters and permanent voters', making it impossible for a voter to vote more than once (Nwagwu 2016: 305). Biometric card readers were able to discourage double voting, though they were affected by technical faults (Alam et al 2020).

Zimbabwe used a biometric system for its 2018 general elections. Though the voter registration was biometric, voter verification on election day was manual, resulting in a disputed election (Mathe 2020). This shows that digital technologies alone cannot guarantee a free and fair election (Mathe 2020).

However, these sorts of challenges do not limit the advancement of technology. There are many technological options that can be used for elections. Blockchain technology has gained prominence as the most secure system for electoral processes. Blockchain is the 'collective digital memory of a group of people', functioning as a public ledger (Racsko 2019: 1). Blockchain technology is also viewed as 'a distributed database that maintains an ever growing list of data records secure from tampering or revision' (Curran 2018: 1). Racsko (2019: 1) views the blockchain as a 'secure digital log of a set of transactions', while Madavi (2019) notes that data entered into the blockchain network cannot be deleted. A blockchain network can be controlled or monitored by three or more servers, making it difficult for one server to erase data without the acknowledgement of the whole network. Over the past eight years, blockchain technology has been piloted and established in cryptocurrency, providing 'indestructible, high-end cryptography security that is transparent and publicly verifiable' (Alam et al 2020: 2). The system is now used for cash transactions, public services, utilitarian agreements and security services, among others. For elections, the blockchain guarantees voter anonymity while making all votes public as an immutable ledger (Racsko 2019; Alam 2020).

In 2018, a blockchain electoral system was piloted in South Korea and West Virginia in the United States. South Korea implemented blockchain technology for a private sector, and West Virginia used it for a diaspora vote as (Zdnet 2018; CBinsights 2019; Racsko 2019). While expensive to establish, analysts believe the blockchain can resolve all the problems and challenges association with electoral systems. They believe the blockchain is able to promote trust because of its potential to block electoral rigging, which can be spotted easily within the network (Alam et al 2020).

Against this background, this article investigates the digital systems and methods used for the 2021 municipal elections and their ability to foreshadow the introduction of e-voting.

A theoretical perspective

The role and impact of digital voting technologies in a democracy are debatable. Some scholars believe they can enhance democracy, while other argue that the efficacy of technologies are determined by social factors (see Ellul 1990; Ott and Rosser 2000; Castells 2004; Mutsvairo and Karam 2018; Mathe 2020). Technological determinism posits a relationship between politics and technology, while the social construction of technology perspective holds that information technologies alone cannot solve political problems (Ellul 1990).

Langdon Winner (1986) argues that some technological privileges or access are linked to institutionalised patterns of power or authority. Thus, utilised effectively technologies can be tools of democracy or suppression. For the purposes of democracy, information and communication technologies (ICTs) can democratise societies through the provision of quality information (Ott and Rosser 2000; Hill and Hughes 1999). Political communication studies support the notion that digital technologies can promote democracy through social media and other spaces (Lee 2009; Mathe and Caldwell 2017). The internet, (Web 2.0 and Web 3.0) and digital devices or media have enhanced political participation by political players and voters, and have enriched voting choices (Ott and Rosser 2000). Kedzie (1997) argues that information technologies can influence change by awakening and promoting citizen engagement among marginalised people. However, the main challenge is digital inequality, whereby disadvantaged people may have less access to some technologies and information.

Although digital technologies provide democratic opportunities, human or social factors may manipulate or discourage technological applications. Theorists about the social construction of technology believe that socio-political problems do hinder the effective use of technology for promoting sustainable democracy. For example, digital technologies in an election may be susceptible to manipulation such as hacking. Robert Dahl (1989: 339) argues that 'the evolving technology is bound to be used somehow, for good or ill, and can be used to damage democratic values and the democratic process or promote them'. While Castells (2004) notes that technology alone cannot guarantee the change of political systems and democratic processes, Putnam (2000) claims that technology can erode social capital. Thus, the social construction of technology perspective criticises an overreliance on technology for political solutions. This means the human factor or social actions play a fundamental role in determining the effective use of technology (Joerges 1999; Hoff 2000). Castells (2001: 5) asserts that the internet is a 'malleable technology that is susceptible to modification by its social practice, thereby leading to a whole range of potential social outcomes'. Therefore, social theorists highlight that positive political will is significant in determining the success of technology for democratic purposes. Given the tenets of the social construction of technology and the technological determinism paradigm, this article analyses the opportunities and challenges presented by the use of digital electoral processes in South Africa.

Methodology

A digital ethnographic approach was implemented on social media, specifically on YouTube, to analyse the IEC's updates on the municipal elections. This comprised qualitative textual analyses of YouTube videos namely the speeches of the IEC Chief Executive Officer, Sy Mamabolo; the IEC Chairperson, Glen Mashinini; and the IEC Commissioner, Nomsa Masuku. The videos studied were 'The IEC launches 2021 municipal elections' (9 July 2021), 'Update on the progress of election day' (1 November 2021), and 'IEC announces 2021 municipal election results' (4 November 2021). This method provided suitable data for this study. Through textual analysis, speakers can easily be studied without them being aware of this. The information provided was used to analyse how digital technologies were employed for the 2021 municipal elections.

The textual analysis of the IEC reports on the municipal elections was supplemented by in-depth interviews with politicians from several political parties on the use of digital technologies and the prospects for e-voting in South Africa. These interviews were conducted between 1 August 2021 and 10 February 2022. Most of the interviews were conducted telephonically, while some respondents preferred responding via emails. A total of ten politicians participated in this study; while some represented their parties, others would not disclose their party affiliations. The interviews were aimed at extracting perspectives on the use of digital technologies, and the possibility of electronic voting (see Appendix). Interviewing representatives of various political parties provided a balanced perspective.

Lastly, two focus group discussions were conducted with voters to gain their perspectives on online registration for the 2021 municipal elections. This was done by means of WhatsApp group calls. One group comprised six respondents, and the other 12. Most were from urban areas in Gauteng and KwaZulu-Natal, while a few were from peri-urban areas in the Eastern Cape. There were more males than females, and their ages varied from 27 to 40. Although the respondents were not drawn from all the provinces, they did represent a spread of South African citizens in urban or peri-urban areas. While the discussions were open-ended, the

basic questions appear in appendix 1. The data was arranged into themes, suited to the objectives of the study.

Findings

Online registration and voter mobilisation

As noted earlier, the IEC introduced an online voter registration facility, aimed at bolstering voter registration despite the COVID-19 pandemic. A total of 26,1 million voters were registered; however only 12,3 million voted. It is argued that voter turnout would have been better if the online registration had been backed up with electronic voting. Because this was still manual, voting was affected by fears of contracting COVID-19.

Voter apathy is a significant factor which should always receive attention (Schulz-Herzenberg 2019). Young people are under-represent on South African voter's rolls, and the IEC specifically wanted to attract more young voters via digital voter registration. Thus Mamabolo stated:

> 'Young voters have had fewer opportunities to register than older voters, with a significant number of them only qualifying for registration over the past few years. Secondly, the youths of today are used to operating within a digital and online ecosystem, and frequently seek a more convenient and accessible option for registration.'

Online voter registration and voting is clearly more convenient, and will almost certainly attract more young people. One respondent noted that the online voter registration was based on a good verification system, which required the user's cell phone number and one-time password (OTP). However, the online registration and other online processes experienced certain challenges, largely due to limited internet coverage and expensive data. One respondent remarked that digital online processes were costly due to expensive data, especially for rural dwellers. The voter went on to say that government should subsidise data to allow youths to participate.

Respondents stated that, due to expensive data and a lack of personal digital devices, relatively few voters utilised the online voter registration system, with many registering manually on registration weekend instead. Some noted that the online voter registration interface was user-friendly, although some glitches were experiences with the submissions of national identity (ID) numbers. Given that not all voters registered online, respondents argued that online and manual registration should always be combined.

Another challenge arose with online candidate nomination. The IEC reopened online voter registration and candidate nominations in September, and scheduled the voter registration weekend for 18 and 19 September (instead of 17 and 18 July). Re-opening the candidate nominations provoked criticism from opposition parties which argued that this was aimed at providing a lifeline to the African National Congress (ANC), as it had previously failed to register candidates in 93 wards. The Economic Freedom Fighters (EFF) also claimed that the IEC had delayed closing the online candidate nominations. These complaints reflect the socio-political challenges that may rise from the use of new technologies, and validate Hoff's argument (2000) that the impact of social action on the use of technology cannot be ignored.

A digital voter's roll

It is common knowledge that without an accurate voters' roll, elections cannot be free and fair, and cannot ensure the participation of every citizen. Mathe (2020) describes the electoral challenges faced in Zimbabwe due to an inaccurate voter's roll, including allegations of ghost voters and double voting. In South Africa, the IEC reported that it had spent five years since March 2016 engaging in a comprehensive programme to update the voters' roll. On 9 July, 2021, the IEC reported:

> In March 2016, we had complete addresses for just over 8,5 million or 33% of registered voters. Today this figure stand at 24,2 million, or 92%. Of course, we do want to improve that 92%, but in a country with human settlement patterns such as South Africa, 100% will not be possible.

Online voter registration provided voters with an opportunity to update their addresses. Evidence from IEC shows that by 9 July 2021, there were still more than 1,2 million registered voters without addresses on the voters' roll. It is argued that the online facility for registering changes of address should be permanently available, thereby giving voters ample time to change their addresses. One respondent noted:

> The IEC has complained (several times over the years, with each budget cut) about budgetary restrictions. In 2021, they only had one registration weekend against two in the past. They also cancelled the piloting of e-voting owing to a lack of funding.

Another respondent noted that the IEC always faced preparation and budget challenges, which affected the smooth running of elections. It is argued there that preparing for a credible election needs ample time, specifically for compiling an accurate voters' roll.

On voting day, some voters could not locate their polling stations, despite an online facility meant to help them do so. This was effectively acknowledged that, early on 1 November 2021, an IEC commissioner, Nomsa Masuku, announced in television that that voters could check their voting station details by dialling *120*42* or sending an SMS with their ID numbers to a specific number.

Despite these challenges, it is argued that the IEC managed to successfully introduce online registration and voter management devices (VMDs) in a short space of time. The digital voters' roll enabled the use of VMDs, which utilised wireless networks, as well as GPS technology. Among other things, the CMDs allowed officials to check instantly whether a voter appeared on the national population register, thereby confirming their citizenship. On 4 November, the IEC stated:

> The voter management device provided access to a real-time voter's roll which enabled election officials to dictate if any voter had already presented himself or herself at the voting station to vote.

This contrasted with the situation in Zimbabwe, where the Zimbabwe Electoral Commission (ZEC) was accused of a failure to monitor real-time voting and detect double voting through the biometric system (Mathe 2020).

Blocking double voting via the CMDs

On 4 November 2021, while announcing the election results, the IEC stated that the municipal election was as much about participation as about the introduction of digital solutions. The VMDs were the most technologically advanced election devices ever used in South Africa. A total of 30 387 VMDs were deployed, connected to a central database via an access point network. The IEC reported that they enabled and strengthened controls over the voting process. Mamabolo declared:

> 'Once ballots were issued to the voter, they could not present themselves at another station without detection. The use of the VMD enabled a live and centrally connected voters' roll, decisively putting to rest allegations of double voting.'

The introduction of VMDs by the IEC was indeed technologically significant. It shows that technology can be useful if applied effectively. The focus group discussions confirmed that the issue of double voting was a perennial problem, which the VMDs had partially resolved. A participant commented that South Africa needed technology that eliminated double voting or vote rigging. This study shows that adoption VMD created prospects for additional devices and systems that will enable the real-time monitoring of quantities of ballot papers issued and on hand at each voting station.

The IEC remains hopeful that the piloted VMDs will also resolve the problem voting stations running out of ballot papers, through the real-time monitoring of quantities of ballot papers per polling station. The VMDs replaced Zip-Zip scanners used over the previous 15 years. The literature highlights that Zip-Zip machines have a history of glitches, causing slow-moving queues, prompting manual voter verification through a hard copy voter's roll and allowing fraudulent double voting (EISA 2019; Mathe 2021). The replacement of Zip-Zip scanners with VMDs were a marked technological advancement. The IEC stated:

> The challenges of the moment as we experience should not cloud the desire to explore digital technology to better our electoral engagement. We dare not retard the progress we have made. … Voter management devices allowed instant electronic capture of the voter's registration details including addresses and where wireless network coverage helped to check that the voter is registered in the correct ward using GPS technology. … Despite challenges, we achieved our innovative objectives of taking our electoral system to the next level of automation through the introduction of the VDM device.

Thus the IEC demonstrated a positive intent to pilot voter management devices. I conclude that, despite significant challenges, South Africa has an electoral management body that is determined to pilot and implement technology for easing electoral processes, possibly leading to e-voting. Mamabolo added that 'innovations form part of electoral commissions, broader utilisation of new technology to enhance all aspects of the electoral process'.

Despite the challenges of bad weather, power interruptions, logistics and other glitches, the IEC used 7 400 VMDs to train electoral officials during the voter registration weekend and other registration initiatives. The advantage was that VMDs could be run offline and would update data as soon as they were back online, thereby resolving internet coverage challenges.

Voting and the tabulation of results

Although the voting process was successfully managed, each and every election has its own logical and technical challenges. The actual voting process from 1 to 4 November 2021 (including special voting on 30 and 31 October) faced several challenges. One problem reported to the IEC was that some voters could not find their names on their voters' roll. Voters could dial *120*42* or 32810 to locate their voting stations. Some voting stations experienced shortages of ballot papers, especially Universal Ballot Templates (UBTs). Twenty voting stations in KwaZulu-Natal and 19 voting stations in the Eastern Cape opened late due to protests. Electricity cuts prompted the IEC to ask Eskom for blackout exemptions to enable vote counting.

Although the VMDS were not reported as hacked, the manual ballot voting was susceptible to stuffing by dishonest polling officials. In one incident, an electoral officer was found stuffing ballots into a box. According to the IEC, party agents and members of the Party Liaison Committee (PLC) exposed the stuffing of ballot boxes as well as the mishandling of ballot boxes. One politician responded that: 'The IEC needs to tighten up the role of its staff in manipulating election process which can create certain level of anxiety to voters and instability across the country.' This shows that human malpractice cannot be ignored regardless of how effective technologies may be. Ballot stuffing by agents is similar to the 2016 Dihlabeng Maluti Hoogland School voting station incident where election material was found unsealed (Mathe 2021). The IEC received 290 objections during the 2021 municipal elections.

A focus group discussant complained that the results have been manipulated over the years through the uploading of result slips from Municipal Offices to the online results system. Other voters noted that the tabulation of results system reflected countless errors over the years. Others added that the tabulation of results, whether manual or electronic, remained susceptible to human manipulation in favour of the ruling party, and only the sophistication of manipulation varied over time. Bantu Holomisa of the United Democratic Party (UDM) added that a country like South Africa could not rely on technology alone to prevent corruption, and was doubtful whether technology should ever be used for voting and tabulation.

Most politicians feared the implementation of technology in electoral processes. Representatives of opposition parties in particular expressed a lack of trust in technology, especially e-voting. Adrian Roos of the Democratic Alliance (DA) noted that the 'twin challenge with digital technology electoral process is a lack of pervasive internet connectivity across South Africa as well as basic technology literacy among a vast majority of the population', as experienced in the municipal elections. He added:

> 'Home Affairs is not even capable of keeping less than 100 mobile units out there in rural communities operational due to connectivity issues. Even fixed, Home Affairs Offices are offline at a chronic level and elections themselves faced a battle to get electricity working in all voting stations on voting day. … The complication is, how do you ensure that persons vote in secret? How do you ensure that it is indeed the voter that votes using whatever credentials? How do you use technologies such as blockchain to ensure that votes are not tampered with?'

Adrian Roos stated argued that the fact that voting and tabulation processes were still manual, helped to circumvent the challenges of failing internet coverage and electricity blackouts.

However, despite a lack of trust in electronic electoral processes, participants agreed that online electoral processes would create opportunities to either enhance voter turnout among youths, or speed up voting and the counting of results. Voter turnout would probably have been better if the actual voting was electronic as well. One participant noted that he could not vote because he felt discouraged about searching for a polling station. This may be an added reason for the poor voter turnout, showing that online voting booths would have been a significant development. It is argued that there is a need to balance technology and political dynamics by combining positive social actions such as transparency, responsiveness, accountability and positive intent with appropriate technological solutions. Technology itself is no substitute for those qualities – it can merely help technically to manage huge tasks.

Conclusion

This article argues that the digital progress achieved in the 2021 municipal elections demonstrates that electronic voting is possible as long as there is positive will. The research findings show that the VMDs blocked double voting, creating prospects of building additional engines to monitor large quantities of ballot papers in real time for each voting station. As usual, the major challenges during the 2021 municipal elections developed around manual vote-counting. This article argues that if VMDs can curb double voting in real time, digital tabulation can also be used for electronic voting. Therefore, there is a need to pilot e-voting, which may boost voter turnout in the digital age. Voters and politicians voiced fears about a dependence on technology. However, while technology cannot serve as a panacea for socio-political ills, it can be a relevant and valuable tool for managing electoral processes. The 2021 municipal elections demonstrated that piloting new technology elections requires positive will. The IEC piloted VMDs successfully, hence piloting e-voting should also be possible. As experiences in other countries show, blockchain is one way of securing electronic voting (Racsko 2019).

This does not mean that socio-political factors determine the effective implementation of technology. The rejection of e-voting by the Parliamentary Portfolio Committee on Home Affairs shows that the political dimension to the design and management of electoral systems cannot be ignored. Politicians displayed a lack of trust in advanced voting technology, highlighting contextual challenges like poor internet coverage and electricity failures. However, in order to boost voter turnout, the IEC could run e-voting and manual voting simultaneously, meaning that those without access to the internet could vote manually, while others could vote electronically. In the 2021 municipal elections, the IEC successfully introduced a dual voter registration process, with some voters successfully registering online, and others registering manually. The IEC cold adopt this dual approach for actual voting as well, thereby significantly raising voter participation, and attract more young voters in particular.

The author holds a Global Excellence Stature (GES) 4 scholarship. No conflict of interest occurred in the course of writing this article.

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Appendix: Semi-structured Interview Questions with politicians and Voters

1. What were the challenges faced so far municipal elections in South Africa and how was technology integrated? Probe: How can we incorporate technology for the electoral system?
2. Do you think IEC was prepared for 2021 Municipal Elections?
3. Did you register online or manually, and what were the challenges?
4. What were the other challenges faced during the 2021 Municipality elections?
5. In what way do you think e-voting can enhance voter participation?
6. Can voter turnout increase through e-voting and what are the complications?
7. Do you think the youth will vote if e-voting is introduced?